

# **THE EFFECT OF A HOLISTIC INTERVENTION FOR CHILDREN WITH COLOUR VISION DEFICIENCY**

by

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Submitted in fulfilment of the requirements for the degree

**PHILOSOPHIAE DOCTOR**

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in the

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Department of Educational Psychology

University of Pretoria

Supervisor

**Prof. Ronél Ferreira**

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*I dedicate this thesis to the participants in the study. Thank you for welcoming me into your lives and allowing me to walk alongside you on this journey. Your stories have taught me the true meaning of strength in adversity and the beauty of embracing our differences. I am deeply grateful for your openness and trust.*

## DECLARATION OF ORIGINALITY

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I, Tegan Leigh van der Westhuizen (student number 12224342), declare that this thesis titled **THE EFFECT OF A HOLISTIC INTERVENTION FOR CHILDREN WITH COLOUR VISION DEFICIENCY** that I hereby submit for the degree Philosophiae Doctor in Educational Psychology at the University of Pretoria is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.



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**Tegan Leigh van der Westhuizen**

1 October 2024



# ETHICAL CLEARANCE CERTIFICATES



**FACULTY OF EDUCATION**  
Ethics Committee

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**CLEARANCE CERTIFICATE**

CLEARANCE NUMBER: **EDU194/20**

**DEGREE AND PROJECT**

PhD

The effect of a holistic intervention for children  
with colour vision deficiency

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**APPROVAL TO COMMENCE STUDY**

12 March 2021

**DATE OF CLEARANCE CERTIFICATE**

21 May 2025

**CHAIRPERSON OF ETHICS COMMITTEE:** Prof Funke Omidire

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This Ethics Clearance Certificate should be read in conjunction with the Integrated Declaration Form (D08) which specifies details regarding:

- Compliance with approved research protocol,
- No significant changes,
- Informed consent/assent,
- Adverse experience or undue risk,
- Registered title, and
- Data storage requirements.



Faculty of Health Sciences

Faculty of Health Sciences **Research Ethics Committee**

**Institution:** The Research Ethics Committee, Faculty Health Sciences, University of Pretoria complies with ICH-GCP guidelines and has US Federal wide Assurance.

- FWA 00002567, Approved dd 18 March 2022 and Expires 18 March 2027.
- IORG #: IORG0001762 OMB No. 0990-0279 Approved for use through June 30, 2025 and Expires 07/28/2026.

19 July 2024

**Acknowledgement Certificate  
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Dear Miss TL van der Westhuizen,

**Ethics Reference No.:** EDU194/20 – Line 4

**Title:** The effect of a holistic intervention for children with colour vision deficiency

The **Research Completed Report** as supported by documents received between 2024-06-20 and 2024-07-17 for your research, was acknowledged by the Faculty of Health Sciences Research Ethics Committee on 2024-07-17 as resolved by its quorate meeting.

Yours sincerely

**On behalf of the FHS REC, Professor Theresa (TM) Rossouw**  
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*The Faculty of Health Sciences Research Ethics Committee complies with the SA National Act 61 of 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 and 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes, Second Edition 2015 (Department of Health).*



## ETHICS STATEMENT

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The author, whose name appears on the title page of this thesis, has obtained, for the research described in this work, the applicable research ethics approval. The author declares that she has observed the ethics requirements in terms of the University of Pretoria's *Code of ethics for researchers and the Policy guidelines for responsible research*.



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**Tegan Leigh van der Westhuizen**

1 October 2024



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---

*I keep my eyes always on the Lord. With Him at my right hand, I will not be shaken.*

Psalm 16:8

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## ABSTRACT

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Limited research has been conducted on the impact of colour vision deficiency (CVD) on the lives of individuals, and how such individuals can be supported to address the challenges they face. Against this background, the purpose of my study was to explore and describe how children with CVD can be supported through a holistic intervention, implemented with four children with CVD and their parents.

The conceptual framework is based on an ecological model for health promotion (McLeroy et al., 1988), the holistic policy and intervention framework for global mental health (Khenti et al., 2016) and Theron's (2018) transactional pathways to resilience, specifically, the *connect&dream&do* mechanisms. I followed a qualitatively driven mixed-methods approach, being guided by social constructivism, implemented an in-depth case study design and purposefully and conveniently sampled the participants. I relied on PRA-guided sessions with the child-participants, online semi-structured interviews with the parent-participants, observation, field notes and a reflexive journal to generate and document qualitative data. In support, quantitative data was collected using the Beck Youth Inventories both prior to and after implementation of the holistic intervention to compare the functioning of the child-participants on emotional and social levels to determine the effect of the intervention. These data sets were informed by selected projective instruments that generated qualitative data. For data analysis, I completed reflexive thematic analysis of the qualitative data and utilised descriptive statistics for the quantitative data.

The holistic intervention consisted of a resilience-enabling intervention for the child-participants, presented over the course of a year, and a parent guidance intervention, delivered over 14 weeks. The findings indicate that children with CVD face a range of challenges that can negatively impact their academic, emotional and social functioning, and that they typically receive minimal support in school, but that they were positively influenced by the holistic intervention. I can accordingly conclude that the intervention supported the overall functioning of the children with CVD through the fostering of resilience-enabling skills. In addition to contributing to existing theory in the field of CVD, my study should raise awareness among parents and teachers of the lived experiences of children with CVD and how others can accommodate and support them more effectively. The findings may subsequently guide teachers to create an inclusive educational environment where these children are accommodated whilst being supported by their families at home.



## DECLARATION BY LANGUAGE EDITOR

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**I HATE  
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26 September 2024

### TO WHOM IT MAY CONCERN

I, the undersigned, hereby declare that the doctoral thesis titled  
**The Effect of a Holistic Intervention for Children with Colour  
Vision Deficiency** by **Tegan Leigh van der Westhuizen** has been  
edited.

It remains the responsibility of the candidate to effect the recommended  
changes.



Prof. Tinus Kühn



## KEY WORDS

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- Case study design applying PRA principles
- Colour vision deficiency (CVD)
- *Connect&dream&do* mechanisms of resilience
- Holistic intervention
- Parent guidance intervention
- Participatory Reflection and Action (PRA)
- Qualitatively-driven mixed methods research
- Resilience-enabling intervention
- Social constructivism



## LIST OF ABBREVIATIONS

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- BYI-II: Beck Youth Inventories – Second Edition
- CCVD: Congenital colour vision deficiency
- CVD: Colour vision deficiency
- DAP: Draw-a-Person
- HPIF: Holistic policy and intervention framework
- IEB: Independent Examination Board
- KFD: Kinetic Family Drawing
- PFP: Protective, promotive and preventive factors
- PRA: Participatory Reflection and Action
- RISB: Rotter Incomplete Sentences Blank



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# CHAPTER 1

## GENERAL ORIENTATION AND INTRODUCTION

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### 1.1 INTRODUCTION AND RATIONALE FOR UNDERTAKING THE STUDY

This study forms part of a research project that involved several postgraduate studies, situated in the University of Pretoria's Centre for Visual Impairment Studies. Research undertaken by the Centre for Visual Impairment Studies seeks to develop a foundation of research that focuses on visual impairments and other visual deficiencies<sup>1</sup> experienced by children in South Africa. In undertaking the study, I aimed to contribute to this broader body of research that may be utilised to support and enhance the implementation of South Africa's inclusive education policy, thereby creating an educational environment where children<sup>2</sup> with visual deficiencies, in this case colour vision deficiency are better understood, accommodated and supported in schools, as propagated by Heyl (2017).

Following an integrative review on the impact that colour vision deficiency (CVD) may have on the daily lives of individuals, Stoianov et al. (2019) emphasise the importance of ongoing research in the field of this specific phenomenon due to limited relevant literature being available. According to Stoianov et al. (2019), further research in this area of study may result in the development and implementation of adaptive strategies that can decrease the detrimental consequences that people with CVD experience, while allowing them to be treated in an inclusive and accepted manner. The need for ongoing research, internationally but especially locally on CVD seems clear in terms of what the condition entails, how it may alter the functioning of those affected and which initiatives can be put into place to address the difficulties these individuals may experience (Barry et al., 2017; Cumberland et al., 2004; Frane, 2015; Stoianov et al., 2019). Against this background and in an attempt to add to this field of research, I set out to explore children's experiences of CVD and the effect of a holistic intervention on them and their parents/caregivers.

Individuals with CVD will typically experience difficulties with identifying colours in their everyday life, with these difficulties varying according to the nature and severity of the deficiency, their circumstances and their ability to develop adaptive coping strategies (Mashige, 2019). Children with CVD are, however, not always able to develop appropriate coping strategies in response, which may hinder their academic, emotional and social functioning and their overall ability to actualise their full

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<sup>1</sup> I acknowledge that from an educational psychology perspective, CVD can be regarded as a special need where support can be provided. However, for the purpose of this thesis, I utilise the term *deficiency* to align with international publications across disciplines.

<sup>2</sup> I am aware that the term *learner* is generally used when referring to children within the academic context. However, I opted to use the term *children* throughout this thesis, as my study concerns the holistic functioning of the child-participants and is not limited to their academic functioning.

potential. As an example, I became aware of the potential negative influence of CVD in 2018 when I was involved in a research colloquium focusing on the difficulties that children with visual impairment may experience in the school environment. I became involved in discussions with people who had experience of this phenomenon, specifically in terms of the difficulties experienced by children at school and with peers as a result of being affected by CVD. During my ongoing involvement as a research assistant in the project focusing on visual impairment, I became increasingly aware of the possible difficulties experienced by children with visual impairment, specifically CVD, and the lack of support typically offered in schools and in education policies.

In 2019 I was made aware of a scientific investigation carried out by a Grade 8 learner for an EXPO for Young Scientists school project. The investigation focused on the perceptions of both teachers and learners regarding CVD. This small-scale study emphasised a significant gap in training and a general lack of awareness of the condition within educational settings. Subsequently, I became all the more interested in understanding the perceptions of children with CVD and the challenges they may experience within the various environments they function in. In support of the identified need for additional research, Meeks et al. (2015) comment that few studies have provided teachers and parents with comprehensive guidelines and recommendations on how to assist children with CVD in schools and in terms of daily living. Insight into this issue may thus provide valuable knowledge regarding the way in which children with CVD can be assisted and better supported by the various role players in their lives (Thomas et al., 2018).

It seems clear that CVD has not yet received the necessary attention, considering the potential impact it can have on children's academic performance, social interactions and overall functioning. As CVD is generally not perceived as a disability, despite the challenges associated with the condition (Ishijima, 2022), children with the condition may not receive the necessary individual support. Understanding the implications of CVD on children's functioning and performance can, however, inform educational and support interventions that may be tailored to meet the specific needs of such children (Kvitle, 2018; Thomas et al., 2018). By identifying the challenges faced by children with CVD, parents, teachers, healthcare professionals and policymakers can thus develop targeted strategies to support the children's academic, emotional and social functioning. Furthermore, raised awareness of CVD and its effects may help mitigate the stigma and misconceptions surrounding the condition. Increased awareness among parents, teachers and the general public can thus ultimately foster a more inclusive and supportive environment for children with CVD, reducing some barriers to their participation in various aspects of life (Chan et al., 2014; Kvitle, 2018; Singal, 2008; Stoianov et al., 2019).

In summary, given the limited available research in this area, the need for further investigation into the implications of CVD for children's functioning seems clear, especially in South Africa where only a few studies have been undertaken to date. Addressing this need for ongoing research may

subsequently promote the inclusion of children with this condition in school in support of their overall performance. In undertaking this study, I aim to contribute to this emerging body of knowledge, building theory yet also in terms of offering practical insights for real-world application.

## 1.2 PURPOSE OF THE STUDY

The purpose of my study was to explore and describe the effect of a holistic intervention for children with CVD, after providing the child-participants and their parents with targeted support and guidance in the form of individual support sessions with the child-participants, assistive devices in the form of EnChroma lens technology eyewear, and a parent guidance intervention in support of the general functioning and performance of children with CVD. Additionally, resource booklets were developed to serve as a supportive tool, raising awareness of CVD while also acting as an assistive resource for teachers, parents and children with CVD. Their purpose is to offer guidance on how to better support children with CVD and to aid children in better understanding and coping with their condition.

The current study, which forms part of a broader research project<sup>3</sup>, can thus contribute to the emerging knowledge base on the way in which support can be provided to children with CVD and how their parents, teachers and other people with CVD may be better informed to in turn educate others and more effectively support these children. Moreover, the findings of my study may contribute to the developing knowledge base on the experiences of children with CVD, the challenges they typically face and how this visual deficiency may impact their overall functioning. In addition, it can contribute to practice, with the child-participants applying the strategies discussed as part of the holistic intervention in their lives.

As I also explored the experiences of the child-participants' parents to elicit their understanding of CVD and the effect of the condition on the academic, emotional and social functioning of their children, the parent-participants may have benefitted from participating in this research. Their participation may also make a contribution to practice in terms of possible supportive strategies employed by the parents of children with CVD. To elaborate, insights gained by the parent-participants during the parent guidance intervention may assist them and other parents in future to better support their children in navigating the challenges they face as a result of CVD.

During my study, I aimed to achieve the following specific objectives:

- To determine the effect of CVD on the holistic functioning of children with CVD.

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<sup>3</sup> I worked alongside two MEd students (also supervised by Prof. Ronél Ferreira) during the pre- and post-intervention phases of data generation (consult Section 1.8.4 for more detail). Ms Tasleem Kala, a MEd student in Learning Support, Guidance and Counselling co-facilitated interviews with me during Phase 1 of the data generation phase. Ms Keshini Naidoo, a MEd student in Educational Psychology co-developed and co-facilitated the parent guidance intervention during Phase 2 as well as co-facilitated parent interviews with me during Phase 3.

- To explore the perceptions of parents regarding CVD as well as the ways in which parents support their children to cope with the challenges they face as a result of CVD.
- To define the components and scope of a holistic intervention designed for children with CVD.
- To determine the effect of the intervention on the holistic functioning of children with CVD by comparing their experiences pre- and post-intervention.

### **1.3 RESEARCH QUESTIONS**

Against the background of the preceding discussion, I formulated the following primary research question: *How can a holistic intervention facilitate positive change in the lives of children with CVD?*

To be able to address the primary research question, I was guided by the following secondary research questions:

- How does CVD and its associated challenges affect the holistic functioning of children with CVD?
- How do parents of children with CVD understand the condition and support their children to cope with the associated challenges?
- What does a holistic intervention for children with CVD entail?
- How does the functioning of children with CVD prior to their participation in the holistic intervention compare to that post the intervention?

### **1.4 WORKING ASSUMPTIONS**

In conducting my research, I considered the following assumptions that I had formulated based on my initial reading on the topic:

- Typically sighted people may not understand or have insight into how children with CVD see the world or how they are affected by this condition.
- Children with CVD may experience academic difficulties, as teaching methods and resources are often not appropriately adapted to accommodate their specific learning needs.
- Children with CVD may experience emotional challenges such as a low self-esteem when compared to their peers with normal vision.
- Children with CVD may experience social challenges such as discrimination and marginalisation due to their medical condition.
- Children with CVD may feel that other people do not understand their condition and do not provide them with the necessary support.
- Children with CVD may be excluded from social activities and feel isolated, which may adversely affect their overall functioning.
- A holistic intervention may potentially improve the academic, emotional and social functioning of children with CVD.

## 1.5 CLARIFICATION OF KEY CONCEPTS

In this section, I explain the key concepts that underpin my study.

### 1.5.1 Colour vision deficiency (CVD)

CVD is a common disorder of vision that affects an individual's ability to see certain colours and differentiate between them (Kvitle, 2018; Mashige & Van Staden, 2019). CVD can either be acquired or congenital, with congenital CVD being untreatable and consistent throughout an individual's life. Whereas people with typical vision have three retinal cone photoreceptors that assist with the perception of green, red and blue colours, people with CVD experience abnormalities within one or more of the retinal cone cells (Mustafi et al., 2009; Neitz & Neitz, 2011). The condition is more common amongst males (Daw & Kremers, 2017; Fakorede et al., 2022; Neitz & Neitz, 2010).

A distinction is made between several variations of CVD that are categorised into three groups, based on the number of retinal cones capable of perceiving colours. These are namely monochromacy, dichromacy and trichromacy (Mashige & Van Staden, 2019). Monochromacy, also known as complete colour blindness, is a rare condition that occurs when two or three retinal cones are abnormal. Dichromacy occurs when only two retinal cones are functional, leading to the complete absence of perception of one specific colour. Finally, trichromacy occurs when one of the three retinal cones experiences a defect, resulting in spectral sensitivity to various wavelengths across the visible spectrum, which leads to a reduced sensitivity to specific colours (Khalaj et al., 2014).

Dichromacy includes protanopia (the complete absence of red retinal photoreceptors), deuteranopia (absence of green retinal photoreceptors) and tritanopia (absence of blue retinal receptors). Anomalous trichromacy involves alterations in one of the three cone pigments' spectral sensitivity, such as protanomaly (reduced sensitivity to red), deuteranomaly (reduced sensitivity to green), and tritanomaly (sensitivity of the red, green and blue/yellow receptors) (Mashige, 2019; Neitz & Neitz, 2010).

For the current study, the child-participants all experienced congenital CVD, to rule out any potential variables of participants experiencing the condition and its challenges only later in life. The focus thus fell on involving children whose experiences have been shaped by congenital CVD from birth.

### 1.5.2 Children with CVD

The Child Justice Act 75 of 2008 and Children's Act 38 of 2005 of the Republic of South Africa conceptualise a child as any individual who is under the age of 18 years. Accordingly, a child is a person who is 18 years or younger unless otherwise stipulated by national law (Child Justice Act 75 of 2008; Children's Act 38 of 2005; World Health Organization, 2013). Within the context of the

current study, children with CVD are thus defined as individuals who were 18 years or younger at the time of my field work and who had congenital CVD.

### **1.5.3 Holistic intervention**

According to Smith et al. (2015), an intervention implies any activity undertaken with the primary objective of improving human health by curing or reducing the duration or severity of an existing condition, preventing disease, or restoring functioning that is lost or reduced as a result of an injury, illness or other medical condition. In support of this definition, Fortune et al. (2018) describe interventions as programmes that are either ongoing or set over a period of time and are aimed at restoring, maintaining, improving and supporting human functioning and potentially optimising an individual's participation across the various domains of life.

Interventions can be categorised into two broad classifications, namely therapeutic interventions and preventive interventions (Craig et al., 2008; Fortune et al., 2018; Smith et al., 2015). Therapeutic interventions focus on mitigating, treating or postponing the effects of diseases or other medical conditions and can therefore reduce the morbidity or disability that is associated with diseases and medical conditions. Preventive interventions can prevent diseases from occurring and may thus reduce the prevalence of disease (Smith et al., 2015).

Researchers who conduct holistic interventions view human beings as complex systems that comprise many unique components. In order to fully understand and provide holistic support to a person, these components are regarded as inseparable and are thus considered in this way (Huljev & Pandak, 2016; Swart & Pettipher, 2019). Therefore, holistic interventions entail the consideration of the whole person – psychologically, physically, socially, emotionally and spiritually to improve overall health and functioning (Huljev & Pandak, 2016). Accordingly, a holistic intervention takes into consideration the physical, emotional, cognitive, social, spiritual and psychological aspects of child functioning when designing and implementing such an intervention in support of children's holistic life situation and functioning (Charles et al., 2016; Erickson, 2007).

In this regard, Nicholas et al. (2021) state that a child-centred approach to an intervention implies a strengths-based view, according to which the skills, abilities, interests, motivations and strengths of the child are identified to decide on individualised strategies that can support them. Charles et al. (2016) similarly posit that interventions should be designed to improve developmental, behavioural, health and psychosocial outcomes among both adults and children. Within the context of my study, I implemented a holistic intervention as part of the broader research project that my study forms part of. The holistic intervention comprised two interventions that were implemented concurrently, namely a resilience-enabling intervention with the child-participants and a parent guidance intervention with their parents, with the latter forming the focus of MEd student Keshini Naidoo's study.

## 1.6 CONCEPTUAL FRAMEWORK OF THE STUDY

In undertaking this study, I compiled a conceptual framework that allowed me to explore the participants' lived experiences and develop a holistic intervention that could promote a better understanding of CVD and what it implies, and foster the development of resilience within the unique contexts of the participants. For this purpose, I adapted the ecological model for health promotion (McLeroy et al., 1988) by incorporating principles from the holistic policy and intervention framework (HPIF) for global mental health (Khenti et al., 2016) as well as Theron's (2018) transactional pathways to resilience, specifically, the *connect&dream&do*<sup>4</sup> mechanisms of resilience, as captured in Figure 2.12 in Chapter 2. In integrating the various theories I relied on, I aimed to develop a comprehensive and effective framework that would enable me to gain an in-depth understanding of the challenges typically faced by children with CVD, and how these have influenced the participants within their various nested systems. By gaining such an understanding I was able to develop a holistic intervention that focused on promoting the child-participants' resilience and holistic functioning by specifically focusing on their individual and family systems.

To elaborate, I primarily relied on the ecological model of health promotion (McLeroy et al., 1988) to develop an in-depth understanding of the perceptions of the participants and how CVD has influenced their holistic health, by considering and examining their unique and specific interpersonal and intrapersonal factors. Moreover, this model enabled me to develop a comprehensive intervention plan that takes into consideration the multiple levels of influence within an individual's context. I also incorporated the HPIF for global mental health (Khenti et al., 2016) to be able to focus specifically on the holistic health and capacity building of the participants. I specifically included the principles of holistic health, cultural and socioeconomic relevance as well as partnerships and collaborative action-based education and learning, which I explain in more detail in Chapter 2. Finally, during the development, design and implementation of the holistic intervention I relied on Theron's (2018) theory on transactional pathways to resilience – more specifically on the *connect&dream&do* mechanisms of resilience. These concepts supported me in developing an intervention and activities that could promote the development of resilience enabling skills while taking into consideration the uniqueness of the participants and their supportive social ecologies (Masten, 2019; Theron, 2018).

The ecological model of health promotion (McLeroy et al., 1988) served as the foundational framework, emphasising the dynamic interactions between individuals and their environments, and highlighting the nested systems within which development occurs. This model provides a holistic view of development, facilitating an in-depth understanding of how CVD may influence children

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<sup>4</sup> According to Theron (2018) the actions *connect*, *dream* and *do* are written together purposefully to demonstrate that they are interconnected and interdependent. For the purpose of this study, these are written as *connect&dream&do* as this was the order in which they were presented to the participants in the holistic intervention.

across various contexts and how support can, in turn, influence these contexts. Based on the ecological model of health promotion (McLeroy et al., 1988) the holistic health of the child-participants was emphasised and the interplay between their intrapersonal and interpersonal factors considered. This approach enabled me to develop an intervention that could address multiple levels of influence within the child-participants' nested systems. Additionally, the HPIF for global mental health (Khenti et al., 2016) enabled me to incorporate a focus on the holistic health and capacity building of the child-participants. Finally, the *connect&dream&do* mechanisms guided me during the development of the resilience-enabling intervention, emphasising resilience and considering the unique contexts of the child-participants, their supportive social ecologies and the skills needed to cope with adversity (Theron, 2018). I explain the conceptual framework in more detail in Chapter 2.

## 1.7 PARADIGMATIC PERSPECTIVES

In the following sub-sections, I introduce the epistemological paradigm and methodological approach that directed my study. These are further elaborated on in Chapter 3.

### 1.7.1 Epistemological paradigm

I relied on social constructivism as a *metatheoretical paradigm*, thereby acknowledging that all knowledge, as well as meaningful reality is contingent upon social practices, being constructed against a backdrop of shared languages, understandings and interactions between individuals and their environment (Crotty, 1998). As a result, knowledge is seen to be developed and transmitted within a fundamentally social context (Crotty, 1998; Schwandt, 2000). The social constructivist paradigm recognises that knowledge and reality are constructed and reproduced through interaction, communication and practice, and that reality is multiple by nature and will vary across contexts (Crotty, 1998; Lincoln & Guba, 2000; Tracy, 2020).

When adopting the social constructivist paradigm, researchers aim to gain an understanding of human behaviour within the context or natural environments of the participants (Tracy, 2020). Additionally, the researcher will rely as much as possible on the research participants' experiences and views of the phenomenon being studied (Creswell, 2014). Therefore, the specific contexts within which participants live and function are focused on to gain an in-depth understanding of the cultural and historical settings of the participants as well as their associated perceptions. Researchers, therefore, become immersed within the context in which the participants live by visiting this context and gathering information to understand the experiences of the participants.

By adopting the social constructivist paradigm, I was able to develop a holistic understanding of the participants' experiences, views and actions within their specific socially constructed contexts (Creswell, 2014; Crotty, 1998; Lincoln & Guba, 2000; Schwandt, 2000). Against this understanding, I was able to describe the experiences and perceptions of children with CVD. My exploration of their

views and experiences enabled me to develop a holistic intervention tailored to support the child-participants' unique needs. Through this intervention, positive changes were possible, potentially leading to improvements in the academic, emotional and social functioning of the child-participants.

### **1.7.2 Methodological paradigm**

According to Creswell (2014), research implies a series of steps, during which researchers obtain and analyse information to increase the understanding of a specific phenomenon. In order to understand the effect of a holistic intervention on the functioning of children with CVD, I followed a convergent mixed methods approach, even though the qualitative component was central to my study. A convergent mixed methods approach represents a fundamental approach within mixed methods research, where qualitative and quantitative data are merged to offer a comprehensive analysis of the research problem. Typically, the researcher will gather qualitative and quantitative data simultaneously and then combine these during the interpretation phase to present a unified picture of the results (Creswell & Creswell, 2023; Creswell & Plano Clark, 2018).

In following a qualitatively-driven mixed methods approach I predominantly relied on qualitative research methods yet incorporated quantitative methods to generate multi-dimensional findings (Frost et al., 2022). Frost et al. (2022, p. 12) state that, when employing a qualitatively-driven mixed methods approach, researchers are encouraged to “pursue good practice by drawing on guiding principles of qualitative research quality”. As a qualitatively-driven mixed methods researcher, I thus focused on developing a detailed understanding of the studied phenomenon by focusing on the participants' lived experiences and their meaning-making yet adding quantitative data to strengthen what I had obtained (Creswell, 2014; Yin, 2011).

As in the case of other mixed methods approaches, qualitatively-driven mixed methods research aim to yield inferences and insights from the combined dataset. The application of a qualitatively-driven mixed methods approach allows for a more comprehensive and multi-dimensional understanding of a phenomenon than when relying only on qualitative or quantitative methods (Bailey-Rodriguez, 2021; Hesse-Biber et al., 2015). This approach integrates the strengths of both qualitative and quantitative methods to provide a richer insight into the research topic.

To elaborate, when following such an approach, the qualitative methods that are included, such as interviews or observations, can allow researchers to explore the depth and complexity of participants' experiences, perceptions and behaviours. However, the quantitative methods relied on, such as questionnaires or experiments, can provide numerical data that can be analysed statistically to identify patterns and relationships within the data. By combining these methods, researchers can triangulate findings, validate results and gain a more holistic understanding of the phenomenon under investigation. This approach can thus enhance the rigour and validity of the research findings, ultimately leading to more robust conclusions and practical implications of the findings (Bailey-

Rodriguez, 2021; Frost & Bailey-Rodriguez, 2020; Hesse-Biber et al., 2015). For my study, I generated and collected qualitative and quantitative data at roughly the same time and then integrated these results (Creswell & Creswell, 2023).

It follows that qualitatively-driven mixed methods research involves the use, generation and interpretation of a variety of materials (crystallisation), relying on, for example, visual data, field notes, reflexive journals, interviews, observation, conversation, audio-visual recordings, reports on personal experiences and questionnaires, which can all describe problematic events and/or meaning making in individuals' lives (Denzin & Lincoln, 2005; Nieuwenhuis, 2019a). As such, qualitatively-driven mixed methods researchers will typically deploy a variety of interpretive practices to gain a better understanding of the studied phenomenon. In following this approach, I accordingly conducted a variation of a convergent mixed methods study, more specifically a QUAL ↔ quan<sup>5</sup> study (Creswell & Creswell, 2023; Creswell & Plano Clark, 2018).

In following this approach, I could develop an in-depth and detailed understanding of the experiences of the participants by adopting a naturalistic approach in exploring their views (Denzin & Lincoln, 2005; Snape & Spencer, 2003). As such, I could rely on an advantage of qualitative research, of studying a phenomenon in its natural setting while attempting to make meaning of and interpret the phenomenon in terms of the meaning that the individuals assign to it, yet I could also rely on the benefit associated with quantitative measures, whereby I could quantify the qualitative results I obtained (Bailey-Rodriguez, 2021; Frost & Bailey-Rodriguez, 2020).

## **1.8 OVERVIEW OF RESEARCH DESIGN AND METHODOLOGICAL STRATEGIES**

In the following sub-sections, I introduce the research design and methodological strategies I utilised. More detailed discussions of these aspects follow in Chapter 3.

### **1.8.1 Research design**

I implemented a multiple case study design, applying Participatory Reflection and Action (PRA) principles. Yin (2011) states that a case study design allows the researcher to study an individual, group or social phenomenon (or case) in its unique, natural real-world setting. In this way, case study research enables the researcher to retain the meaningful and holistic characteristics of real-life events, such as lived experiences, individual life cycles and personal performances in various domains (Neuman, 2020; Stake, 1995; Yin, 2018). By applying PRA principles (Chambers, 2015) in my study, knowledge could be generated through an active partnership with the child-participants

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<sup>5</sup> Qualitative data formed the primary data set, was collected pre- and post-intervention (consult Section 1.8.4) and is thereby indicated in capital letters (QUAL). The secondary data set is indicated in lower case letters (quan), as the data for this dataset was collected within the QUAL dataset pre- and post-intervention to supplement, clarify and elaborate on the QUAL dataset.

that may have informed their functioning in their educational and social settings within their real-world contexts (Ebersöhn et al., 2019; Ferreira et al., 2013; Schwandt & Gates, 2018). Additionally, the participants could develop a partnership with me as the researcher while obtaining insight into their own abilities, networks and resources, leading to their mobilisation of these in overcoming the challenges they faced and had identified (Bhana, 2002; Ebersöhn et al., 2019; Ferreira et al., 2013).

According to Yin (2018), case study research is specifically suitable when examining contemporary events that cannot be controlled. Yin (2018) states that a unique strength of case study research lies in the ability to manage and incorporate a range of data when implementing this design, relying on, for example, interviews, visual data, observations and artefacts that can be used to create an in-depth understanding of the phenomenon under study (Neuman, 2020; Yin, 2018). Therefore, detailed and descriptive data is typically yielded when doing case study research, due to the variety of data generation methods often used (Neuman, 2020; Schwandt & Gates, 2018; Stake, 1995). By implementing a case study design, I was able to obtain in-depth information on the effect of a holistic intervention on children with CVD.

Neuman (2020) argues that case study research implies a comprehensive investigation of the details within different cases as well as the information contained on the context of the phenomenon under investigation. Case study research can furthermore enable researchers to link micro-level interactions and the actions of individuals to the macro-level, reinforcing the idea that systems interact and influence one another, and that participants' lived experiences need to be investigated within their real-world settings when wanting to gain an in-depth understanding of a phenomenon (Neuman, 2020; Swart & Pettipher, 2019). As alluded to earlier, PRA focuses on the enablement of people on the ground level to enhance, share and analyse such lived experiences and knowledge of life to develop locally relevant solutions to shared difficulties and challenges (Chambers, 2008; 2015; Lawson, 2015). PRA, therefore, encourages researchers to engage in a so-called reversal of learning process, where they learn directly from the participants, face-to-face, within their natural settings, gaining insight from their social, personal and technical knowledge (Chambers, 2015).

As stated, I specifically utilised a multiple or collective case study design, applying PRA principles (Chambers, 2015; Stake, 2005; Yin, 2018). This design involves the exploration of multiple instrumental case studies, with each case offering valuable insights into the research topic (Grandy, 2010a; Stake, 1995). To elaborate, an instrumental case study focuses on a particular case to shed light on a specific issue (Stake, 2005). Applying this description to my study, I thus selected several cases (four child-participants and their parents) to explore the impact of a holistic intervention on children with CVD, with each case providing unique perspectives and experiences related to the intervention process and its effects (Grandy, 2010a; Stake, 1995). Additionally, by employing PRA principles, I regarded the participants as active members of the research process who contributed to and influenced the outcome of the research findings.

### **1.8.2 Selection of cases and participants**

In selecting suitable cases, I utilised non-probability sampling, specifically purposive sampling or criterion-based sampling as well as snowball sampling (Maree, 2019; Maree & Pietersen, 2019a). The goal of purposive sampling is to select participants who may yield plentiful and rich data relevant to the topic of a study (Yin, 2011; 2018). Cases or participants are accordingly chosen based on set criteria (consult Chapter 3) and for a specific purpose (Creswell, 2016), with them being knowledgeable about the phenomenon under study, in this case the effect of CVD on the functioning of children as well as the subsequent value (if any) of a holistic intervention in support of these children. Secondly, snowball sampling is typically used when the population under study belongs to an interconnected group of people, or when they are difficult to locate (Maree & Pietersen, 2019a).

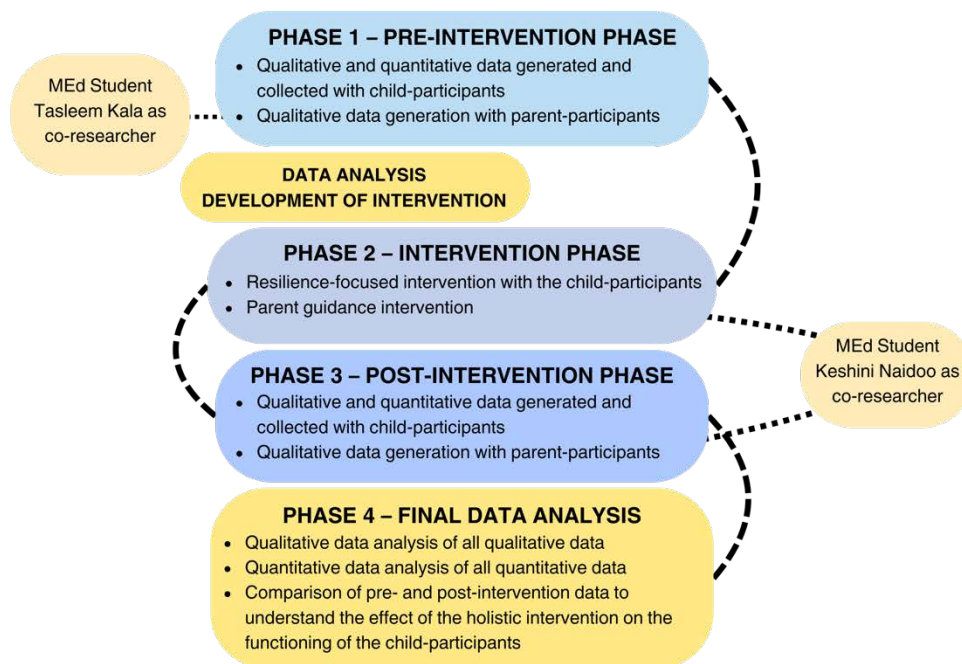
I began searching for child-participants by reaching out to schools to inquire about any of their learners who may have CVD whom I could contact to enquire if they would be interested in participating in the holistic intervention. In order to safeguard participants who might have been wrongly identified as having CVD, I did not solely rely on teachers in schools to identify possible children to participate in my study, but also asked individuals I knew who could be aware of people with CVD, or who had children with CVD or knew of children with CVD to participate, or for the contact details of the potential participants. Based on the preceding EXPO project undertaken by Gerthyo Ferreira in 2019, I furthermore identified a few possible participants for my study who fitted the selection criteria whom I could contact. As my focus fell on younger child-participants, I eventually did not involve the participants from the science EXPO project. However, I contacted some of them, enquiring from them whether they were aware of other people who met the selection criteria and whom they could refer me to. This enabled me to identify and recruit participants who met the selection criteria (Maree & Pietersen, 2019a; Neuman, 2020).

I initially selected six child-participants; however, only four of them were eventually able to participate in the holistic intervention. In addition, six parent-participants (n = 6), became involved in the study.

### **1.8.3 Phases of the research**

Figure 1.1 provides a brief overview of the phases of my research. To develop a holistic intervention that could support the specific needs of the child-participants and provide them with resilience-enabling skills to address their unique challenges, insight and understanding were needed before the intervention could be developed and implemented. As a result, my study comprised the following four phases: pre-intervention phase, intervention phase, post-intervention phase, and final data analysis phase. A more detailed overview of the various phases is included in Chapter 3.

**Figure 1.1**  
*Phases of the study*



During the *pre-intervention phase*, I generated/collected both qualitative and quantitative data with the four child-participants. In addition, I co-facilitated online semi-structured interviews with the six parent-participants alongside MEd student Tasleem Kala to generate qualitative data. The pre-intervention data generation/collection phase focused on an in-depth understanding of the perceptions and experiences of the child- and parent-participants of CVD and its associated challenges, providing the necessary baseline data to develop a holistic intervention for the child-participants as well as a parent guidance intervention that could address the needs of both these groups of participants.

Based on the qualitative and quantitative data obtained during the pre-intervention phase, I developed the resilience-enabling intervention (*intervention phase* of the study), which was implemented during subsequent PRA-guided sessions with the child-participants between February 2022 and December 2022 (consult Section 3.6 for more detail). Even though I intended to cover one topic (consult Section 3.6) per session, logistical and time constraints in the form of the child-participants' limited availability in the afternoons and power outages leading to connectivity issues sometimes led to sessions being shorter, necessitating the spreading of topics over multiple sessions. I focused on covering all intervention topics rather than strictly adhering to a predetermined number of sessions. Each intervention session focused on a specific topic that was supported by suitable resources and YouTube videos that were displayed and then discussed. Throughout, I used guiding questions to encourage the active participation of the child-participants. Consult Table 3.5 for an overview of the holistic intervention that I implemented with these participants.

Relying on the pre-intervention data that was generated alongside co-researcher and MEd student Tasleem Kala on parents' perceptions and needs to better support their children with CVD, MEd student Keshini Naidoo and I developed a parent guidance intervention with the aim of equipping the parent-participants with knowledge and skills that could enable them to support their children to better cope with CVD. During the intervention phase of the study, we thus also implemented this intervention with the parent-participants over a period of 14 weeks via a WhatsApp group (consult Section 3.6 for more detail).

During the *post-intervention* phase of my study (Phase 3), both qualitative and quantitative data was generated/collected with the child-participants through additional PRA-guided sessions, implementation of the Rotter Incomplete Sentences Blank (RISB), Draw-a-Person (DAP), Kinetic Family Drawing (KFD) and the Beck Youth Inventories – Second Edition (BYI-II; Beck et al., 2005). Open-ended questions were posed to the child-participants to gain insight into their experiences and perceptions of the holistic intervention, thereby generating qualitative data. Additionally, online semi-structured interviews with the parent-participants were co-facilitated by Keshini Naidoo to explore their experiences of the parent guidance intervention and how the holistic intervention had influenced their children's functioning. As in the case of the data generated/collected prior to implementing the intervention, I once again relied on observation, field notes and a reflective journal.

All pre- and post-intervention qualitative and quantitative data was analysed to determine the effect of the holistic intervention on the child-participants' functioning during *Phase 4* of the study. A comparative analysis of the qualitative and quantitative data obtained from the child-participants was conducted to identify any changes that may have occurred as a result of the holistic intervention. Supplementary data from the parent-participants supported this analysis, providing a comprehensive understanding of the effect of the holistic intervention.

#### **1.8.4 Data generation/collection and documentation with child-participants**

I employed multiple data generation/collection and documentation strategies with the child-participants. For qualitative data generation, I relied on PRA-guided sessions and discussions during which I administered qualitative assessment measures and implemented participatory visual methods in the form of participatory drawings and PRA-posters (matrices) (Chambers, 2015; Ebersöhn et al., 2019), observation-as-context-of-interaction (Angrosino, 2007; Angrosino & Mays de Perez, 2000), field notes (Silverman, 2017), a reflective journal (Braun & Clarke, 2022) and audio-visual methods (Creswell, 2014). To collect quantitative data, I administered the BYI-II (Beck et al., 2005) a self-report instrument that assesses emotional and social functioning.

Most of the PRA-guided sessions with the child-participants were conducted *via* the online audio-visual platforms of Zoom or Google Meet due to the pre-intervention data generation/collection phase taking place during the national lockdown of the Coronavirus disease (COVID-19) in South Africa,

with the majority of the sessions and interviews taking place while COVID-19 precautions were still being observed (Brown, 2022). Each PRA-guided session lasted 30 minutes to one hour. In order to build rapport and explain the outline of the research process to the child-participants I had an initial session with each participant during which I discussed the assent form and addressed any questions or concerns they had. Subsequently, during the follow-up sessions, the child-participants completed PRA-matrices, capturing their insights and perceptions of CVD and its impact on their functioning. After implementing the holistic intervention, during a concluding PRA-guided session, I posed open-ended questions to elicit the child-participants' experiences of the holistic intervention, thereby generating qualitative data through discussions about its effect on their functioning.

By applying PRA principles, I could rely on the active participation, active meaning-making and experiences of the child-participants. Additionally, I depended on their ability to facilitate and continuously evaluate their own lived-experiences, knowledge and prior learning to generate data (Chambers, 2015; Ebersöhn et al., 2019; Ferreira et al., 2013). I specifically included PRA-guided activities during individual sessions with the child-participants to create pre- and post-intervention data (Ebersöhn et al., 2019; Ferreira, 2006). During these sessions that involved a range of creative activities, the main focus was to explore their views and experiences of CVD and the influence it had had on their academic, emotional and social functioning. As the PRA-guided sessions were conducted online, I attempted to support the child-participants, regularly checking on their progress and determining whether they were encountering any difficulties and whether any further support could be offered. I also provided the child-participants with useful information and discussed resilience-enabling coping skills and tips that could assist them to cope with the challenges they were facing during our engagements.

During the pre- and post-intervention qualitative data generation phases of my study, I included some projective psychological measures<sup>6</sup> to deduce the emotional and social functioning of the child-participants and identify how CVD was influencing their functioning. To be more specific, the RISB (Rotter et al., 1992), DAP (Goodenough, 1926) and KFD (Burns & Kaufman, 1970) were utilised to assess the emotional and social functioning of the child-participants pre- and post-intervention. The RISB, developed by Rotter et al. (1992), involves the completion of sentence stems to reveal unconscious thoughts and feelings (Torstrick et al., 2015; Weis, 2015). Similarly, projective drawings, based on techniques pioneered by Burns and Kaufman (1970) as well as Goodenough (1926) can provide insight into children's emotions and experiences through their artistic expressions.

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<sup>6</sup> Being a qualified educational psychologist, I was able to implement these measures as part of the qualitative data generation phase of my study. I was also able to implement the BYI-II as quantitative measure.

In support of the qualitative data I obtained, I implemented the BYI-II (Beck et al., 2005) as a quantitative assessment measure. The BYI-II is a standardised self-reporting tool designed to assess emotional and social difficulties experienced by children and adolescents aged seven to 18 years. It consists of five scales, namely the Depression Inventory, Anxiety Inventory, Anger Inventory, Disruptive Behaviour Inventory and Self-Concept Inventory. Each scale contains a series of statements that need to be rated based on the frequency or severity of experiencing certain emotions or behaviours. The BYI-II provides quantitative scores on each scale, allowing for a more systematic and objective assessment of emotional and social functioning.

Qualitative data obtained from the said methods as well as the quantitative scores on the BYI-II were compared pre- and post-intervention to determine the effect of the holistic intervention on the child-participants' functioning. The quantitative data obtained on the BYI-II (Beck et al., 2005) complemented the qualitative data, providing me with an understanding of the participants' experiences, needs and levels of functioning before and after implementation of the holistic intervention (Beck et al., 2005; Ding et al., 2021; Makhubela & Mashegoane, 2016).

I captured and documented all online PRA-guided sessions by audio-recording the sessions and transcribing the audio-recordings verbatim. Video recordings were used for all online sessions that enabled me to capture the participants' non-verbal communication and behaviour. These PRA-guided sessions were thus supported by *observation-as-context-of-interaction* (Angrosino & Mays de Perez, 2000) whereby I adopted a membership role in the selected context and involved participants as research partners so that I could observe their participation. I relied on structured observation to gain insight into the meaning that the participants had assigned to their experiences during the PRA-guided sessions and discussions, and compared what they said with what they did (McKechnie, 2012a). This collaborative approach, as stated by Nieuwenhuis (2019b), highlights one of the potential benefits of observation, wherein the researcher actively engages with and becomes integrated into the research process alongside the participants.

Throughout, I compiled detailed field notes, thereby documenting the data generation process, my observations and the perceptions and experiences of the participants (Creswell, 2016). Field notes allowed me to maintain a record of my observations in a reflexive journal, whilst I also recorded my thoughts, ideas, breakthroughs and notes on ideas and complications that arose during the research process (Braun & Clarke, 2022).

Finally, I maintained the PRA-matrices and participatory drawings of the child-participants as data sources to be analysed. For this purpose, the child-participants took photographs of their PRA-matrices and scanned the documents they had completed during the data generation/collection sessions, sending these to me for analysis and safekeeping (McKechnie, 2012b; Neuman, 2020).

### **1.8.5 Data generation with parent-participants**

I co-facilitated nine online semi-structured interviews with the parent-participants (Brown, 2022; Creswell, 2016; Fan et al., 2024), working alongside MEd students Tasleem Kala and Keshini Naidoo during both the pre- and post-intervention phases. These interviews lasted between 30 minutes to one hour each. The interviews conducted with the parent-participants during the pre-intervention phase focused on gaining insight into the parent-participants' perceptions of CVD, the challenges their children experienced and the support they believed was needed to overcome these difficulties.

Following implementation of the parent guidance intervention, MEd student Keshini Naidoo and I conducted semi-structured interviews online with the parent-participants who had been involved in the intervention to gain insight into their perceptions and experiences of the holistic intervention, thereby generating qualitative data on the effect of the intervention. During all online semi-structured interviews with the parent-participants, my co-researchers and I were guided by a set of open-ended pre-determined questions that allowed us to manage the topics discussed during the interviews, thereby gaining in-depth understanding of the phenomenon we set out to explore. We followed a flexible approach and were guided by the discussions that took place within the parameters of what we wanted to discuss (Brown, 2022; Creswell & Creswell, 2023; Fan et al., 2024).

All online interviews were recorded and transcribed verbatim for data analysis purposes. In addition to this data source, I relied on observation, field notes and a reflexive journal for data generation and documentation, as done during data generation/collection with the child-participants.

### **1.8.6 Data analysis and interpretation**

I conducted reflexive thematic analysis (Braun & Clarke, 2022) of the qualitative data obtained through PRA-matrices, drawings, photographs, transcribed audio-recordings and all written documents that contained generated data (Creswell, 2016). According to Patton (2015), the strategy of induction allows for meaningful categories or dimensions to emerge as a researcher attempts to understand the patterns that exist in the data pertaining to a phenomenon under study. Inductive reasoning starts with evidence and then moves on to build general patterns and interpretations, without presupposing in advance what those patterns may be (Maguire & Delahunt, 2017; Patton, 2015). Reflexive thematic analysis specifically refers to the process of encoding qualitative data into themes, with themes referring to the patterns found in the data which organise and describe observations and interpret aspects of the phenomenon under study (Braun & Clarke, 2021a; 2022).

It follows that reflexive thematic analysis entails the process of coding, identifying themes, categories and patterns within qualitative data. Braun and Clarke (2022) argue that reflexive thematic analysis is a particularly useful method when researchers are investigating an under-researched

phenomenon or if little is known about the participants' views on a topic. This method thus enabled me to extract rich and detailed accounts of the studied phenomenon (Braun & Clarke, 2021a; 2022).

Clarke and Braun (2013) emphasise the flexibility of thematic analysis and state that this analytic method can be applied within a variety of theoretical frameworks. I followed Braun and Clarke's (2022) six phases of thematic analysis. Accordingly, I began the data analysis process by familiarising myself with the generated data, whereafter I generated initial codes, searched for themes and patterns, reviewed the themes, defined and named them, and finally, compiled a report in the form of this thesis (Braun & Clarke, 2021a; 2021b; 2022).

A potential challenge often associated with reflexive thematic analysis relates to researchers being guided by the formulated research questions as possible themes, which may reflect data as being summarised and categorised rather than analysed (Braun & Clarke, 2022; Maguire & Delahunt, 2017). In order to shoulder this challenge, I focused on the generated data and allowed it to define the identified patterns and themes without being directed by the research questions. Another possible challenge of reflexive thematic analysis relates to researchers conducting an unconvincing or weak analysis, whereby themes do not emerge, with little coherence and consistency amongst the analysed data (Braun & Clark, 2022). I combated this potential challenge by including adequate examples from the data in my discussions in Chapter 4 to demonstrate that the analysis had been thoroughly and meticulously completed. In addition, I regularly discussed the data analysis process with my supervisor to ensure that the themes I had identified were suitable (Creswell, 2016).

The analysis of projective drawings involved my assessment of the symbolic content and imagery created by the child-participants in response to the given stimuli. During my analysis of the qualitative data obtained through psychological measures, various elements of the child-participants' drawings were scrutinised, including, for example, the presence of specific objects or figures, spatial utilisation and overall composition. Each of these elements offered clues about the child-participants' inner worlds and emotional and social functioning. For instance, the inclusion or omission of specific elements may reflect interests, fears or relational dynamics. Additionally, the spatial arrangement of elements in a drawing may convey feelings of confinement or isolation. I used several interpretation guides to aid me in understanding and interpreting the projective assessment data I obtained, namely the guidelines of Burns and Kaufman (1970), Goodenough (1926), Hsu (2014) and Zlateva (2019).

For the analysis of the quantitative data, I systematically examined and interpreted the numerical data to identify patterns, relationships and trends. To be more specific, I followed the scoring and interpretation guidelines as outlined in the BYI-II Manual (Beck et al., 2005). After obtaining the pre- and post-intervention scores for the child-participants I was able to compare these for each child. This approach aligns with the ultimate goal of quantitative data analysis, being to derive meaningful

insights and draw valid conclusions from the data, thereby contributing to a deeper understanding of the research phenomenon (Creswell & Creswell, 2023; Creswell & Guetterman, 2019).

## 1.9 QUALITY CRITERIA

I was guided by Tracy's (2020) eight big-tent framework for high quality qualitative research and Lincoln and Guba's (1985; 2013) criteria for trustworthiness. As such, I attempted to meet the criteria of a worthy topic, rigour, sincerity, credibility and dependability, resonance and transferability, significant contribution, ethical research practice, meaningful coherence, confirmability and authenticity to produce quality research, which is authentic, meaningful and relevant (Tracy, 2020).

The criterion of a *worthy topic* refers to the topic of a study being relevant, needed, and implying the potential of making a contribution to what is known about a phenomenon that has been misunderstood, overlooked or that will bring about change or transformation. Secondly, the criterion of *rich rigour* refers to effort and care being taken when conducting research to ensure that a study has been carried out in an appropriate and thorough manner (Tracy, 2020). This means that the researcher will not do what is comfortable or convenient but will strive to do what is best for the participants and to obtain data that is representative of the phenomenon under study. Next, *sincerity* relates to researchers being genuine and vulnerable throughout the research process and therefore being willing to share aspects of their own experiences and concerns. When conducting research that is sincere, researchers will continuously consider themselves as well as the participants, co-researchers and readers (Tracy, 2020; Tracy & Hinrichs, 2017).

The next criterion, *credibility*, refers to researchers being guided by principles of trustworthiness and dependability. Researchers will accordingly strive towards providing thick and accurate descriptions of a phenomenon under study that may support credibility (Tracy, 2020). When credibility is shown, *dependability* is often achieved as this is linked to the extent to which the findings of a study adhere to a dependable and consistent process (Lincoln & Guba, 2013; Nieuwenhuis, 2019a). *Resonance* relates to a researcher's ability to develop a text that impacts the audience in a meaningful manner. This can be achieved through aesthetic merit, evocative writing, naturalistic generalisations, transferability and logical transference. *Transferability* refers to the degree to which the findings of a study can be applied in other contexts, thus transferred to other similar contexts and settings (Lincoln & Guba, 2013; Lincoln et al., 2018). Next, the criterion of *significant contribution* refers to a study's possibility to make a meaningful and significant contribution conceptually, practically, heuristically and methodologically, according to which a study's findings should transform and extend a body of knowledge that can be used to understand the phenomenon under study and identify areas where further research may be needed (Tracy, 2020; Tracy & Hinrichs, 2017).

In terms of *ethical research practice* all researchers are expected to follow sound ethics principles throughout the duration of their studies. This implies that the researcher will generate data in an

ethical manner that does not compromise or place the participants in harm or misinterpret their experiences (Tracy, 2020). Tracy (2020) states that *meaningful coherence* can be achieved when a study accomplishes what it sets out to achieve, meets its stated goals and purpose, and uses methods that partner well with theories and paradigms, and interconnects with the reviewed literature. Once credibility, dependability and transferability have been established, confirmability can be met. This criterion relates to the degree to which the findings of a study can be attributed to a reliable research process (Morse, 2018; Nieuwenhuis, 2019a). Finally, *authenticity* encompasses the genuineness and integrity of the research process and outcomes (Lincoln et al., 2018).

In terms of the validity and reliability of the quantitative measure, Pietersen and Maree (2019a) define reliability as the instrument's consistency and repeatability, while validity pertains to its capacity to measure the intended construct. Reviews by Bose-Deakins and Floyd (2004) as well as Makhubela and Mashegoane (2016) indicate acceptable internal consistency of the BYI-II across inventories and norm groups. The standardisation sample of the BYI-II reflects the diverse population of learners in the United States of America, with evidence suggesting consistent measurement over short intervals (Beck et al., 2005). Content validity was ensured through expert review and pilot testing, while criterion-related validity was obtained by significant correlations between BYI-II scores and related constructs. Construct validity was confirmed through factor analysis, affirming the intended theoretical constructs of the BYI-II. Overall, reliability and validity studies by Ding et al. (2021), Ganji et al. (2022), Makhubela and Mashegoane (2016) as well as Park et al. (2020) indicate satisfactory psychometric properties, supporting the BYI-II's utility in assessing emotional and social impairment in youth, thus aiding in clinical and research endeavours focused on mental health issues. The strategies that I utilised to enhance the quality of this study are elaborated on in Chapter 3.

## **1.10 ETHICS CONSIDERATIONS**

According to Mouton (2022), children are regarded as a vulnerable population group, necessitating strict codes of ethics to be followed to safeguard child-participants' rights. In order to ensure that the research process did not cause harm to the participants of my study (both children and parents), I was guided by the ethics principles of permission to conduct research, informed consent and assent, voluntary participation, protection from harm, anonymity, confidentiality, trust and respect for privacy (Babbie, 2021; Cannella & Lincoln, 2018; Mouton, 2022; Nieuwenhuis, 2019a).

I obtained permission to conduct my research from the Ethics Committee of the University of Pretoria's Faculty of Education as well as Faculty of Health Sciences (Ethics Reference No: EDU194/20). I also obtained informed consent from the participants' parents (consult Appendix A) and assent from the child-participants themselves (consult Appendix B) prior to commencing with any data generation/collection sessions. As part of this process, I obtained permission from the child- as well as the parent-participants to audio-record all data generation and intervention sessions as

well as to take photographs of the data, the PRA-matrices and any worksheets completed during the sessions with the participants (Mouton, 2022; Nieuwenhuis, 2019a).

Before the field work commenced, I explained the research process, duration of the study, role of the participants and potential risks and benefits of participation. I respected the principle of voluntary participation and explained to the participants that they had the right to withdraw from the study at any given point if they wished to do so (Christians, 2018; Neuman, 2020). I respected the participants' right to privacy by remaining aware of and reminding them that they had the right to refuse to answer questions that made them feel uncomfortable (Mouton, 2022; Tracy, 2020). Additionally, I aimed to protect the identities of the participants and the locations of the research sites by concealing their personal data and securing the data at a safe place at the University of Pretoria (Creswell & Poth, 2018; Maree, 2019; Mouton, 2022). I blurred the faces of the participants in the photographs included in this thesis and made use of pseudonyms not to indicate their real names.

It was of the utmost importance to develop a trusting, open and respectful relationship with the participants. When interacting with them, I thus openly and honestly discussed the research process as well as the roles of the participants and of me as the researcher. I was available to the participants and provided them with my contact details, encouraging them to contact me if they had any queries or questions. Additionally, I created an environment of equality, acceptance and respect where both the child- and parent-participants could feel free to express themselves without any fear of prejudice, discrimination or harm (Babbie, 2010).

I strove to consider the special needs of the participants throughout the research process and ensured that I did not put them at risk (Creswell, 2014). I endeavoured not to cause any harm to the participants, nor to degrade or humiliate them, nor to release harmful information about them. All possible precautions were thus taken to ensure that the participants were protected from harm and that no psychological consequences would occur. Even though no instances of harm occurred I referred two of the participants for additional therapeutic support after identifying this need.

Due to the outbreak of the COVID-19 pandemic in 2020, I had to take additional precautions for the sake of physical safety during all data generation/collection sessions. As a result of this, most sessions were conducted *via* the online audio-visual platforms of Zoom and Google Meet to ensure the safety of both the participants and myself. Later on in my study, when some of the sessions were conducted in person, I complied with the regulations to protect oneself and others from the spread of COVID-19 as outlined by the World Health Organisation (World Health Organization, 2020). I further reflect and elaborate on the ethics considerations I respected in Chapter 3.

## **1.11 OUTLINE OF THE THESIS**

In this section I provide an overview of the content of the different chapters of this thesis.

## **CHAPTER 1: GENERAL ORIENTATION AND INTRODUCTION**

In Chapter 1, I provide an overview of the study by presenting the relevant background and explaining the rationale for my decision to explore the specific phenomenon. I stipulate the purpose and then formulate research questions that directed me in undertaking my research. I clarify the key concepts of the study after declaring my working assumptions. I also introduce the selected paradigms, research design and methodological choices I made, in addition to providing information on the guiding conceptual framework of the study. Lastly, I provide a brief overview of the ethics guidelines I considered and the quality criteria I adhered to.

## **CHAPTER 2: LITERATURE REVIEW**

In Chapter 2, I discuss the existing literature on CVD, the support needs of children with CVD and how they may be supported. I describe the causes, prevalence and types of CVD as well as the challenges that people with CVD often face. Next, I explore possible ways of supporting children with CVD against the backdrop of inclusive education, and then contemplate the potential value of including resilience in holistic interventions. I furthermore explain the conceptual framework of the study and discuss my integration of the various relevant concepts underlying the framework.

## **CHAPTER 3: RESEARCH PROCESS AND METHODOLOGY**

In Chapter 3, I discuss and justify the research process I completed. I therefore elaborate on the research design and methodological strategies I relied on in undertaking this study. I discuss the social constructivist stance I took in conducting a qualitatively-driven mixed methods study, explain my selection of cases and participants, and elaborate on the selected methods of data generation/collection and documentation and analysis. I conclude the chapter by discussing the ethical considerations and quality criteria I respected when conducting this research.

## **CHAPTER 4: RESULTS OF THE STUDY**

In Chapter 4, I present the results of the study in terms of the qualitative themes and sub-themes that I identified following the reflexive thematic analysis I completed. I also present the quantitative results I obtained during the pre-intervention and post-intervention phases. Throughout this chapter, I enrich my discussion of the qualitative results by providing visual and verbatim evidence for the themes and sub-themes I identified, and graphs and tables to reflect the quantitative results of the study. I then integrate the qualitative and quantitative results, explaining how this guided me in developing the holistic intervention yet also how the pre- and post-intervention results compared.

## **CHAPTER 5: FINDINGS OF THE STUDY**

In Chapter 5, I present the findings of the study by interpreting the results I obtained against existing literature and the conceptual framework I compiled and presented in Chapter 2. I highlight contradictions, similarities, silences and new insight gained from this study.

## CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

In Chapter 6, I provide an overview of the previous chapters. I draw conclusions by addressing the research questions that directed the study. Next, I reflect on the potential contribution of the study and identify the challenges I encountered, as well as the potential limitations of the study. Finally, I formulate recommendations for training, practice and future research.

### 1.12 CONCLUSION

In this chapter, I introduced my study and presented a brief overview of the research by outlining the rationale, stating the purpose and formulating guiding research questions. After introducing and contextualising the study, I indicated the selected paradigms, research design, selection procedures, and data generation/collection, documentation and analysis strategies I relied on.

In the next chapter, I explore existing literature that relates to the current study. To this end, I discuss the types, causes and prevalence of CVD, the challenges associated with the condition and the impact it may have on the holistic functioning of children, specifically focusing on the domains of daily living, academic, emotional, social and occupational functioning. Next, I explore existing literature on inclusive education policies and current attempts to support children with CVD. I contemplate the potential value of resilience-focused interventions for children with CVD and explain the value of promoting and fostering resilience-enabling skills amongst children. I conclude Chapter 2 by explaining my conceptual framework in terms of the way in which I integrated the ecological model for health promotion (McLeroy et al., 1988), principles from the HPIF for global mental health (Khenti et al., 2016) and Theron's (2018) transactional pathways to resilience, specifically, the *connect&dream&do* mechanisms of resilience.



# CHAPTER 2

## LITERATURE REVIEW

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### 2.1 INTRODUCTION

In the previous chapter I introduced my research and provided an overview of the study. I presented the rationale for focusing on the specific topic, formulated research questions and provided a brief overview of the epistemological and methodological paradigms that guided my research. I introduced the conceptual framework and provided an overview of the research process.

In this chapter, I explore the existing literature related to CVD, the possible impact of CVD on children's holistic functioning, as well as current support interventions available for children with CVD. I also discuss the potential value of resilience-focused interventions in supporting children with CVD and explain my conceptual framework in more detail.

### 2.2 UNDERSTANDING CVD

Colour vision refers to the ability of the eye to distinguish between different wavelengths of light and differentiate between the wavelengths and their corresponding colours (Jadhav et al., 2017; Pasmarter & Munakomi, 2022). Defects in colour vision may thus result in the inability to perceive different colours or seeing differences between various colours (Mashige & Van Staden, 2019).

#### 2.2.1 Normal colour vision

Colour vision is facilitated by several mechanisms in the brain and retina. The retina is the eye tissue layer that converts light impulses into visual signals that are subsequently transmitted to the brain. This process is possible through two major types of photoreceptor cells, namely cones and rods that are responsible for the ability to perceive different colours as they transmit visual signs from the eye to the brain (Mustafi et al., 2009; Zaleska-Żmijewska, 2017). More than approximately seven million retinal cones and 100 million rods are located on the outer layer of the retina, with these enabling normal colour vision. To be more specific, retinal cones are responsible for mediating vision in bright light and are critical for colour discrimination and visual acuity, while rods are responsible for providing vision in low light (Mustafi et al., 2009; Neitz & Neitz, 2000; Patel et al., 2016).

Typical human colour vision is referred to as trichromatic vision, in which case colour is represented in terms of quantities of three colour wavelengths, also known as chosen wavelengths or primaries. Accordingly, any colour may be reproduced by a mixture of the three carefully selected primaries (Simunovic, 2010; 2016). It follows that colour vision is attributed to the function of the three retinal cones. For the brain to produce normal trichromatic vision it must combine input from all three types

of retinal cones, each with its own photosensitivity to pigments of yellow/blue, green and red. These sensitivities result from the absorption of various wavelengths of light, reflecting from different colour pigments (Flück, 2011; Pasmanter & Munakomi, 2022; Simunovic, 2016; Wu et al., 2019).

The three retinal cone types, termed S, M and L cones are distinguished by the sensitivities they display to different portions of the visible spectrum (Mustafi et al., 2009). S cones are most sensitive to short wavelengths towards the blue end of the visual spectrum, M cones are sensitive to medium wavelengths towards the green portion of the spectrum and L cones are sensitive to long wavelength light towards the red end of the spectrum (Mustafi et al., 2009; Pasmanter & Munakomi, 2022). Stimulation of the different cones creates colour axes between blue-yellow and red-green that enable the visualisation and perception of different colours that fall within the range of the visual spectrum for normal trichromatic vision (Neitz & Neitz, 2011; Pasmanter & Munakomi, 2022; Patel et al., 2016).

The S cone is located on chromosome 7, while M and L retinal cones are located on the X-chromosome and are almost identical (Neitz & Neitz, 2000; 2010). According to Pasmanter and Munakomi (2022), M and L cones undergo frequent recombination that may cause the degree of sensitivity of the M and L cones when exposed to different wavelengths of light to change and become more severe that may, in turn, explain the development of CVD and the different degrees of severity of specifically red-green CVD (consult Section 2.2.3). Abnormalities in any of the three retinal cones cause the affected person to perceive colours differently from a person with normal colour vision (Mashige & Van Staden, 2019).

### **2.2.2 CVD and possible causes of the condition**

CVD is considered to be one of the most common vision disorders. It can take the form of either acquired or congenital CVD (Simunovic, 2010). According to existing literature, the most generally accepted and frequently reported occurrence of congenital CVD (CCVD) is approximately 8% in the male population and 0,5% in females (Simunovic, 2010). This difference in prevalence is related to CCVD usually being inherited in an X-linked chromosome recessive pattern. Accordingly, men will be affected when they inherit the defective gene on their single X chromosome. However, for women to be affected, both of their X chromosomes must carry the defective gene, necessitating that both parents pass on this chromosomal defect (Mashige & Van Staden, 2019; Simunovic, 2010). CCVD is therefore an X-linked chromosome disorder that is associated with a diverse range of abnormalities of the three retinal cones, optic nerve, optic tract, retina and visual cortex as well as mutations in the OPN1LW, OPN1MW and OPN1SW genes that may cause defects in colour vision (Neitz & Neitz, 2011). CCVD is a non-progressive, untreatable condition that remains constant throughout one's life (Mashige & Van Staden, 2019).

To elaborate, the OPN1LW, OPN1MW and OPN1SW genes provide the retinal cones with instructions on how to make photopigments. Each retinal cone contains different types of

photopigments that allow the eye to absorb light. Photopigments are molecules made up of an opsin (a heptahelical protein) and 11-cis retinal, which is a derivative of vitamin A (Hasrod & Rubin, 2016; Neitz & Neitz, 2011; Simunovic, 2010). The opsin made from the OPN1LW gene is sensitive to light in the orange/yellow part of the visual spectrum, with this opsin being associated with the L cone. The opsin pigment made from the OPN1MW gene is sensitive to light in the middle of the visual spectrum (green/yellow light) and is associated with the M cone. Lastly, the opsin pigment made from the OPN1SW gene is sensitive to light in the violet/blue part of the visual spectrum and is associated with the S cone (Patel et al., 2016; Hasrod & Rubin, 2016; Simunovic, 2010; 2016). Colour vision defects thus imply gene defects that may influence the function of one or more retinal cones, due to colour vision resulting from the alteration, malfunction or absence of one, two or all of the pigments in the retinal cones (Hashemi et al., 2019; Jadhav et al., 2017).

Acquired CVD may be the consequence of exposure to neurotoxins or disease (Neitz & Neitz, 2010), or the alteration of colour vision due to a systemic disease, such as diabetes and eye-specific diseases like cataracts and glaucoma (Pasmanter & Munakomi, 2022; Simunovic, 2016). Acquired colour vision defects may furthermore be the result of general and ocular pathology, such as neurological diseases, drug toxicity exposure to certain medications and toxins, or certain metabolic diseases, such as diabetes (Hashemi et al., 2019). According to Neitz and Neitz (2010, p. 478) the hallmark feature of CVD “is a reduction in the number of different colours that are seen as distinguishable from each other”, resulting in an inability to differentiate between certain colours.

### **2.2.3 Types and prevalence of CVD**

Various types of CVD are distinguished that fall within three broad categories, based on the number of retinal cones able to perceive colours, namely monochromacy, dichromacy and trichromacy (Mashige & Van Staden, 2019). Monochromacy, also termed complete colour blindness, is a rare deficiency and occurs when two or three retinal cones are abnormal, whereas dichromacy occurs when two retinal cones are able to perceive colour, resulting in the total absence of one specific colour. Finally, trichromacy occurs when one of the three retinal cone pigments is changed, resulting in the cones' spectral sensitivity to various wavelengths on the visible spectrum being altered, which may cause reduced sensitivity to specific colours (Khalaj et al., 2014).

The most common type of CVD is characterised by red-green deficiencies that are also known as the protan and deutan type (Neitz & Neitz, 2010). Protan type CVD, which may be absolute (protanopia) or partial (protanomaly), as well as deutan type CVD, which may be absolute (deutanopia) or partial (deutanomaly) is a result of abnormalities in the M and L cones in the retina and are termed red-green colour vision deficiencies (Ishihara, 1972). These deficiencies are characterised by reduced sensations of red and green that may lead to individuals experiencing difficulties with several colour combinations. These include difficulty to distinguish between reddish

and greenish hues, as well as between colours such as grey and turquoise, and pink or magenta and grey. Challenges may also arise to distinguish between blue, purple and violet, as well as colours within the middle to long wavelength portion of the visible spectrum, such as green, orange, yellow and red (Neitz & Neitz, 2010).

Tritan refers to colour vision defects caused by abnormalities in the S cone that are characterised by reduced sensations of yellow and blue, resulting in individuals experiencing confusion between black and blue, white, yellow and yellow-green, and between other colours in the short wavelength section of the visible spectrum, namely purple, blue, violet and blue-green (Berisso, 2018; Neitz & Neitz, 2010). This deficiency is termed blue-yellow deficiency. Among the various types of CVD, deuteranomaly is most prevalent, affecting approximately 5% of the male population, while deuteranopia affects 1,5% of the male population and protanomaly and protanopia 1% of the male population (Wu et al., 2019). Protanomaly, protanopia and deuteranopia affect 0,01% of the female population while deuteranomaly affects 0,4%. Tritanopia affects 0,008% of the population, with tritanomaly being rare and monochromacy very rare amongst both males and females (Berisso, 2018; Birch, 2012; Wu et al., 2019). Table 2.1 provides an overview of the types of CVD, indicating the proportion of the population being affected by each type (Berisso, 2018).

**Table 2.1**

*Overview of the types of CVD*

TYPE OF CVD	DEFICIT	GROUP OF DEFICIENCIES	PREVALENCE	
			MALES	FEMALES
Overall			8%	0,5%
Protanomaly	Malfunctioning red cone	Red-green	1%	0,01%
Deuteranomaly	Malfunctioning green cone	Red-green	5%	0,4%
Tritanomaly	Malfunctioning blue cone	Blue-yellow	Rare	Rare
Protanopia	Missing red cone	Red-green	1%	0,01%
Deuteranopia	Missing green cone	Red-green	1,5%	0,01%
Tritanopia	Missing blue cone	Blue-yellow	0,008%	0,008%
Monochromatic	Two or more missing cones	Complete CVD	Rare	Rare

*Note.* Adapted from Berisso (2018)

By understanding the various types of CVD, I was able to provide appropriate support to the child-participants and create resources that they would be able to view and engage with without depending on colour. I accordingly designed materials that are CVD-friendly and used colours within the child-participants' perceivable spectrums. I furthermore emphasised key information with bold text and through visual cues other than colour. Additionally, my knowledge enabled me to educate the child-participants on what CVD entails, what possible causes are and why they are affected by the

condition. By imparting this knowledge, I attempted to empower the participants with knowledge and enable them, in turn, to inform and educate others about their condition.

In Figures 2.1, 2.2 and 2.3 some images are included, as typically seen by people with normal colour vision. In Figures 2.4, 2.5 and 2.6, the same images are displayed, illustrating how people with the different types of CVD and the various forms of each will see the images. In line with the context and purpose of the current study, the three examples that are included illustrate what a child with CVD may see in the different areas of functioning of their lives.

**Figures 2.1, 2.2 and 2.3**



*Images as seen by people with typical vision*



*Note.* Images were generated using Meta AI. The images were generated in response to these respective prompts: 'Create an image of rainbow in a forest', 'Create an image of coloured pencils' and 'Create an image of school children in the art classroom'.

**Figure 2.4**

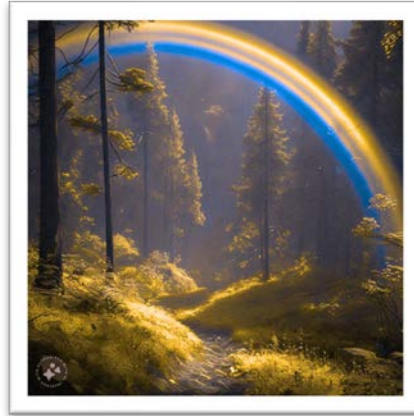
*Images seen by people with the various types of CVD in comparison to Figure 2.1*

RED-GREEN CVD	
PROTANOMALY (PARTIAL)	PROTANOPIA (ABSOLUTE)
	

**DEUTERANOMALY (PARTIAL)**



**DEUTERANOPIA (ABSOLUTE)**

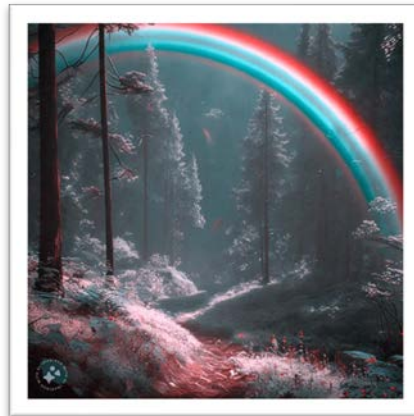


**BLUE-YELLOW CVD**

**TRITANOMALY (PARTIAL)**



**TRITANOPIA (ABSOLUTE)**



**COMPLETE COLOUR BLINDNESS**

**MONOCHROMACY**

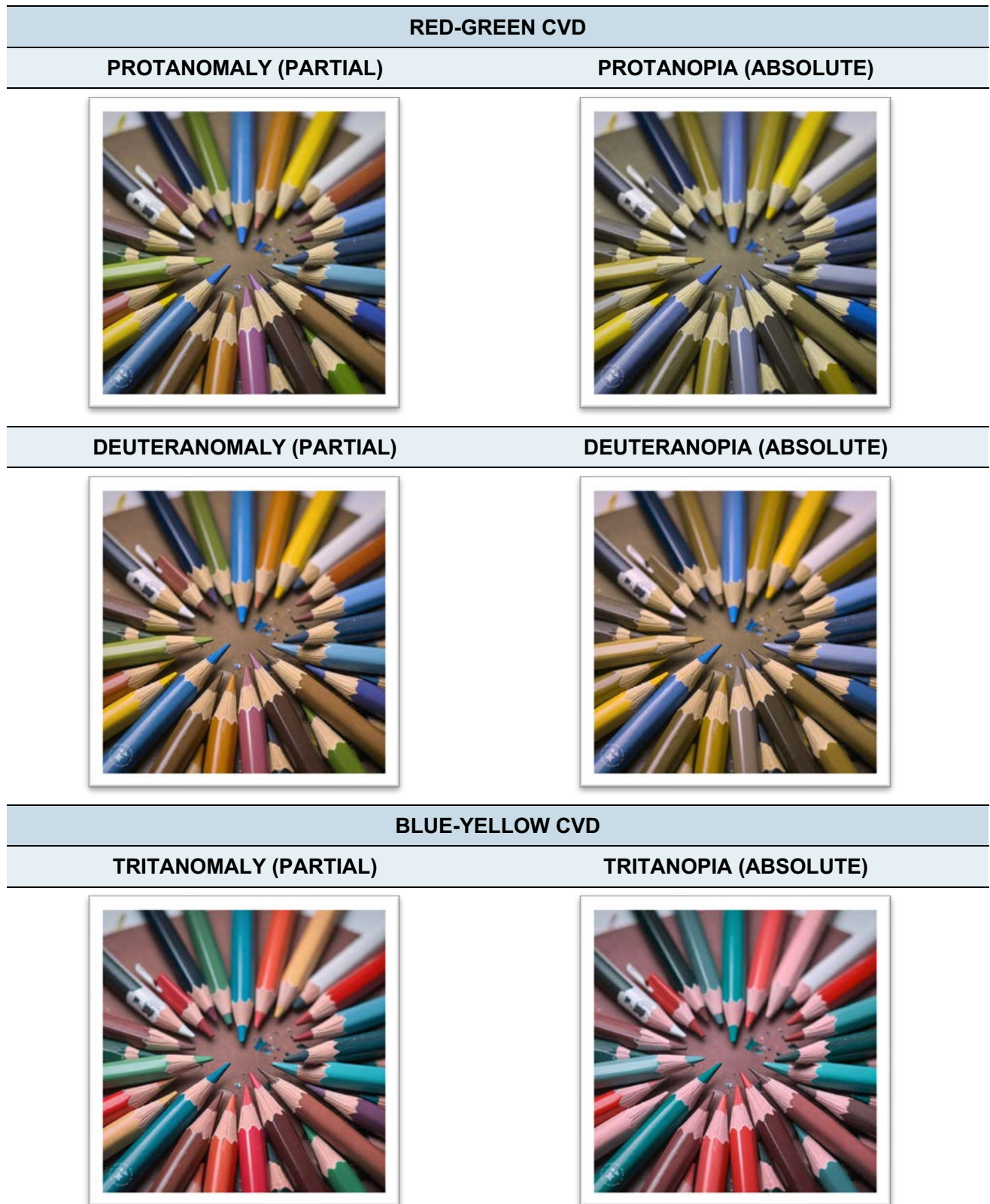


*Note.* The images have been adapted to depict what a child with CVD would see and were created using a CVD simulator (Pilestone Colour Blind Experts, n.d.).

As indicated, Figure 2.5 illustrates what people with different types of CVD may see in the school or academic context.

**Figure 2.5**

*Images seen by people with the various types of CVD in comparison to Figure 2.2*



**COMPLETE COLOUR BLINDNESS**

**MONOCHROMACY**



*Note.* The images have been adapted to depict what a child with CVD would see and were created using a CVD simulator (Pilestone Colour Blind Experts, n.d.).

In Figure 2.6, illustrations are included of what people with different types of CVD may see in their academic and social contexts.

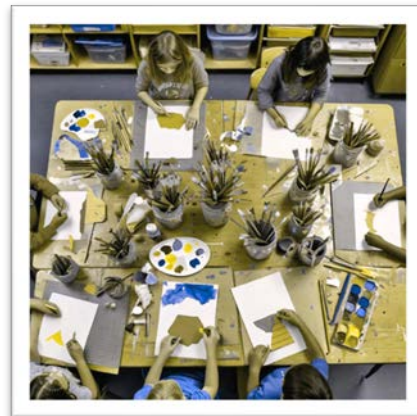
**Figure 2.6**

*Images seen by people with the various types of CVD, in comparison to Figure 2.3*

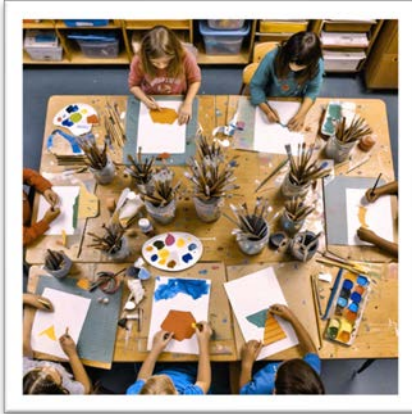
**RED-GREEN CVD**

**PROTANOMALY (PARTIAL)**

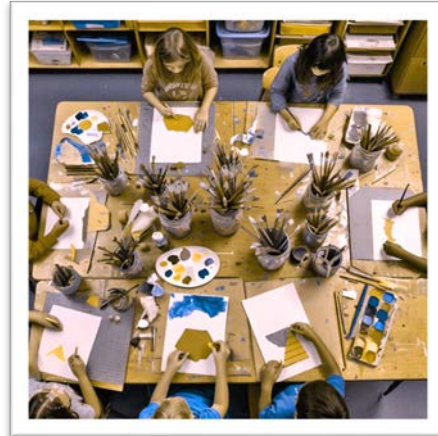
**PROTANOPIA (ABSOLUTE)**



**DEUTERANOMALY (PARTIAL)**



**DEUTERANOPIA (ABSOLUTE)**

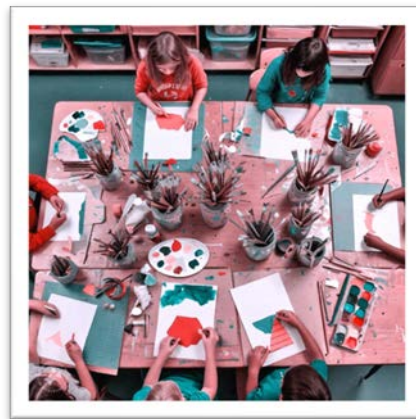


**BLUE-YELLOW CVD**

**TRITANOMALY (PARTIAL)**



**TRITANOPIA (ABSOLUTE)**



**COMPLETE COLOUR BLINDNESS**

**MONOCHROMACY**



*Note.* The images have been adapted to depict what a child with CVD would see and were created using a CVD simulator (Pilestone Colour Blind Experts, n.d.).

A review of available literature indicates that several studies have been investigating the prevalence of CVD amongst various global population groups in the past (Birch, 2012; Eze et al., 2020;

Harrington et al., 2021; Hashemi et al., 2019; 2023; Khalaj et al., 2014; Khosla et al., 2017; Mashige & Van Staden, 2019; Mitiku et al., 2020; Moudgil et al., 2021; Osman et al., 2021; Reddy et al., 2017; Shah et al., 2013; Shrestha & Pradhan, 2022; Wale et al., 2018; Woldeamanuel & Geta, 2018; Zelalem et al., 2019). The findings of these studies indicate that the prevalence of CVD varies across different racial groups and geographical regions. To be more specific, Asians and Caucasians have been found to exhibit higher prevalence rates of CVD when compared to African populations (Birch, 2012), with the prevalence of CVD being approximately 8% among men and 0,4% among women of European Caucasian descent. Harrington et al. (2021) found in their study amongst predominately Caucasian Irish school children that 8,3% of the male child-respondents had CVD and 1,8% of the female children who participated. In contrast, among men of Chinese and Japanese descent, the prevalence of CVD has been found to range between 4% and 6,5%. Additionally, the prevalence of CVD has been reported as 6,5% in China, 7,3% in Turkey, 4,7% in Iran, and from 2,8% to 8,2% in India by Abah et al. (2011), Niroula and Saha (2010), Shrestha et al. (2010) and Wale et al. (2018).

Following an investigation focusing on the prevalence of CVD amongst Black South African school children, Mashige and Van Staden (2019) indicate the prevalence as 2,2%, with 2,3% being reported by other scholars in Ibadan, South-West Nigeria and 2,6% in Port-Harcourt, Southern Nigeria (Abah et al., 2011; Niroula & Saha, 2010; Shrestha et al., 2010; Wale et al., 2018). Mashige and Van Staden (2019) indicate a higher prevalence of CVD amongst male children (4,2%) than female children (0,5%). In their study, Mashige and Van Staden (2019) did not detect any monochromacy amongst their participants, confirming that the condition is rare amongst the group who participated (Birch, 2012; Neitz & Neitz, 2010). The fact that Mashige and Van Staden (2019) rather recently initiated the first South African inquiry into the prevalence of CVD amongst Black school children points to the limited research and availability of statistics and information on this subject in South Africa. Their study underscores the necessity for further local research to gain deeper insight into this condition within the South African context across various ethnic and racial groups.

#### **2.2.4 Identification and diagnosis of CVD**

A study by Woldeamanuel and Geta (2018) indicates that most of the children who are screened for CVD are unaware of their colour vision status. In agreement with this finding, Chan et al. (2014), Dohvoma et al. (2018) and Steward and Cole (1989) report that most children with CVD discover the condition only later on in their school careers. CVD may, as a result, be misdiagnosed due to a lack of awareness and/or an insufficient understanding of the condition, resulting in children possibly being labelled as difficult or having other learning difficulties or attention deficits (Chaparro & Chaparro, 2017; Male et al., 2024; Prieto et al., 2021). As a result, undiagnosed CVD can cause distress and contribute to academic, emotional and social challenges. This possibility emphasises the importance of early detection of CVD as this is essential to provide such learners with the appropriate support and minimise negative learning experiences. In response to this apparent lack

of awareness of CVD in society, I developed two resource booklets for children with CVD (consult Appendix C) and their parents and teachers (consult Appendix D) as part of my study. These booklets aim to serve as resources that may create and facilitate awareness of CVD, as well as contribute to the support materials available for CVD.

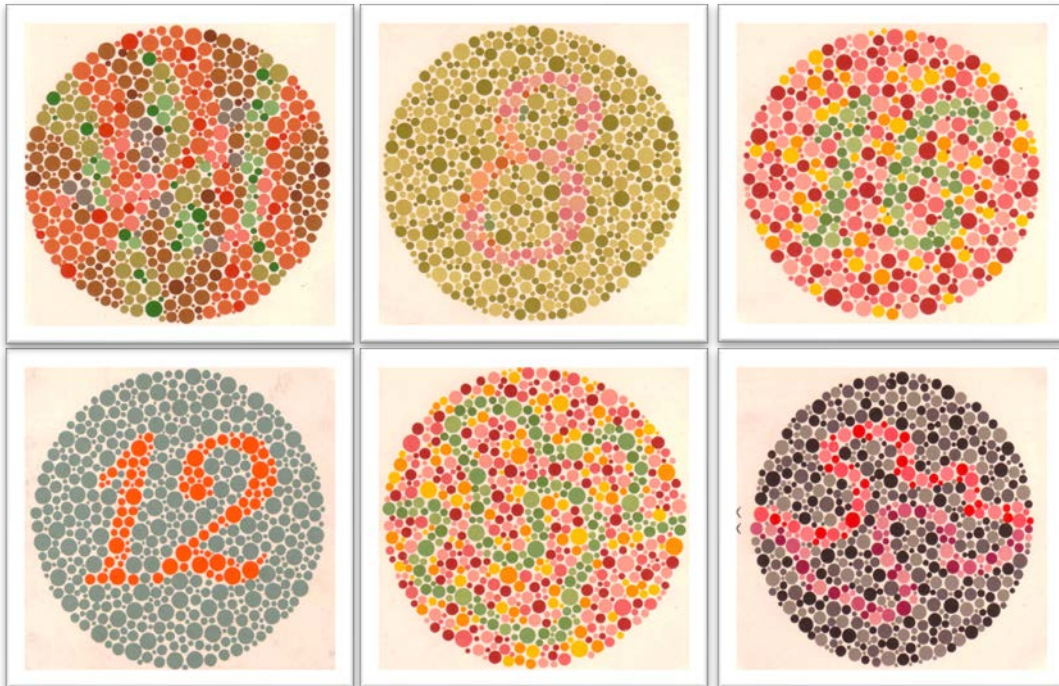
According to Sullivan (2011b), in the United Kingdom children are not routinely screened for CVD as the condition is not considered to be a special educational need, despite the fact that it can disadvantage children on various levels of academic functioning (Male et al., 2024). Similarly, in South Africa, no formal screening for CVD is done in early childhood education settings (Mashige & Van Staden, 2019). Limited provision thus seems to be made for supporting children with CVD who struggle with tasks that rely on colour perception in both the United Kingdom and South Africa by identifying these children at an early age (Colour Blind Awareness, 2020; Male et al., 2024; Mashige, 2019; Mashige & Van Staden, 2019; Sullivan, 2011a; 2011b). Chan et al. (2014) concur with this finding by emphasising a lack of awareness of CVD amongst the general population of Singapore as well as the absence of adequate screening instruments to detect colour vision defects in the general population (Chan et al., 2014; Dohvoma et al., 2018). Keeping this in mind, I assumed that the participants in my study may have received limited support and information concerning CVD in the past and therefore I aimed to create a holistic intervention that could bridge this knowledge gap and provide the participants with useful knowledge and skills that they could use to counter the negative implications of CVD when left unsupported. Additionally, the resource booklets I developed aim to serve as supportive materials for people with CVD and those interacting with them to better understand CVD and thereby be able to provide appropriate support.

In this regard, Mashige and Van Staden (2019) emphasise the importance of colour vision assessments for individuals affected by CVD, due to such assessments holding the potential of enabling individuals with CVD to implement adaptive strategies that may reduce the risks associated with the condition. By identifying their specific challenges and limitations in colour perception, individuals can, for example, develop coping mechanisms and strategies to navigate daily tasks and activities more effectively (Birch, 1989; Male et al., 2024; Prieto et al., 2021; Shi et al., 2014). Additionally, colour vision assessments can assist in raising awareness of CVD and ensuring better support and accommodation for those who need these, ultimately enhancing the individual's overall quality of life and functioning.

In terms of existing available screening instruments, the absence or presence of CVD can be determined by colour vision tests such as the Ishihara Test (Ishihara, 1972), Farnsworth-Munsell 100 Hue Test (Farnsworth, 1957) and the Hardy-Rand-Rittler (HRR; Hardy et al., 1954) Standard Pseudoisochromatic Test, 4th ed. (Bailey et al., 2004; Birch, 1989; Farnsworth, 1943; Foote et al., 2014; Varikuti et al., 2020). The Ishihara (Ishihara, 1972) colour vision test is one of the most common methods used to identify CVD. This test consists of a series of plates with coloured dots displaying

numbers or figures, as depicted in Figure 2.7. Individuals with typical colour vision can easily discern the patterns or numbers on the plates, whereas those with CVD may struggle to differentiate these. According to Chan et al. (2014), the Ishihara chart is thus ideal to implement as a routine screening tool in schools as it can identify congenital red-green CVD in children.

**Figure 2.7**  
*Ishihara test plates*



*Note.* Images of the Ishihara test plates have been photographed directly from the original source (Ishihara, 1972).

The Farnsworth-Munsell 100 Hue Test (Farnsworth, 1957) and the HRR Standard Pseudoisochromatic Test, 4th ed. (Hardy et al., 1954) offer more detailed assessments of colour discrimination abilities, allowing for a comprehensive evaluation of an individual's colour vision (Bischhoff, 2016; Foote et al., 2014; Varikuti et al., 2020). The Farnsworth-Munsell 100 Hue Colour Vision Test (Farnsworth, 1943) is commonly used to assess CVD. The test consists of four rows of similar colour hues, each containing 25 distinct variations of each hue, with fixed anchor hues at the ends of each row. Test participants are requested to arrange the hue tiles between the anchor hues according to their perceived colour order. The final arrangement reflects the individual's ability to discern differences in colour hue. Limitations and deficiencies in colour vision can be quantified based on the number of misplaced tiles or the severity of displacement, measured as the distance between the correct and actual placement of a tile (Birch, 1989; Farnsworth, 1943; Foote et al., 2014). A limitation of this test is that it is time consuming and the results can be negatively impacted by lapses in patience and concentration (Foote et al., 2014).

Similarly to the Ishihara colour vision test, the HRR Pseudoisochromatic Plate Test, 4th ed. uses plates to determine an individual's colour vision ability and screens for CVD. The test comprises a 6-plate screening section plus 14 detailed diagnostic plates to determine the type and extent of CVD, as depicted in Figure 2.8. When compared to the Farnsworth-Munsell 100 Hue Colour Vision Test, the HRR provides a quicker yet accurate measure of CVD (Bailey et al., 2004; Birch, 1989; Foote et al., 2014).

**Figure 2.8**  
HRR test plates



*Note.* Retrieved from Foote et al. (2014)

In support of the screening for CVD, a person's medical history, including any previous diagnoses or family history of CVD, is considered during the diagnostic process to provide a more comprehensive understanding of the individual's condition. If CVD is suspected, individuals are often referred to ophthalmologists or optometrists or to a general physician if specialists are not available for further evaluation and confirmation of the diagnosis, which may involve additional tests and examinations to assess the severity and specific characteristics of the condition (Cole, 2016; Colour Blind Awareness, n.d.-b).

Even though screening tests are not implemented at schools in South Africa, teachers can fulfil a role in identifying children struggling with colour identification who potentially suffer from CVD. Typical signs that may indicate CVD include the consistent use of incorrect colours for objects by a child; for example, colouring leaves purple instead of green, and avoiding schoolwork or tasks that involve colour. These children may show decreased attention when colour is involved in tasks or explanations of content, struggle to distinguish between certain colours or shades, and perceive the brightness of colours differently from their peers. In keeping this in mind when conducting my study, I created resources that were not colour-dependent and limited my use of colour during the PRA-guided sessions with the child-participants.

Other symptoms of CVD that may be observed by others relate to sensory behaviours, such as smelling food before eating it, and complaints of eye discomfort or headaches when viewing colourful

text on coloured backgrounds. Furthermore, problems may be experienced in identifying red or green-coloured pencils, or any pencils with red or green components, extending to difficulty distinguishing similar hues like purple from blue, pink from grey, or red from brown. Such identification challenges can be exacerbated by dim lighting, small colour areas, and encountering colours of the same hue. Sensitivity to bright lights and specific colour combinations may also cause discomfort for a person with CVD, potentially resulting in reading difficulties on coloured pages or worksheets that use colour-on-colour presentations. Additionally, eye strain or headaches will typically result from viewing contrasting colour combinations, such as red on a green background. Interestingly, however, individuals with CVD are generally proficient in seeing through camouflage due to their unique visual perception (Colour Blind Awareness, n.d.-c).

### 2.3 IMPACT OF CVD ON HOLISTIC FUNCTIONING

Little research has been conducted that specifically focuses on the unique implications of CVD for the various domains of functioning (Kvitle, 2018). In this section, I indicate how CVD may affect the lives of those affected by the condition, referring to general and specific challenges often faced by people with CVD throughout their lifespan. As an introduction, Figure 2.9 provides an overview of the potential effect of CVD on individuals at different life stages. In the discussion that follows, I refer to challenges relating to the possible effects of CVD on everyday living, school-related performance, emotional functioning, social functioning as well as career choices.

**Figure 2.9**

*Overview of the areas of functioning that can be influenced by CVD per life stage*



*Note.* Adapted from Chan et al. (2014)

Given the importance of colour as an essential aspect of communication, it can be expected that defects in colour vision may have sociocultural implications throughout an individual's life (Melo et al., 2014). In this regard, Wu et al. (2019) state that colour serves as a non-linguistic code that provides people with important information about the environment surrounding them. Stoianov et al. (2019) similarly emphasise colour as a powerful tool that is generally used for emphasising and

encoding visual information in daily life despite a person's lifestyle, culture or background. Colour is thus an important component of visual information, and often linked to different objects or feelings (colour association) that can support individuals as they interact and engage with people and the world surrounding them.

As such, atypical colour vision can qualitatively influence an individual's life even in a case of the CVD being barely noticeable (Stoianov et al., 2019). In applying this argument to my study, I attempted to acknowledge the child-participants' experiences notwithstanding the severity of their CVD, focusing on how the condition influenced their experiences and functioning. According to Stoianov et al. (2019), regardless of the degree or severity of an individual's CVD as well as how they have sought to correct this, changes in colour vision will probably impact daily routine as well as the way in which people with CVD perceive and understand the world. As children with CVD may experience failures at an early age, such experiences can lead to long-term ramifications in terms of academic, emotional and social functioning, resulting in them potentially requiring support.

Based on my discussion in this section, I remained aware of the challenges that children with CVD may experience throughout the research process. I attempted to attend to these challenges by imparting appropriate knowledge and skills to the participants in an attempt to reduce the negative implications of CVD they may have experienced. Additionally, I remained conscious of the limited available research on the experiences of children with CVD and its impact on daily functioning. Therefore, I remained open to exploring this phenomenon with the child-participants and their parents by acknowledging their experiences and focusing on an in-depth understanding of the phenomenon rather than solely relying on imparting knowledge and skills.

Even though my discussion in this section focuses on the challenges experienced by people with CVD, some studies have identified a potential advantage of the condition related to people with CVD being able to better identify and recognise changes in textures and camouflage than those with normal colour vision. This suggests that people with CVD are better able to identify colour patterns as they focus less on colour interference and focus more on texture detection (Morgan et al., 1992; Neel & Post, 1963; Stoianov et al., 2019).

### **2.3.1 Potential impact of CVD on daily living**

Although CVD is not life-threatening, people with the condition often experience challenges in their everyday life (Mashige & Van Staden, 2019). When misdiagnosed or undiscovered, a person with CVD may not be able to identify the root cause of the difficulties experienced. According to Wu et al. (2019), nearly 90% of all dichromats (when only two retinal cones are able to perceive colour) and 66% of all trichromats (when one of the three retinal cone pigments is changed) experience challenges with everyday tasks involving colour. As colour vision is a basic requirement in most daily

living activities related to tasks of work, clothing, driving and cooking, people with CVD can thus be negatively influenced in terms of quality of life and daily living (Osman et al., 2021).

Sullivan (2011a), for example, explains that people with CVD may experience difficulty in dressing themselves due to them finding it hard to match specific coloured clothing or pick suitable clothes from a colourful pile. CVD may similarly affect a person's food choices as people with CVD may perceive certain foods, especially vegetables, as unpalatable due to their perceived colour (Sullivan, 2011b). This may lead to children with CVD becoming fussy eaters and not consuming enough foods that may support their growth and development.

In the same way, people with CVD may experience difficulty in selecting groceries based on colour. For instance, individuals with CVD may struggle to distinguish between similarly coloured items, such as green and red apples, which can lead to confusion and incorrect choices. Moreover, determining the ripeness of fruits can be particularly challenging; for example, to recognise when bananas are ripe, as the transition from green to yellow might not be easily discernible for people with CVD (Colour Blind Awareness, n.d.-d). This difficulty extends to other fruits and vegetables, where colour changes indicate freshness or spoilage. Additionally, people with CVD may also encounter difficulties in cooking, specifically with distinguishing between raw and cooked meat or whether vegetables are adequately cooked or not, due to their inability to perceive typical visual cues, leading to challenges in assessing the readiness of food for consumption. This can lead to overcooked or undercooked food, and have implications for food safety, as undercooked meat poses health risks associated with foodborne illnesses (Colour Blind Awareness, n.d.-d).

Other challenges that people with CVD may experience in their daily lives include the possibility of not being able to notice changes in the colour of skin due to sunburn, confusion about the colour of medication, and not noticing a change in colour of urine, vomit or stools when blood or mucus is present (Barry et al., 2017). In addition, people with CVD may experience difficulties in identifying rashes or changes in moles and other skin lesions (Raynor et al., 2019). These difficulties will persist throughout a child's life and into middle and late adulthood (Barry et al., 2017; Melo et al., 2014).

In life in general, colour is widely used to direct attention to targets, as a coloured target item can usually be found quickly by people with normal colour vision (Costedoat & McHughes Palmer, 2018). However, individuals with deutan or protan CVD face unique challenges in noticing certain signals and signs when compared to those with normal colour vision. For instance, to differentiate between green, yellow, orange and red, people with deutan or protan CVD may need to rely more heavily on the luminance hierarchy, where yellow appears the brightest, followed by green, orange and then red. Although this strategy can assist their ability of recognition, it may also increase the time needed to notice a specific coloured object (Costedoat & Palmer McHughes, 2018). In daily living, this poses significant challenges; for example, when driving, when the quick recognition of signs and signals is

crucial. Important signals often occur amidst distractions, and if colour is the primary identifier, those with CVD will be at a substantial disadvantage. Experiencing difficulty to recognise critical signals quickly may lead to accidents or other unintended consequences, impacting individuals' safety and daily functioning (Costedoat & McHughes Palmer, 2018).

Several studies investigating the impact of CVD on driving have documented this reduced ability of people with CVD to detect different traffic signals and signs when compared to people with normal colour vision as well as to distinguish traffic lights, decode traffic signs, identify vehicle brake lights and interpret road signs (Barry et al., 2017; Cole, 2016; Costedoat & McHughes Palmer, 2018; Melo et al., 2014). According to studies conducted by Cole (2004; 2016), people with red-green CVD, in particular, experience difficulties in identifying road traffic signal lights. To be specific, one of Cole's (2004) surveys indicates that 49% of the dichromats and 18% of the anomalous trichromats who participated reported difficulty to differentiate the colours of traffic lights. Additionally, 16% of the people with protan-type CVD indicated that they sometimes fail to see red traffic lights, and 20% of the dichromats indicated that they find it difficult to identify vehicle brake lights.

As a result of such difficulties and the potential risk to community safety, people with CVD may experience challenges in obtaining a driver's licence in some countries outside South Africa (Tan et al., 2023). According to Manyal (2023), people with CVD specifically face limited driving rights in countries such as Turkey, Singapore and Romania due to their condition. These individuals are often prevented from obtaining a driver's licence in these countries to safeguard against possible accidents caused by colour recognition difficulties. However, this is only the case in a few countries globally, with CVD not hindering an individual from obtaining a licence for private or commercial vehicles in the rest of the world (Tan et al., 2023). In this regard Tan et al. (2023) argue that most individuals with CVD can adapt and drive safely if they have normal visual acuity and understand their condition's associated limitations and how to overcome these.

Similar to experiencing difficulties with road signs, people with CVD may find it hard to navigate public spaces. For example, interpreting coloured signs, maps and transit lines requires the ability to distinguish between various colours, which can lead to misunderstandings and difficulties in finding the correct routes or locations if an individual is not able to differentiate between the various colours. According to the United Kingdom's Sports Grounds Safety Authority (2018), people with CVD may also experience difficulty in interpreting important safety information, such as emergency evacuation routes, differently coloured seats, maps, wayfinding signs, and clearly seeing safety related signs or emergency equipment against certain background colours, for example, in the case of some emergency signs or equipment being red (Sports Grounds Safety Authority, 2018).

This challenge extends to electronic devices, where colour-coded notifications and alerts may not be easily interpretable for individuals with CVD. Closely related, household appliances may present

challenges to individuals with CVD, as many modern appliances use coloured lights and indicators to display status, settings and errors (Colour Blind Awareness, n.d.-d). For example, washing machines often use coloured LEDs to signal different stages of the washing cycle, while ovens typically use coloured indicators to indicate preheating status or temperatures. These colour-based cues can be difficult or impossible for someone with CVD to interpret accurately. Moreover, small kitchen appliances such as coffee machines, toasters and microwave ovens often use colour-coding for different functions that can complicate their use for individuals with CVD. To name an example, distinguishing between the settings for defrosting and reheating in a microwave oven might rely on coloured buttons or displays, creating potential confusion and errors when used by someone with CVD (Colour Blind Awareness, n.d.-d; Kobrin & Martin Optometrists, 2017).

In terms of technology, many digital interfaces and content heavily rely on colour to convey information, differentiate elements, and enhance user experience (Napoli & Chiasson, 2018; Wu et al., 2019). User interface design, for example, often utilises colour to highlight important information, indicate status (for example, red for errors, green for success), or differentiate between categories. However, people with CVD may not perceive these distinctions accurately, impacting their ability to navigate and interact with digital platforms effectively. Content consumption may also be affected, as reading text on backgrounds with insufficient contrast can be difficult for these individuals (Kerac et al., 2022). To be more specific, when the contrast between text and background colours is low, it becomes challenging for someone with CVD to read and comprehend the content. Additionally, educational and professional materials may include colour-coded charts and graphs that will be hard to interpret when not able to distinguish colours. In the same way, visual media, such as images and videos, often use colour to convey key information or visual cues that individuals with CVD may miss, reducing their ability to understand the content they review fully (Plothe, 2018; Tillem & Gün, 2023). In considering these possibilities, I remained actively aware of the visual media I selected to use in the holistic intervention. For this purpose, I relied on media that would be easily distinguishable and viewable by the child-participants to add meaning to the intervention rather than cause distress.

Closely related to the use of technology in general and for educational purposes, gaming may pose another challenge to people with CVD, as video games frequently use colour to indicate progress, identify characters or items and convey essential information. Players with CVD may struggle to engage fully or compete effectively in video or computer games. Moreover, not all software or digital platforms include accessibility options, such as high-contrast modes, CVD-friendly palettes, or the ability to adjust colour settings for users with CVD. Consequently, such users will often rely on third-party tools or browser extensions to adjust the colour schemes, which can be inconvenient and may not always work seamlessly (Kerac et al., 2022; Reinaldo et al., 2021; Wu et al., 2019). According to Napoli and Chiasson (2018) who investigated the effects of CVD on casual computer gaming and overall user experience, objective measures will not indicate a significant decline in gaming performance due to CVD, yet people's subjective experiences of a game's difficulty will probably be

affected. Ongoing research in the field of CVD and its impact on the gaming experiences of individuals is, however, required to reach final conclusions on this topic (Tillem & Gün, 2023).

### **2.3.2 Potential effect of CVD on school performance and academic functioning**

According to Liquin and Gopnik (2022), children learn by exploring and engaging with the environment around them. Sullivan (2011a) emphasises that it is thus important to consider how children are instructed during their early childhood years and how a condition such as CVD can influence their learning. In this regard it is important to remember that children are often exposed to colourful objects during their early childhood years and encouraged to develop the ability to understand and navigate the world by relying on colour. Children are, for example, expected to develop the ability to sequence by using colour before they start reading. In the same way, colour is utilised to describe most objects and scenarios to young children (Sullivan, 2011a). Despite this reliance on colour when presenting children with new content, Chan et al. (2014) indicate that a child with deutan type CVD will, for example, only be able to accurately identify four colours within a box of 24 coloured pencils, even though they might be able to guess some other colours. As these children will typically confuse colour combinations and will often be unable to accurately identify and differentiate certain colours, they will be disadvantaged throughout their academic career if undiagnosed (Colour Blind Awareness, 2020). Furthermore, in the case of a child being diagnosed yet not given the necessary support, they may also be disadvantaged and discriminated against.

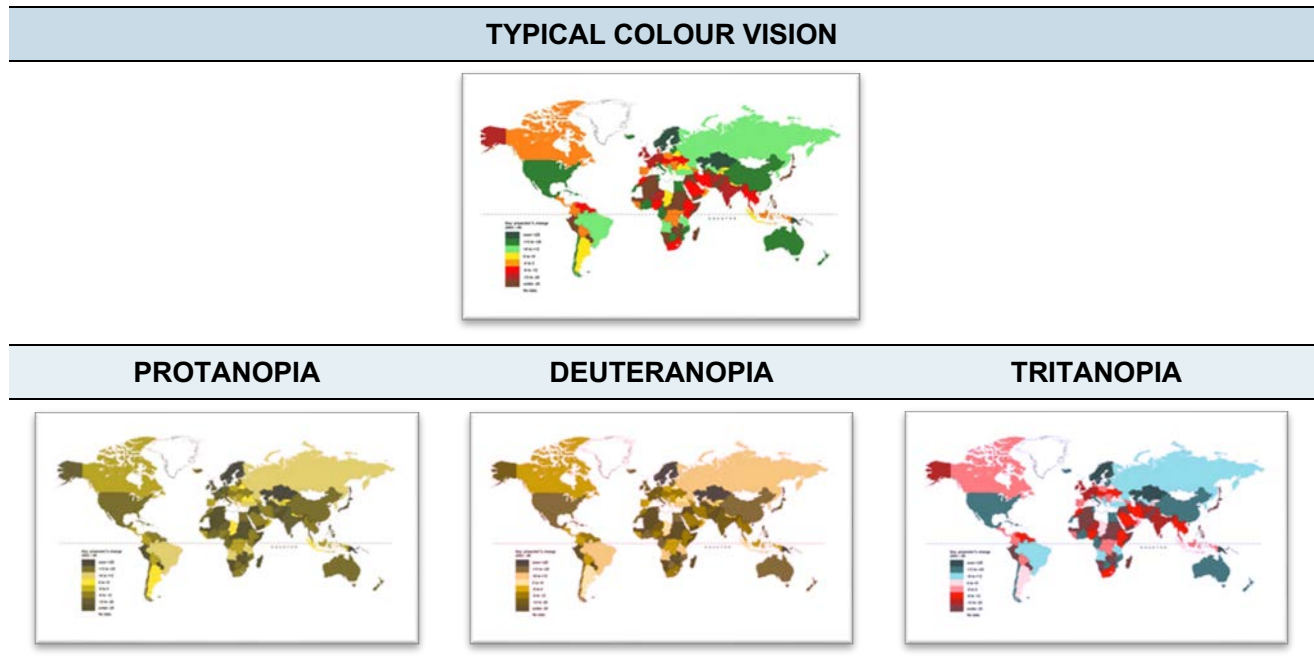
Children with CVD are typically challenged in a variety of school subjects, especially when colour is utilised as a primary teaching tool (Chan et al., 2014; Sullivan, 2011a; 2011b). For example, children with CVD may experience difficulty when analysing and interpreting charts, maps and images in their textbooks (Zorn & McMurtrie, 2019). Subjects that these children commonly experience difficulties in include Art, Mathematics, Physical Science, Biology, Geography, Physical Education and Consumer Studies.

To be more specific, in the Arts classroom children with CVD may, for example, be unable to differentiate colour and understand how to use colour when learning colour theory, when painting or when creating artworks. In the Mathematics classroom, children with CVD may be unable to differentiate which colour relates to which data in graphs and charts, with this potentially causing them to incorrectly calculate or understand a concept. In the Physical Science classroom, children with CVD may experience difficulty in reading litmus paper, differentiating colour changes in experiments, or when working with chemical solutions. They may also find it hard to identify the colour of a flame produced when a specific compound is burnt. Furthermore, in the Biology class, children with CVD may not be able to accurately read slides under the microscope, identify species of plants, carry out dissections, or understand coloured diagrams and drawings in textbooks and in examination papers (Albany-Ward, 2011; Chan et al., 2014; Spalding, 1997). Figure 2.10 provides

examples of how children with CVD may perceive maps in the Geography classroom when compared to the image of what typically sighted children will see (Colour Blind Awareness, n.d.-a).

**Figure 2.10**

*Examples of how children with various types of CVD may perceive maps*



*Note.* Retrieved from Colour Blind Awareness (n.d.-d)

Results from several studies investigating the academic achievement of children with CVD in Italy indicate that these children typically present with lower overall school achievements than their sighted peers (Grassivaro Gallo et al., 1998; 2002). Suero et al. (2005) similarly found that Spanish children with CVD achieved lower scores when performing tasks that require colour discrimination. This finding is confirmed by Moudgil et al. (2021) who state that CVD can pose a handicap to the performance of affected individuals. Studies such as these suggest that CVD may negatively affect learning and present a barrier to learning that may impede the optimal academic development and functioning of these children.

Despite the potential barrier to learning that CVD may present, Torrents et al. (2011) indicate that evidence of efforts to design and develop CVD-friendly learning and teaching resources and materials remains scarce, resulting in children with CVD often having to spontaneously develop adaptive strategies to counterbalance the difficulties they experience. As published literature offers only a few examples of teaching resources developed and designed specifically for children with CVD (Melgosa et al., 2006; Rubin et al., 2009), the need for ongoing research in this field seems clear. Keeping this in mind, I developed a CVD resource booklet for parents and teachers, aiming to provide them and potentially others in the field of education with guidelines on how to support children with CVD in an attempt to address the limitation of existing available research.

Most children with CVD experience difficulty at school, especially when they are regularly exposed to colourful objects. To mention an example, children at school are often asked to describe and identify objects based on their colour, or to work on school materials that are colourful (Barry et al., 2017; Chan et al., 2014; Cole, 2015; Mashige, 2019). According to Sullivan (2011a), other difficulties that children with CVD may experience include the inability to accurately describe objects around them, difficulty to read coloured printing against a coloured background as well as challenges to follow instructions relating to and including colour. Such difficulties may translate into practical difficulties whereby children with CVD struggle to complete tasks involving colour. In extreme cases, children with CVD may, as a result, develop additional learning difficulties that may hinder their ability to function and develop optimally.

As indicated earlier, teachers may misdiagnose or struggle to recognise the root of the difficulties of children with CVD and may associate these with other more common learning impairments (Mashige & Van Staden, 2019; Sullivan, 2011a; 2011b; Torrents et al., 2011; Zorn & McMurtrie, 2019). Children with CVD may, as a result, potentially be labelled by peers and even teachers as being less intelligent or slow due to them being perplexed by the need to make decisions and choices based on a construct they do not see like others do (Eze et al., 2020). Children with CVD may thus find it hard to cope in the classroom and meet expectations, especially in the early grades. Such perceived inadequacies may result in observable emotional, social and behavioural difficulties (Chakrabarti, 2018; Espinda, 1973; Kvitle, 2018), as discussed further on in Sections 2.3.3 and 2.3.4<sup>7</sup>.

The misdiagnoses of CVD in children can have significant consequences, both on an academic and emotional level. CVD can thus be considered as a learning impairment as it impedes a child's ability to learn optimally, especially when support is not received (Sullivan, 2011a). To elaborate, when teachers incorrectly label a child as having CVD without a proper assessment or understanding of the condition, it can lead to misunderstandings and unfair expectations of these children. This may result in unnecessary scrutiny or support provision that does not identify or address the actual support needs of the child. Such unjust labelling can also affect a child's self-perception, as they may internalise the belief that they are different or deficient in some way (Chaparro & Chaparro, 2017; Kvitle, 2018). Keeping this in mind, I included resilience-enabling and communication skills in the resilience-enabling intervention that was facilitated with the child-participants, with the hope of them applying these skills to future challenges experienced in the school setting.

Moreover, CVD can create a stigma around these children's abilities, potentially leading to lowered self-esteem and reluctance to engage in academic activities. This can cause a knock-on effect,

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<sup>7</sup> I acknowledge that some of the sources referenced in this study are dated; however, they provide relevant context and an understanding of CVD as phenomenon. To the best of my knowledge, few recent studies have explored the impact of CVD on the functioning of children with the same depth and richness of description as Espinda (1973).

impacting not only the child's academic performance but also their overall sense of self-worth and belonging in the classroom environment. This possibility emphasises the importance of teachers receiving proper training to accurately identify and support children with CVD, ensuring that they receive appropriate assistance without unnecessary labelling or stigma (Chakrabarti, 2018; Chan et al., 2014; Hathibelagal, 2022; Kvitle, 2018; Moudgil et al., 2021; Shi et al., 2014; Stoianov et al., 2019). As the majority of teachers do not receive formal training in CVD, teachers who report children with colour discrimination and perception difficulties may think that these difficulties are indicative of intellectual inadequacy, as already indicated. The insinuation is often made that if a child is not able to identify colours in their early development phase, they may experience cognitive impairment (Barry et al., 2017; Espinda, 1973).

Despite the possibility of these challenges being experienced by children with CVD, limited research is available on school-based support and interventions available to children with CVD in the school setting (Torrents et al., 2011; Zorn & McMurtrie, 2019). The limited existing research suggests that instead of teachers adapting teaching styles, methods and materials to accommodate children with CVD, the possibility exists of them not making the necessary adjustments for children with CVD, thereby disregarding the idea of these children requiring unique support. In a study by Maule and Featonby (2016) it was, for example, found that although most of the teachers who participated were aware of CVD, they made little or no effort to provide appropriate support for learners with CVD. They tended to rather force the learners to adapt and accommodate the existing school environment, which in some cases led to the children feeling inferior, confused or experiencing little confidence in their own abilities as they were unable to accurately engage with colourful learning materials.

These findings once again highlight the link between academic difficulties and experiencing emotional distress or even long-term emotional difficulties, such as a poor self-concept, a lack of self-confidence, difficulty to express needs and experiences as well as a feeling that the condition of CVD does not merit accommodation or support by others (Demmin & Silverstein, 2020; Gabrielli et al., 2022). In view of this argument, I endeavoured to empower the child-participants during my study to view their condition as a need that requires support and attention within the school setting. I encouraged the child-participants to actively seek support and create awareness of their condition throughout my engagements with them, encouraging them to educate their teachers and peers on how they could provide appropriate support and care to the participants.

### **2.3.3 Potential effect of CVD on emotional functioning**

According to the limited number of studies that have explored the possible effect of CVD on children (Barry et al., 2017; Chakrabarti, 2018; Cumberland et al., 2004; Dvorine, 1957; Espinda, 1973; Mashige & Van Staden, 2019; Peters, 1957; Stoianov et al., 2019; Thomas et al., 2018; Thompson, 1962; Waddington, 1965), these children tend to experience elevated levels of behavioural and

emotional challenges when compared to children with normal colour vision. They may, for example, develop feelings of depression, anxiety, worry, social withdrawal, shame, embarrassment and frustration that may continue into adulthood (Demmin & Silverstein, 2020; Gabrielli et al., 2022). They may, as a result, also experience negative self-perceptions as well as the fear of being rejected and ridiculed by peers due to possible societal stigma and feeling different and alone (Thomas et al., 2018). By applying these findings of preceding studies to my study, I aimed to explore and debunk possible distorted and negative self-perceptions the child-participants held about themselves as a result of CVD by empowering them to understand their condition, the support they required and how they could mobilise the resources in their surroundings to cope with the challenges they faced.

Children with CVD may feel inadequate or frustrated when not able to meet the expectations placed on them, leading to a sense of not being good enough. This can undermine a child's confidence and contribute to feelings of uncertainty about their own abilities. Sullivan (2011a) clarifies that children with CVD may, for example, experience strong feelings of shame and embarrassment when they are not able to choose appropriate colours or accurately use colours to describe the surrounding world, as done by their typically sighted peers. Zorn and McMurtrie (2019) further state that children with CVD may experience feelings of distress when perceived as different by their peers. Snyder (1973) refers to an example, emphasising feelings of disappointment and anxiety experienced by a child with CVD who was unable to learn the names of colours even with the assistance of his teacher. Without proper support and understanding, children with CVD may internalise such struggles, with this negatively affecting their overall academic, emotional and social functioning (Kvitte, 2018; Nithiyaanathan et al., 2020). In order to effectively support the child-participants in my study, I remained aware of this possibility and assessed the participants' emotional and social functioning. Where needed, I referred the participants to educational psychologists for professional support.

The difficulties experienced in childhood as a result of CVD will probably continue into adulthood, especially when CVD is undiagnosed and the appropriate support not received, resulting in possible long-term emotional difficulties that may influence an individual during the various phases of life (Barry et al., 2017). Thomas et al. (2018) add that when children with CVD are overlooked, additional emotional distress may arise. In applying this finding to my study, I endeavoured to create a space for the child-participants where their experiences and perspectives were valued. I strove to listen actively to their experiences and collaborate with them in understanding how they could address the CVD-related challenges they were experiencing.

As indicated already, children with CVD interpret and understand the world differently from others, due to their missing or interpreting the information that is portrayed through colour differently. This implies that children with CVD may not learn or perform at full capacity, resulting in them not building a healthy and positive self-concept or the necessary self-confidence to meet the academic demands they face (Mashige, 2019; Sullivan, 2011a; Thomas et al., 2018). These children may, as a result,

display atypical behaviour in class, such as immature behaviour, aggressive or withdrawn behaviour, hyperactivity, inattention, diverse memory abilities, inefficient visual motor perception and/or learning difficulties as referred to in the previous section (Augestad, 2017; Barry et al., 2017; Nithiyaanathan et al., 2020).

Children with CVD may, as a result, be considered as educationally handicapped or experiencing learning problems (Barry et al., 2017). According to the findings of a study by Thuline (1964) a higher number of children with CVD will be referred to, for example, a school psychologist for behaviour problems than children with typical colour vision. According to this author (Thuline, 1964), the use of colour in teaching methods places a child with CVD at an unrecognised disadvantage that may lead to emotional distress and behavioural patterns that may require professional intervention (Chakrabarti, 2018; Espinda, 1973; Thuline, 1964). When developing the CVD resource booklet for parents and teachers I attempted to address this finding by creating a guide that explains how CVD can influence learning and that has the potential to provide support strategies that parents and teachers can implement to mitigate the emotional difficulties that children with CVD may experience.

Discrimination against and stigmatisation of children with disabilities usually arise as a consequence of combined factors, such as rejection of difference, lack of knowledge and understanding of the condition's implications and causes, prejudice, negative views and understanding of differences, or negative cultural, societal and religious views of disability or learning problems (UNICEF, 2013a). Furthermore, children with disabilities are often judged and defined by their differences, what they lack as well as what they cannot do rather than what they have and can achieve. Due to this discrimination and stigmatisation, children with disabilities may be excluded, resulting in their being vulnerable (UNICEF, 2013a; 2013b). Even though these findings apply to children with disability in general, it is possible that children with CVD may have similar experiences. Taking this finding into consideration, I made a conscious effort to emphasise the strengths of the child-participants and their capabilities, rather than dwell on their weaknesses and deficits. This approach is in line with the resilience-enabling approach I followed for the intervention that aimed to cultivate and harness individual strengths to overcome challenges.

#### **2.3.4 Potential effect of CVD on social functioning**

Children with disabilities are generally at a higher risk of experiencing bullying, discrimination, prejudice, mistreatment and stigmatisation in various aspects of their lives by peers, family members and teachers (UNICEF, 2013b). In a study conducted by Banks et al. (2022) involving children with disabilities, it was found that almost all of the participating children had experienced some form of victimisation at school in the form of, for example, discrimination, stigmatisation or bullying. In most reported cases, peers and classmates were the perpetrators. As a result, some of the children became reluctant and unwilling to go to school (Banks et al., 2022; UNICEF, 2013a).

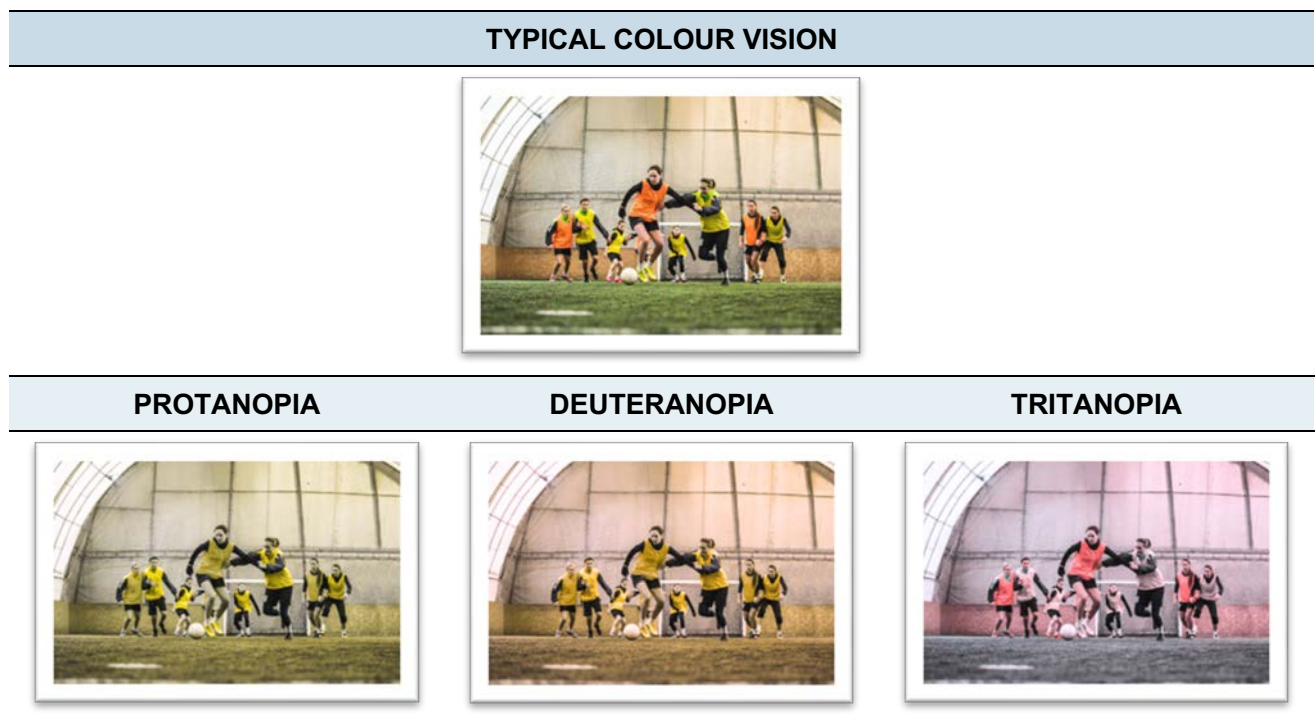
Even though these findings relate to children with disabilities in general, CVD can potentially also result in experiences of being teased or bullied, possibly resulting in feelings of uncertainty and a poor self-concept. To be more specific, children with CVD may face ridicule or may be teased by their peers due to their inability to perceive colours accurately or to distinguish between certain shades of colours or to successfully complete tasks that include colour. As indicated in the previous section, such teasing can lead to feelings of embarrassment and shame, causing these children to potentially withdraw socially and avoid situations where their condition might be exposed. This view is supported by Thomas et al. (2018) whose research findings indicate that children with CVD in general experience internalising difficulties whereby they may present as shy, withdrawn, displaying a preference to be alone, staring blankly and showing signs of sadness and anxiety. Additionally, the constant fear of being teased or bullied may contribute to heightened levels of uncertainty and anxiety in social settings (Barry et al., 2017; Chakrabarti, 2018; Stoianov et al., 2019; Sullivan, 2011a; UNICEF, 2013a; 2013b). Taking these possibilities into consideration, I attempted to develop an intervention that championed the child-participants' differences and their unique strengths associated with their CVD. I furthermore attempted to empower the child- and parent-participants with knowledge of CVD that they could impart to others when faced with difficult social situations.

It therefore seems clear that experiences of teasing or bullying related to their CVD can exacerbate children's feelings of inadequacy and self-doubt. To elaborate, these children may internalise negative messages about their abilities and appearance, potentially leading to a distorted self-concept, poor self-esteem and incorrect narratives that they may apply in their lives. In other words, the constant struggle to differentiate colours or feeling inadequate in activities that require colour perception can negatively impact a child's sense of competence and worth. The fear of being judged or ridiculed may diminish these children's confidence during social interactions, perpetuating a cycle of social isolation and negative self-perception (Chan et al., 2014; Cole, 2015; Kvitle, 2018; Moudgil et al., 2021; UNICEF, 2013a; 2013b). This may, in turn, negatively affect a child's desire to participate in the school environment, resulting in an unwillingness to engage in learning and social experiences as well as potentially withdrawing from peers and loved ones (Banks et al., 2022; UNICEF, 2013a). In this way, negative experiences on academic, emotional and social levels may form a cycle of continuous negative impact in these areas of functioning in the case of a child with CVD.

In a study conducted by Steward and Cole (1989) it was found that children with CVD often experience difficulty when engaging in sport activities with peers due to the possibility of them not being able to differentiate their opponents from their own team members wearing different coloured bibs. These children may subsequently struggle to pass the ball to a teammate wearing a colour that is not easily distinguishable from that of the opponents. This possibility is captured in the images included in Figure 2.11 of how people with CVD may perceive coloured sports kit when compared to what other people will see.

**Figure 2.11**

*Examples of how children with various types of CVD may perceive coloured sports kit*



*Note.* Retrieved from Colour Blind Awareness (n.d.-d)

In the same way, children with CVD may experience difficulty in identifying coloured objects in board games or lose toys and balls in the grass due to them not being able to differentiate red from green. This may once again lead to children with CVD experiencing ridicule and discrimination from their peers as well as during social interaction and communication, resulting in a possible unwillingness to engage in social activities, games, and sport events with peers when there is a chance of failure and ridicule (Sullivan, 2011a).

It seems clear that the impact of CVD on social functioning extends beyond the physical limitations of colour perception and can significantly affect both a child's emotional and social functioning. The experiences of being teased or bullied, uncertainty, and a poor self-concept can have long-lasting effects on the individual's social development and overall quality of life (Barry et al., 2017; Chakrabarti, 2018; Demmin & Silverstein, 2020; Gabrielli et al., 2022). It is therefore important that parents, teachers and peers display the necessary understanding, support and acceptance in support of children with CVD to navigate these challenges and foster their social confidence and resilience. By promoting empathy, inclusivity and positive social interactions, environments where all children feel valued and accepted, regardless of their visual differences, can be developed. In this regard, the positive attitudes of peers can be regarded as an important and positive enabler that can support and encourage children with impairments, such as CVD to attend school and optimally engage in all learning opportunities (Banks et al., 2022).

### 2.3.5 Potential effect of CVD on career choice

According to research conducted by Hathibelagal (2021) and Reddy et al. (2017), CVD may have a notable impact on an individual's career choice and development. This implies that people with CVD may be excluded from their preferred occupations, as CVD can pose challenges to individuals seeking employment across several industries, particularly those reliant on accurate colour perception. In this regard, Barbur and Rodriguez-Carmona (2017) emphasise that typical trichromatic colour vision is generally required for employment in visually demanding occupations.

Individuals with CVD, for example, have traditionally been excluded from certain occupations due to safety concerns or the need for high-quality assurance (Chan et al., 2014; Ramachandran et al., 2014; Simunovic, 2010). To be more specific, occupations in the commercial driving, aviation, defence and electronics industries often require normal colour vision to ensure safety. Certain professions, such as aviation and electrical engineering maintain stringent colour vision standards due to safety considerations or job functions involving colour-coded signals or systems (Chan et al., 2014; Moudgil & Arora, 2021; Singh et al., 2021; Tan et al., 2023; Varikuti et al., 2020).

Similarly, jobs in industries that necessitate the recognition of surface colours or aesthetic judgement, such as textiles, chemicals, design and interior decoration typically exclude those with severe levels of CVD due to possible limitations in quality assurance. Careers in graphic design and visual arts, for example, often demand precise colour discrimination for design projects, potentially limiting the available opportunities for individuals with CVD in these fields (Moudgil et al., 2021; Wu et al., 2019). To address such challenges, technology developers and designers are encouraged to follow best practices in accessibility, such as using high-contrast colour schemes, incorporating text labels and patterns along with colour, and providing customisation options. These measures may ensure that digital content is accessible and usable by a broader audience, including those with CVD (Barbur & Rodriguez-Carmona, 2017; Cumberland et al., 2005; Hathibelagal, 2022).

Evidence suggests that CVD may also create barriers within the practice of medicine (Chakrabarti, 2018; Costedoat & Palmer McHughes, 2018; Meeks et al., 2015; Patel et al., 2016; Raynor et al., 2019; Shi et al., 2014; Spalding et al., 2010) as medical professionals affected by CVD may experience difficulties with some clinical skills and situations (Raynor et al., 2019). Several studies indicate that medical professionals with CVD performed significantly worse than their peers with typical colour vision in identifying clinical signs based on colour and in objective tests (Campbell et al., 1999; Poole et al., 1997). As interpretation and differentiation of colour is an important aspect in medicine, a misinterpretation by a medical professional can lead to potentially life-threatening outcomes (Spalding, 1997). Medical practitioners with CVD may furthermore experience difficulty in identifying blood in vomit and stool, noticing the redness of inflammation, or interpreting strips tests, for example, glucose and urine tests. Doctors with CVD may, as a result, experience insecurity and

even self-doubt, which can cause some emotional distress and uncertainty around their ability to perform their duties (Costedoat & McHughes Palmer, 2018; Raynor et al., 2019; Spalding, 1997; Spalding et al., 2010). To address these challenges, Costedoat and McHughes Palmer (2018) suggest countermeasures, such as screening for CVD, changing colour-coding systems to systems based on other visual cues, and making CVD-related support available that can reduce the chances of colour-cue based errors being made by medical professionals.

A growing awareness of equal opportunity legislation has led to many professions relaxing their colour vision standards in recent years. This shift reflects a broader understanding of the need for inclusivity and the potential for individuals with CVD to successfully navigate various career paths despite their condition (Chakrabarti, 2018; Cole, 2004; Hathibelagal, 2022; Moudgil & Arora, 2021; Ramachandran et al., 2014; Simunovic, 2010). Advancements in technology have also expanded career possibilities for individuals with CVD in recent years (Costedoat & Palmer McHughes, 2018; Tan et al., 2023). In addition, people with CVD tend to rely on self-developed adaptive strategies to support themselves in coping with potential difficulties as a result of their CVD or may spontaneously choose an option that is suitable for them (Cumberland et al., 2004). Although there are countermeasures and supportive aids that can be used to overcome CVD-related difficulties, careers in the army, air force, railways and navy generally still prohibit the use of, for example, colour-corrective lenses such as EnChroma glasses (Hathibelagal, 2022).

It remains important to understand the possible challenges related to CVD within the occupational landscape, as the restrictions and exemptions for individuals with CVD vary across countries, with supportive efforts noticeable in certain careers and countries. For instance, in 2009 the United Kingdom Civil Aviation Authority introduced the Colour Assessment and Diagnosis (CAD) test criteria for flying regulations. This change allowed 30% to 35% more aspiring pilots with CVD to qualify as pilots compared to previous regulations. In 2019, the New Zealand Civil Aviation Authority similarly adopted a new Occupational Colour Vision Assessment (OCVA) for pilot aspirants that assesses an individual's practical competency both in-flight and on the ground. These tests are more accommodating to individuals with CVD (Barbur & Rodriguez-Carmona, 2017; Civil Aviation Authority of New Zealand, 2019).

To navigate the challenges they may experience effectively, individuals with CVD can be advised to explore career options that align with their strengths and interests, leveraging available accommodations and support resources. While some professions may require accurate colour perception, others offer pathways for individuals with CVD to thrive by focusing on alternative skills sets. By understanding the demands of different industries and accessing appropriate support, individuals with CVD can pursue careers in diverse fields (Costedoat & McHughes Palmer, 2018; Hathibelagal, 2022). For example, opportunities in information technology (IT), education and business administration that prioritise skills such as verbal communication, data analysis and project

management over colour perception offer viable pathways for individuals with CVD to pursue fulfilling careers. Moreover, certain engineering disciplines, like mechanical or civil engineering, may be less affected by CVD when compared to other engineering fields with more stringent colour requirements.

### **2.3.6 Challenge of other people's limited awareness and understanding of CVD**

Due to the general limited understanding of CVD, the condition is often misunderstood and incorrectly conceptualised, with some people even regarding it as a joke or as a condition that does not cause any discomfort. It is usually difficult, if not impossible, for typically sighted individuals to understand and visualise what people affected by CVD may perceive and experience. This can be observed in, for example, the fact that most people refer to people with CVD as being "colour blind" (Berisso, 2018). According to Sullivan (2011b), it is important for other people to understand that those with CVD do see colour but in a different way, to be able to comprehend what the condition implies. For example, people with severe red-green CVD may view the world in shades of green, blue, and yellow. I accordingly endeavoured to create resources that capture the way in which people with CVD may perceive the world around them as opposed to what others will see.

Sullivan (2011b) is of the view that the general lack of sufficient awareness of how CVD may influence an individual's life and of the challenges it may cause can result in the possibility of people with CVD being ignored or disregarded in terms of their needs. This implies that children with CVD may not be accommodated and catered for in terms of their specific needs in school, with this subsequently affecting their functioning and performance in a negative way.

According to Jadhav et al. (2017) as well as Mashige and Van Staden (2019), a large percentage of people with CVD remain undetected as they in general manage to adapt to their surrounding environment and cope with the challenges they face without seeking a formal diagnosis (Colour Blind Awareness, 2020). In addition to individuals not being aware of their CVD, some people with normal vision will typically remain unaware and uninformed of this and of what CVD entails. As children with CVD who are unaware of their condition may experience emotional, social and behavioural challenges, with this, in turn, potentially affecting their associated academic performance, and their self-confidence and self-image, Cole (2015) emphasises the importance of children being aware of their CVD. Long et al. (2015) agree by stating that a delay in the diagnosis and awareness of CVD may lead to significant emotional and social difficulties amongst children with CVD.

Within the school setting, children with impairments often encounter teachers who have not received appropriate or comprehensive training on how to support and accommodate children with special needs. With specific reference to CVD, Colour Blind Awareness (2020) notes that teachers are generally not trained to identify CVD and are thus often unaware of the needs of children with CVD, not understanding their obligations to identify and support those who are affected (Colour Blind Awareness, 2020). This statement is supported by various studies (Espinda, 1973; Kvitile, 2018;

Mashige, 2019; Mashige & Van Staden, 2019; Sullivan, 2011a; 2011b) that indicate a state of teachers often not being trained to identify and support children with CVD, in addition to them having limited access to educational resources that can aid the learning of these children. According to Zorn and McMurtrie (2019), little research has focused on the accommodation of children with CVD. Due to a lack of sufficient awareness and knowledge on strategies to support children with CVD, teachers may thus unknowingly prevent children from actualising their potential due to them not receiving the appropriate support they deserve within the school context (Zorn & McMurtrie, 2019).

According to Colour Blind Awareness (2020) a similar lack of sufficient awareness of CVD amongst parents is common, due to no screening taking place in schools and CVD not being commonly identified or portrayed as a difficulty at an early age. Parents may, as a result, not necessarily consider CVD when their child experiences difficulties at school. This can lead to children with CVD being misidentified as slow learners or being ridiculed in preschool for incorrectly identifying colours. Such misunderstandings can lead to children with CVD developing insecurities and sensitivities that may culminate in learning, behavioural and emotional difficulties as well as social withdrawal and even school refusal (Chan et al., 2014) as indicated in previous sections.

Against this background, Chan et al. (2014) postulate that by increasing the awareness of CVD and the impact it may have on the various developmental stages of an individual's life, affected individuals can potentially be supported, with them taking appropriate measures to ensure that the CVD does not become a barrier within their lives. In the absence of awareness, however, children with CVD may be deprived by parents, teachers, peers and others in society of the necessary support they deserve, with the related negative effect on their functioning on various levels.

## **2.4 INCLUSIVE EDUCATION POLICIES AS BACKDROP TO SUPPORTING CHILDREN WITH SPECIAL NEEDS**

According to Lansdown (2005), it is essential for people to remember that all children have rights. Regardless of a child's ability, disability, impairment or differences, their rights should be respected and protected. To be more specific, all children have the right to education, the right to human dignity, the right to express their views freely, the right to be heard in all matters affecting them, the right to have their views taken seriously and the right for their views to be respected in accordance with their maturity level and age (Department of Education, 2001). This is essential to be borne in mind by role players in the lives of children with CVD (as in the case of other disabilities) to understand that the accommodation of these children is not merely a courtesy but a right that needs to be implemented and enforced (Lansdown et al., 2014). Against this background, during the implementation of the holistic intervention, I aimed to empower the child-participants to stand up for their rights within the various ecological systems they function in by informing others of their need for support.

Inclusion has been internationally advocated for since the Universal Declaration of Human Rights was adopted by the United Nations General Assembly in 1948 that states that universal access to quality education is a human right (Banks et al., 2022; Du Plessis, 2013). This right is codified in international consensus documents, including the Sustainable Development Goals (SDGs) that provide clear guidelines and targets as to how countries can achieve these goals. In 1994, South Africa also became a signatory to the Salamanca Statement and Framework for Action On Special Needs Education (UNESCO, 1994), making a commitment to accommodate all children regardless of their intellectual, social, linguistic or social economic needs (Du Plessis, 2013). As a result of this and South Africa's drive to address discrimination and inequality after years of injustice, neglect and discrimination, the Department of Education launched White Paper 6 on building an inclusive education and training system (Department of Basic Education, 2016; Department of Education, 2001). The main intention of this policy document is to ensure that all children in South Africa, especially those experiencing developmental and learning impairments, will have access to education and be supported while participating meaningfully in the national curriculum (Department of Basic Education, 2016).

Many definitions of inclusive education have been developed and are utilised throughout the world. According to the Salamanca Statement and Framework for Action On Special Needs Education (UNESCO, 1994) as well as South Africa's White Paper 6 on building an inclusive education and training system (Department of Education, 2001), inclusive education emphasises that all children have a fundamental right to education and must be given every opportunity to maintain and achieve an acceptable level of learning. Inclusive education policy states that differences should be respected and acknowledged, and that every child has unique and specific interests, characteristics, physical and emotional needs, abilities and learning needs that need to be valued equally and accepted as an ordinary part of life. In this regard, education systems, structures and learning methodologies should consider the diversity of children's needs and characteristics. Stakeholders, curricula, teaching methods and environments need to meet the needs of all children in mainstream schools (UNESCO, 1994). Accordingly, all schools are expected to maximise the participation of all children, despite their different learning needs, thereby minimising barriers to learning.

Against the backdrop of inclusive education policy (Department of Basic Education, 2016; Department of Education, 2001), the South African Department of Education set out to reform and develop an education system that can cater for all children despite their diverse and different learning needs. Schools are mandated to be able to accommodate a diverse range of learning needs and are expected to adapt and devise teaching methods and strategies that can best support all children without any unfair discrimination (Department of Basic Education, 2016).

Supportive strategies available in South Africa, as put in place by the Department of Education (2016), include but are not limited to concessions and accommodations that can be implemented in

all schools (Engel-Yeger, 2010; Mpu & Adu, 2021). According to the Department of Education (2016), a concession entails permission to children who experience barriers to learning to be exempt from specific subjects or sections of the curriculum, whereas accommodations entail reasonable modifications and adjustments to the assessment format, the environment and/or curriculum format as well as permission to use assistive technology and devices in support of children who experience barriers to learning to encourage optimal performance within a test, assessment or examination.

The Department of Basic Education (2016) stipulates that learners may be accommodated in their various school environments, with the stakeholders within the specific school environment taking responsibility to ensure that all learners' special educational needs are identified, the curriculum differentiated and/or the learners accommodated. Even though the Department of Basic Education (2016) refers to concessions and accommodations for blind and low vision learners, no mention is made of CVD or that it is regarded as a visual impairment or barrier to learning in the draft procedural manual for the assessment of such learners. A limitation that greatly influences inclusion in South Africa relates to the fact that no consistent regulation of schools is in place to ensure that all schools are actively implementing inclusion as a strategy (Mpu & Adu, 2021; Singal, 2008). In addition, no specific and detailed concessions or accommodations are outlined to support learners who experience difficulty in perceiving colour.

Despite the Department of Education (2016) in South Africa not recognising CVD as a barrier to learning, the Independent Examinations Board (IEB, 2017), a South African independent assessment body that is accredited to offer external assessments, classifies CVD as a barrier to learning that warrants accommodations to support the learning of those affected. According to the IEB (2017) policy document for accommodations and exemptions, learners with CVD are able to apply for an adaption of their examination papers, additional time, a practical assistant, a reader, and a separate venue if this is needed for optimal performance. Against this background, I informed the child-participants and their parents about their right to apply for an accommodation and receive individualised support within the school setting due to their CVD.

According to written evidence submitted to the United Kingdom parliament by the organisation Colour Blind Awareness (2018) to advocate for the rights of children with CVD, this condition can be classified as a Special Education Need and disability as it causes impairment that requires support and accommodations. Despite this, education policies in the United Kingdom have not yet been amended and CVD is not recognised as such in the United Kingdom, nor in Canada, despite special accommodations being provided in some cases. In Australia, however, CVD is recognised as a disability (Male et al., 2024).

In the United Kingdom undiagnosed children with CVD are often not catered for, with their examination papers not being printed in a CVD friendly format (Colour Blind Awareness, 2020).

Limited advice is also available for schools on how to adjust examination and school material to appropriately support children with CVD. Examination and assessment papers are generally not CVD friendly and are usually, as stated, adapted for formally diagnosed children only. This means that children with CVD who are still undiagnosed, will probably not receive the support they are entitled to and may as a result be discriminated against (Colour Blind Awareness, 2020). Therefore, whilst accommodations are available in the United Kingdom, the lack of sufficient awareness amongst the various role players seems to hinder teachers' ability to support children with CVD and apply the available accommodations. In the United States of America, CVD is also not considered or documented as a disability although the condition can be considered as a disability under the Americans with Disabilities Act (Spitz, 2023). Children with CVD are accordingly able to apply for a 504 plan that is developed to ensure that a child learns optimally despite a learning impairment, implying changes to the learning environment to meet their unique learning needs (Spitz, 2023).

To summarise, even though the concept of inclusion is widely embraced, the implementation of effective support for children with CVD remains an area of limited research and practice. There is a noticeable gap in understanding how best to support these children effectively as well as a need for tailored interventions within the school environment to address CVD-related difficulties. Ongoing studies are required to explore possible strategies and interventions that can address the unique challenges faced by children with CVD, thereby ensuring that they receive the necessary support to succeed academically, emotionally and socially (Karunanayake et al., 2021; Manyal, 2023; Moudgil et al., 2021; Mpu & Adu, 2021; Spitz, 2023; Stoianov et al., 2019; Swart & Pettipher, 2019; Thomas et al., 2018; Torrents et al., 2011).

The potential value of this study lies in its possible contribution to the emerging body of knowledge on the support needs of children with CVD in the various settings where they function. By exploring the effect of a holistic intervention on the functioning and development of children with CVD, the current study may offer insight into possible approaches for facilitating the positive development of children's academic, emotional and social functioning when facing challenges due to CVD. The findings of the study can potentially inform policymakers, teachers and healthcare professionals about the importance of tailored support measures for children with CVD, and encourage the development of evidence-based interventions that may enhance these children's educational experiences and outcomes. By conducting the study, I may indirectly contribute to the creation of more inclusive and supportive educational environments that can cater for the needs of all children (such as those with CVD), ensuring that they can thrive and succeed regardless of any deficiencies.

## **2.5 CURRENT ATTEMPTS TO SUPPORT CHILDREN WITH CVD**

In this section I discuss some examples of attempts to address individuals' needs associated with CVD. According to Elsmann et al. (2019), visual impairment during childhood can have lifelong

implications if the appropriate support is not received. Due to the challenges that children with CVD typically experience, they often spontaneously develop mechanisms and strategies to cope with the difficulties they face as they progress through life (Melo et al., 2014). Remaining aware of this probability, I explored the strategies and coping mechanisms that the child-participants had already developed during my engagement with them. I evaluated the adaptiveness of these strategies and sought to reframe and enhance them to promote additional positive and healthy outcomes. Even though no cure or treatment exists for CVD in human beings (Gómez-Robledo et al., 2018; Varikuti et al., 2020; Werner et al., 2020), certain tools and resources are available to assist people with the condition, enabling them to more easily differentiate between colours (Gómez-Robledo et al., 2018). To elaborate, adaptive lenses, gene therapy, colour transformation methods and digital simulation tools can support people with CVD in terms of general functioning (Almagambetov et al., 2015; Mancuso et al., 2009; Rubin et al., 2009; Stoianov et al., 2019; Wong, 2011).

### **2.5.1 Promoting awareness in society**

According to Chan et al. (2014), a broader awareness of CVD can assist with the identification of people being challenged by the condition and the development of corresponding coping strategies. In this regard, Singal (2008) emphasises the need to provide stakeholders, such as teachers and parents, with the necessary knowledge and understanding to be able to apply inclusive teaching practices, and to challenge existing beliefs, values and attitudes to children with special needs, such as those with CVD. This view is elaborated on by Mpu and Adu (2021) who indicate that currently the South African landscape is characterised by limited available support, a lack of knowledge and insufficient training for people on how to support others who face specific difficulties, such as CVD. These authors suggest that the development of awareness amongst parents and the broader school-community is crucial. This can be done by training parents and teachers, or through in-depth courses on accommodating children with differences, or the distribution of promotional videos and resources on inclusion. In support, Stoianov et al. (2019) foreground the importance of building knowledge amongst the people of society on how CVD may influence those who are affected.

In addition to an increased awareness amongst the general population, teachers specifically may benefit from knowing how to identify CVD if screening procedures are not implemented with all children at school (Melo et al., 2014). In this regard, Kvittle (2018) states that an awareness and greater general understanding of CVD amongst teachers can contribute to the optimal development of a child with CVD, where both teachers and parents remain aware of the potential challenges faced by the child and can provide the suitable support. In applying this argument to my study, I created a resource booklet on CVD that may serve as a guide for parents and teachers. This guide aims to raise an awareness of CVD, its causes, presenting symptoms within the classroom setting, methods for identifying CVD, and support strategies that can be implemented to meet the special educational needs of children with CVD.

According to Dohvoma et al. (2018), processes of screening for CVD may be valuable to raise awareness, so that the condition can be identified when present. Once identified, the awareness of CVD may reduce the levels of anxiety often experienced by children with CVD, with this, in turn, positively influencing their interactions within the nested systems (Shi et al., 2014). Awareness of CVD can furthermore empower people with the condition to make informed decisions about their lives; for example, in terms of career choices while also developing coping strategies to overcome the challenges faced as a result of CVD (Costedoat & Palmer McHughes, 2018; Dohvoma et al., 2018; Hathibelagal, 2022).

With increased awareness positive change can thus occur, where a movement of change is created that may benefit the lives of children living with CVD. In this regard, Wang et al. (2023) state that increased education and awareness levels can support society to recognise CVD and then react in a suitable way by providing support and assistance where needed. Additionally, an increased awareness of CVD amongst teachers, parents and society may result in educational environments becoming more inclusive and attuned to the various learning challenges and support mechanisms required to address the unique barriers to learning that children with CVD may face (Shi et al., 2014). The fact that CVD is a fairly unknown condition highlights the importance of ongoing research in the field (Dohvoma et al., 2018; Male et al., 2024; Mashige, 2019; Mashige & Van Staden, 2019; Zelalem et al., 2019). In undertaking this study, I thus aimed to contribute to the existing literature on CVD and its effect on the development and functioning of children with the condition, while also highlighting the need for further awareness and research in this field.

### **2.5.2 Value of early screening and diagnosis**

Early screening and diagnosis of CVD can play a crucial role in the academic, emotional and social development and functioning of children with the condition. According to Eze et al. (2020), the optimal age for CVD screening lies between four and six years. This view is shared by Fakorede et al. (2022), Martins et al. (2001) as well as Moudgil et al. (2016) who all emphasise the importance of early identification of the condition to avoid children with CVD experiencing difficulties and uncertainties as a result of their lack of understanding the challenges they may encounter. Understanding and addressing CVD from an early age can lead to more effective support strategies, thereby fostering better overall functioning and wellbeing. In this regard, Mashige and Van Staden (2019, p. 1) state that “early assessment and diagnosis of CCVD is necessary to minimise the disability associated with the condition”. This view suggests that the benefits of early screening and diagnosis extend across the various areas of a child's life.

Male et al. (2024) indicate that early intervention through vision screenings, particularly colour vision assessments, can lead to better management of and support for the challenges that may be experienced. Such an approach may ensure that children with CVD achieve their full potential

academically, emotionally and socially. To elaborate, by identifying CVD at an early age, a more supportive and accommodating environment can be created that may enhance the overall wellbeing and functioning of children with CVD. According to Melo et al. (2014), various initiatives can be undertaken to support such an early diagnosis and intervention with children with CVD, with one of these strategies relating to the early diagnosis through screening when children are in preschool.

An early diagnosis can support the tailoring of educational approaches to meet the specific needs of children with CVD. In this regard, Mashige and Van Staden (2019) state that teachers will be able to adjust their teaching methods and materials when aware of a child with CVD, ensuring that these children are not disadvantaged in the classroom. For instance, teachers can avoid using colour-coded information and rather rely on textures, patterns or labels to differentiate items when working with a child with CVD. This proactive approach can prevent these children from falling behind due to misunderstandings or misinterpretations of colour-based information in class. Harrington et al. (2021) concur with this view and indicate that early screening is essential to counsel children with CVD and support them to make decisions about their future academic and career journeys (Manyal, 2023; Moudgil et al., 2016).

On an emotional level the early screening of children and timely diagnosis of CVD can mitigate feelings of frustration and anxiety often experienced by children with CVD who may not understand why they perceive colours differently from others (Harrington et al., 2021; Hathibelagal, 2022). According to Harrington et al. (2021), early counselling and efficient support can help these children to develop coping strategies and build resilience, thereby reducing the risk of emotional distress and potentially fostering a positive self-image. Addressing CVD-associated challenges at a young age may furthermore prevent future emotional hardships, as children can be equipped to better handle the challenges they face as a result of their condition when being supported at a young age – something that is only possible if an early diagnosis is made (Eze et al., 2020; Hathibelagal, 2022). In addition to educational adjustments, psychological support is regarded as important for helping children with CVD to cope with the emotional challenges they face. By identifying the condition at an early age, children may thus be empowered with the necessary skills and strategies to deal with CVD-related challenges and propagate an awareness of their condition, indicating how others may support them (Hathibelagal, 2022).

Socially, early detection of CVD and suitable intervention can significantly improve the way in which children with CVD interact with their peers. In this regard, Eze et al. (2020) argue that the early identification of CVD can help prevent unjust discrimination and stigmatisation, as teachers and classmates may then be more aware and understanding of the condition. Such an awareness can foster a more inclusive environment, where children with CVD feel supported and accepted. Moreover, the early diagnosis of CVD can aid these children in developing social strategies, allowing

them to navigate social situations more confidently and effectively due to them being able to effectively communicate their needs with others (Torrents et al., 2011).

### **2.5.3 Assistive technology, eyewear and resources**

Due to people with CVD often struggling to distinguish between certain colours, which can hinder their ability to fully engage with digital content, various tools and technologies have been developed as supportive devices for people with CVD (Berisso, 2018; Kerac et al., 2022; Simon-Liedtke et al., 2017). One such tool is a browser add-on for Google Chrome called Daltonise that allows users to adjust and recolour images on websites. This can enable individuals with CVD to view content more clearly and accurately. To elaborate, by using algorithms to alter the colour composition of images, Daltonise assists in making the distinctions between colours more apparent, thereby enhancing the accessibility of online content for those with CVD (Berisso, 2018; Kerac et al., 2022). To be more specific, this complex process involves the remapping of a colour spectrum to a smaller, more suitable one for those with CVD (Kerac et al., 2022).

Two main types of daltonisation are distinguished, namely content-independent and content-dependent daltonisation. Content-independent daltonisation remaps one colour to another without considering the image's content, while content-dependent daltonisation remaps colours based on the image content, ensuring that objects stand out from the background (Simon-Liedtke et al., 2017). Currently, content-dependent daltonisation is computationally intensive, making it potentially unsuitable for real-time image changes, such as those used in video games.

According to Tillem and Gün (2023), assistive technology can be especially helpful in the context of digital games, as CVD can influence a person's ability to accurately interact with and interpret certain games. These scholars who explored the effect of CVD in the digital gaming landscape, indicate that assistive technology and colour vision filter modes in gaming can enhance the experience of people with CVD when playing digital games. Such techniques can improve visibility based on the use of patterns and textures, alternative colour schemes and customisable settings, making games more accessible and inclusive of people with CVD (Yu, 2015; Reinaldo et al., 2021; Paiva et al., 2021).

In an attempt to address CVD-related vision challenges, various colour-enhancing lenses have been developed over the years, such as EnChroma lenses (Varikuti et al., 2020). Assistive eyewear for CVD specifically aims to enhance colour perception and improve the visual experiences of individuals affected by the condition. Whereas traditional eyewear like glasses or contact lenses cannot make a difference in the case of CVD, specialised lenses and filters can help individuals with specific types of CVD to better distinguish between different colours.

As an example, EnChroma lenses utilise an iron-based filter to increase or boost the colour differences compromised by defective receptors in the eye by selectively filtering unwanted

overlapping light wavelengths of the visible colour spectrum that increase their separation. These lenses cannot undo colour vision defects; they merely boost colour differences, thereby enabling the wearer of the glasses to better differentiate between different shades and hues of colour (Webster, 2020). The glasses can therefore enhance the saturation of greenish and reddish hues, with these being visible when the glasses are worn (Gómez-Robledo et al., 2018; Varikuti et al., 2020). In applying my knowledge of the functionality of EnChroma corrective glasses, I could explain to the child-participants and their parents that the EnChroma glasses supplied to them could not cure their condition but could in some cases improve their ability to distinguish colours.

Werner et al. (2020) conducted a study where participants wore EnChroma lenses for a period of two weeks for these scholars to explore whether or not the participants experienced any adaptive changes in their colour vision. The findings of this study indicate that most of the participants noted a difference in colours and were able to identify reddish hues more easily, and that sustained use of the glasses was accompanied by an increased ability to identify contrast between colours when the participants were not wearing the glasses. These findings suggest an adaptive visual response as a result of wearing the glasses for sustained periods of time, implying that EnChroma glasses can have a positive effect on the ability of the wearer to better differentiate between hues of colours, as the glasses can seemingly cause a recalibration of individuals' colour vision (Webster, 2020; Werner et al., 2020). According to Lu et al. (2010), such changes in ability can be ascribed to perceptual learning whereby the brain learns to take notice of and become increasingly sensitive to colour differentiations. This then becomes a learnt process where it is easier to identify slight colour changes, with this process potentially becoming a long term learnt process even at times when EnChroma lenses are not worn (Lu et al., 2010; Webster, 2020; Werner et al., 2020).

In another study by Varikuti et al. (2020) where participants were also required to wear EnChroma lenses, the majority of the participants reported a noticeable overall subjective improvement in their colour vision as well as the ability to differentiate in colour brightness and distinction. Varikuti et al. (2020) are of the view that long-term clinical improvements are, however, unlikely and that EnChroma lenses may not significantly affect, for example, career opportunities or activities of daily living in a positive way, even though many of the participants in these scholars' study reported a strong subjective improvement in their colour vision sensitivity after having worn the lenses.

In support of these findings, Gómez-Robledo et al. (2018) emphasise that EnChroma lenses do not allow wearers to have typical vision but that they can increase the ability to identify visual differences between certain colours that may make it easier for some people with CVD to differentiate between colours when wearing the glasses. It can, however, be noted that some people who wear EnChroma lenses do not notice any significant or noticeable differences in their colour vision due to the severity of the CVD (Gómez-Robledo et al., 2018; Webster, 2020). As such, these lenses do not have a complete success rate.

Another form of assistive eyewear includes wearable augmented reality devices, such as Google Glass that aim at improving colour vision by remapping the colours of a scene observed by a person with CVD to increase the individual's ability to differentiate between colours. In a study conducted by Melillo et al. (2017) it was found that a wearable augmented-reality device can offer a viable option to support people with CVD as it can enhance their colour vision. In the case of Melillo et al.'s (2017) study, this was true in 96% of the cases involved in the study.

Finally, according to El Moussawi et al. (2021), ongoing research and clinical trials are continually investigating the effectiveness and viability of targeted stem cell therapy, pharmacological therapy and gene therapy in the treatment of CVD (Du et al., 2015; Gonzalez-Cordero et al., 2013; Marangoni et al., 2015; Petersen-Jones, 2012; Roosing et al., 2014; Sweigard et al., 2010;). Gene therapy trials have been performed in both animals and humans, targeting specific mutations in the hope of improvement and a change in the colour vision of the affected subjects. To elaborate, El Moussawi et al. (2021) mention three current ongoing human trials for the treatment of CVD based on mutations in the CNGA3 and CNGB3 gene. These studies generally indicate improvement and provide promising results in the treatment of CVD; however, additional research is required before gene therapy will be approved as a safe method of treatment for CVD (Alexander et al., 2007; Deng et al., 2019; Kohl et al., 2000; Mancuso et al., 2009; Pang et al., 2010; Ye et al., 2016; Zhang et al., 2011).

#### **2.5.4 School-based support and intervention**

According to Fischer et al. (2023), schools can be considered as a key setting for health promotion and prevention as these institutions play a pivotal role in providing support to children and encourage optimal development in the various areas of functioning (Margaretha et al., 2023). Zorn and McMurtrie (2019) similarly regard teachers as primary sources of support to prepare children, including those with CVD, for the difficulties they may face. It follows that when such support is lacking within the school setting, children with CVD may experience school as emotionally distressing and unsafe. Even though Zorn and McMurtrie (2019) indicate that little research exists on current school-based interventions specifically for children with CVD, these scholars suggest that such school-based support strategies can be effectively implemented through the positive efforts and practices of teachers and other stakeholders within the school setting.

Awareness and education within the school setting have, however, been indicated as essential for promoting inclusion and sufficient support for children with CVD as this can improve the quality of life of a child with CVD (Karunanayake et al., 2021; Mashige, 2019; Shrestha et al., 2010; Valero et al., 2022). By educating teachers, school staff and other children about CVD, the general awareness and understanding of the challenges faced by individuals with CVD can be raised. Interventions focused on creating such awareness may include information about the types of CVD, the impact of CVD on individuals living with the condition, and strategies for accommodating children with CVD in

the classroom (Barry et al. 2017; Berisso, 2018; Stoianov et al., 2019). Additionally, teachers can be encouraged to support children with CVD by promoting an awareness amongst other teachers, with the possible result of teaching methods being adjusted and adapted, and teachers collaborating with children with CVD as well as with their parents (Cole, 2015; Karunanayake et al., 2021; Kvitle, 2018; Male et al., 2024; Nithiyaanathan et al., 2020; Shi et al., 2014).

Collaboration between teachers, parents and healthcare professionals is important to support children with CVD. This may involve the sharing of information about the child's specific needs, communication about the implementation of recommended accommodations, and monitoring progress over time (Berisso, 2018; Torrents et al., 2011). Awareness and an understanding of the support strategies that are implemented are important, as the mere provision of additional time is not an effective strategy in itself due to this strategy not addressing the difficulty a child with CVD may experience in differentiating between colours (Zorn & McMurtrie, 2019).

According to Zorn and McMurtrie (2019), an effective school-based support and intervention strategy implies the appointment of a specific teacher or a few teachers as supportive adults that advocate for children with CVD. This means that such a teacher or group of teachers will fulfil the role of mentor, mediator and protector of children with CVD. In addition, this adult can be involved in the screening of individual children with the aim of identifying CVD, and then sharing support options with the child, their teachers and parents. Such a teacher can also support a child with CVD and their families by referring them to helpful resources and external support systems, such as optometrists for formal diagnosis and some guidance on living with CVD (Cole, 2016).

While further research is required on specific supportive interventions for children with CVD, any support attempts can assist in creating inclusive learning environments where children with CVD will be able to thrive academically and socially (Meeks et al., 2015; Wright, 2022; Zorn & McMurtrie, 2019). To elaborate, children with CVD, just as other children experiencing learning difficulties, are entitled to education that is delivered in such a way that their special educational needs are accommodated (Mpu & Adu, 2021). Accommodations and concessions for children with CVD may include additional time allowance for tasks, the use of assistive eyewear, as well as modified learning material, assessment and examination papers (IEB, 2017). Zorn and McMurtrie (2019) furthermore encourage teachers to remain mindful of their classroom practices and determine how they can integrate such accommodations for children with CVD in school. They make several recommendations that teachers can implement when working with children with CVD.

For example, teachers are firstly encouraged to remain aware of the fact that colour-related mistakes made by children may be due to CVD, rather than assuming that these are linked to factors such as other learning difficulties, children misunderstanding instructions or a lack of concentration (Chakrabarti, 2018; Nithiyaanathan et al., 2020; Shi et al., 2014; Valero et al., 2022). Secondly,

children with CVD should be seated in good, natural light directly facing the board in class as this can support easier colour recognition (Colour Blind Awareness, n.d.-a; Pesko, 2020). Thirdly, teachers are cautioned not to use coloured markers on whiteboards or green chalkboards, but rather to opt for black or white markers to create the best possible contrast. Next, teachers should remain aware of the fact that textbooks are generally not manufactured in CVD-friendly formats, requiring of teachers to reproduce colour images in grayscale when teaching children with CVD. Fifthly, teachers are encouraged to use only white paper and black ink for handouts to children with CVD. Closely related, teachers are cautioned to look for alternatives for colour-coded graphs, charts and texts. For example, teachers can annotate text by using bold, underlining, capital letters, italics, patterns or other visual cues instead of colour when wanting to differentiate or emphasise text (Zorn & McMurtrie, 2019). In support of this recommendation, Torrents et al. (2011) suggest the redesigning of colour images used in school, relying on greyscales or adding a texture or marker to an image to guide children with CVD, rather than including any colour.

Additionally, alternative colours and textures may be used that are better suited for learners with CVD. In this regard, findings in a study by Serrantino et al. (2015) similarly suggest that teachers steer away from using colour to note or distinguish items in examinations or during presentations, rather highlighting key concepts through the use of numbers, textures or arrows in black ink. In this manner, accessible learning materials that are CVD friendly can be created that may enhance the learning experiences of children with CVD (Valero et al., 2022). Berisso (2018) also suggests strategies for teachers to use when wanting to create CVD friendly teaching materials, referring to the use of high-contrast materials, avoiding colour-coded information, and providing alternative formats for colour-dependent learning content. According to Berisso (2018), certain factors need to be considered when developing supportive educational teaching material for children with CVD to avoid colour combinations that may cause confusion, for example, choosing blue and red pairings, blue and orange, or yellow and blue, rather than red-green combinations (Frane, 2015).

Teachers can furthermore allow children with CVD to submit work where black-and-white or self-selected colours that they can see have been used. Next, teachers are encouraged to label coloured objects with word labels in support of children with CVD who may not be able to distinguish the various objects if only relying on colour. In addition, teachers can assign a classmate to a child with CVD who can provide support to the child by identifying colours when needed (Colour Blind Awareness, n.d.-a). Finally, teachers should avoid using colour-coded systems for classroom management, as children with CVD may not be able to discern the colours as intended.

Examples of specific strategies for accommodating children with CVD in the classroom context include teachers applying for formal concessions and accommodations to address the child's special educational needs with the school board and/or national Department of Education. Another possible school-based strategy that may help teachers create CVD-friendly teaching materials concerns the

utilisation of adaptive technology, such as online CVD simulators by teachers to check their work and ideas before implementing these. To be more specific, online CVD simulators (Colbindor, n.d.; Pilestone Colour Blind Experts, n.d.) enable people to upload photographs or diagrams and then apply a CVD filter to be able to view what a person with CVD may see. These tools can help teachers to modify the appearance of colours on screens in an attempt to improve the visibility of images for children with CVD. As such, teachers can evaluate their work or gain an understanding of how someone with CVD may perceive an image before presenting the image to a child with CVD.

CVD simulators can thus be regarded as powerful tools that can enable teachers, parents and peers to assist children with CVD based on a better insight into the challenges that these children may experience (Berisso, 2018). In creating resources for the intervention I implemented as part of the current study, I relied on such online CVD simulators to check how the child-participants of this study might view the world and the resources I included (Pilestone Colour Blind Experts, n.d.). Throughout, I aimed to ensure that the materials I included were accessible and effective for children with CVD. This approach assisted me in developing inclusive resources yet also provided a practical example of how adaptive technology can be used to enhance the learning experiences of children with CVD.

## **2.6 POTENTIAL VALUE OF RESILIENCE-FOCUSED HOLISTIC INTERVENTIONS IN SUPPORT OF CHILDREN WITH CVD**

Numerous studies confirm that psychosocial interventions can support individuals who are exposed to challenges and adversity to achieve healthy and positive outcomes (Frounfelker et al., 2020; Giordano et al., 2021; Luthar & Cicchetti, 2000; Morina et al., 2017). According to Stodden et al. (2023), childhood and adolescence represent vulnerable phases of human development in terms of various domains of functioning, with context impacting overall development. As such, interventions focusing on holistic functioning and the unique context of an individual have the potential to encourage and enhance positive child development. By nurturing foundational personal assets and resources during such interventions, children and adolescents may be guided to utilise the available resources and learning opportunities within their supportive social settings (Brymer & Davids, 2016). In applying this possibility and knowledge of the value of holistic interventions to my study, I focused on the holistic development of the child in the intervention I developed and implemented, including the child-participants' supportive social ecologies. My goal was to effect change within these social contexts to increase the impact of the holistic intervention on the child-participants.

Holistic interventions consider the whole child, thereby attending to the physical, cognitive, emotional and social domains of development, also considering the various social settings and influence these may have on development and human functioning (Charles et al., 2016; Erickson, 2007; Fortune et al., 2018; Huljev & Pandak, 2016; Khenti et al., 2016; Kiling et al., 2019; Smith et al., 2015). By taking into account the interconnectedness of the various domains, holistic approaches can promote

healthy growth and development. For instance, when addressing a child's emotional health through a holistic intervention, the child's academic performance and social relationships may be positively affected (Dray et al., 2015; Khenti et al., 2016; McLeroy et al., 1988; Morina et al., 2017). As holistic interventions are tailored to the unique context of the participant, including the individual's family dynamics, cultural background and community environment, the support that is provided can be relevant and impactful, possibly leading to better outcomes. Additionally, when fostering foundational assets and strengths, holistic interventions can equip participants with resilience and the skills needed to navigate challenges and seize opportunities. Overall, holistic interventions provide a comprehensive framework that may support the functioning of the whole human being (child in this case), ensuring that they thrive in the various domains of their lives.

Various studies (Cameranesi et al., 2023; Crisan et al., 2021; Fergus & Zimmerman, 2005; Frounfelker et al., 2020; Gabrielli et al., 2022; Giordano et al., 2021) demonstrate the potential value of interventions that focus on the enhancement of resilience amongst population groups faced with adversity on a daily basis. Masten (2019) describes resilience as the capacity of a system to positively adjust despite experiencing significant adverse events or disturbances that may normally threaten the function, viability or development of the system. According to Masten (2019), this definition can be applied to diverse systems that include individuals, families, communities, businesses, or ecosystems. According to this definition, the resilience of an individual is dependent on the resilience of the individual's interconnected and nested systems, as opposed to being limited to the capacity and abilities of the person in isolation. As such, resilience is embedded in social support and relationships (Masten & Cicchetti, 2016).

Resilience implies healthy development in terms of positive internal and external adaption by an individual in circumstances of risk or hardship. In this regard, Theron (2018) suggests that positive adjustment is fluid and dynamic, and that it will differ, depending on the specific context and person involved. Common protective factors that can support an individual in adapting, include effective caregiving, supportive relationships, self-regulation and problem solving skills, optimism and self-efficacy as well as the belief that life has meaning (Masten & Cicchetti, 2016). Based on these descriptions of resilience, it seems clear that resources and processes exist within the various systems of any individual that can be mobilised to restore equilibrium, transform the system and counter the challenges faced by an individual.

A potential factor that may support the healthy and positive development and functioning of children with disabilities is self-belief and a belief that they are valuable, deserve to be seen and heard, and deserve to be accommodated and supported by others (UNICEF, 2013a). According to Fergus and Zimmerman (2005), promotive factors that can support children in avoiding the effects of the challenges they may face can take the form of assets or resources. Assets entail positive factors that are found within an individual, such as self-efficacy, coping skills and competence, whereas

resources refer to positive factors external to an individual such as parental support, community organisations that promote development, or adult mentoring (Bronfenbrenner & Morris, 2006).

According to Theron (2018), resilience requires the input from individuals to navigate towards or ask for resources that can support and capacitate them as well as the input from their social ecologies, where these can work together to enable an individual to cope with adversity. Therefore, resilience cannot be conceptualised as an individual construct but can rather be seen as a “wellness-promoting transaction” that is shared between an individual and the supportive social ecologies (Theron, 2018). In applying this view to my study, I aimed to acknowledge the dynamic interaction between individuals and their social environment, with this view informing the development of the intervention that could potentially promote resilience within the context of supportive social networks. I thus included the child-participants’ parents in the study in an attempt to foster positive change within the children’s supportive social ecologies.

When conceptualising the resilience-enabling intervention for the child-participants, I focused on addressing the various components of child development. These encompassed their academic, emotional and social functioning. I aimed to address topics such as self-image, self-awareness and the ability to communicate one’s needs and experiences with others as this could potentially positively influence other areas of functioning such as academic performance and social interaction. By addressing these diverse areas, the holistic intervention aimed to support the child as a whole and cultivate skills and strategies that can be employed to overcome the challenges related to CVD. Rather than merely focusing on isolated issues, the intervention sought to equip children with tools for navigating life’s challenges, applying the skills they acquired on a broader level.

I included resilience as a cornerstone of the intervention, due to resilience being considered as essential for fostering long-term positive outcomes in life in general. The possibility thus exists that the child-participants may be able to apply the skills they gained during the intervention to support themselves in addressing CVD-related challenges throughout their various life stages. By focusing on resilience, the holistic intervention did not merely aim to mitigate the immediate impacts of CVD but also to empower the child-participants with the necessary skills and confidence to thrive in the various domains of their lives. This comprehensive approach was designed with the purpose of the intervention being holistic and impactful, promoting overall wellbeing and development.

The adoption of a holistic intervention approach was particularly important in this study as children with CVD face unique challenges that may impact not only their visual perception but also the various domains of functioning as well as their respective mesosystems, implying a potential negative effect on their academic performance, self-esteem and social interactions. By considering the emotional and social dimensions of functioning as well as the child-participants’ family and school settings, I was able to develop an intervention that could support a child as a whole. This implied the inclusion

of tailored strategies to accommodate the child-participants' visual needs, resilience-focused support, social and communication skills that could promote interactions with peers, and knowledge of CVD as well as guidance provision to the parents of the child-participants. This comprehensive approach implied the potential of enhancing the children's overall functioning and quality of life while potentially positively influencing their home and school contexts.

### **2.6.1 Potential value of holistic interventions for child functioning**

As already indicated, a holistic intervention encompasses a comprehensive approach that addresses the various aspects of an individual's functioning, including the physical, academic, emotional and social functioning while considering the individual within the unique social ecologies (Dadaczynski et al., 2020; Fischer et al., 2023). The whole person is considered to deliver support that may positively affect the holistic system and facilitate long-term positive effects. This approach involves a consideration of the interconnectedness of the various domains of functioning and implementing interventions that target multiple aspects simultaneously (Huljev & Pandak, 2016; Swart & Pettipher, 2019). Stodden et al. (2023) argue that before a holistic intervention can be implemented, a thorough understanding of a child's development as well as their unique contexts must thus be developed to provide support that is appropriate and effective. Such an understanding may ensure that the intervention can be tailored to address the specific needs and circumstances of the participant, thereby maximising its potential impact and fostering more meaningful and sustainable outcomes. I accordingly conducted pre-intervention data generation/collection to develop an in-depth, comprehensive understanding of each child-participant, their unique contexts and how CVD affected each of them differently. Keeping this in mind, I then developed the resilience-enabling intervention.

A holistic approach to an intervention relies on an ecological model for health promotion, as it can be considered to be the result of a complex interaction of individual, social, cultural and socio-economic factors (Dadaczynski et al., 2020; McLeroy et al., 1988). As a result, holistic interventions can address multiple aspects of child functioning and provide multi-level support. Within the context of children with CVD, holistic interventions may thus include the provision of assistive eyewear, such as EnChroma glasses, to address the physical functioning of participants by mitigating these challenges associated with CVD (Gómez-Robledo et al., 2018; Varikuti et al., 2020). Academic functioning can be supported by implementing strategies that may enhance academic performance, such as providing tailored learning materials that are CVD friendly, applying CVD accommodations and concessions in school, providing additional assistance to children in identifying colours, and using visual aids that are accessible to children with CVD. For social functioning, support can, for example, focus on the development of positive intrapersonal and interpersonal skills (Khenti et al., 2016). This aspect of a holistic intervention may include raising awareness of CVD among teachers, peers and the broader society, promoting empathy and understanding within the school community,

and facilitating social skills training to help children with CVD build confidence in their interactions with others and voice their experiences and needs.

By addressing the various components of functioning, a holistic intervention can create a supportive environment that may foster the overall wellbeing of children with CVD. In terms of emotional functioning, holistic interventions can support children with CVD by fostering resilience, promoting a positive self-esteem, and reducing feelings of frustration and isolation. By addressing their unique challenges and guiding participants in terms of suitable coping strategies, these interventions can assist children with CVD to better manage their emotions and interactions with others (Baranne & Falissard, 2018; Chakrabarti, 2018; Eze et al., 2020; Karunanayake et al., 2021; Khenti et al., 2016; Kiling et al., 2019; Kvitle, 2018; Meeks et al., 2015; Schlack et al., 2023; Shi et al., 2014; Shrestha et al., 2010; Silva et al., 2020; Steward & Cole, 1989; Torrents et al., 2011; Valero et al., 2022).

Collaboration between parents, teachers and other support systems plays a crucial role in the effective implementation of holistic interventions (Stodden et al., 2023). By working together, these stakeholders can promote a comprehensive approach to addressing the diverse needs of individuals and maximising the effectiveness of intervention strategies that are applied (Huljev & Pandak, 2016; Lingwood et al., 2020; Sanders et al., 2022). To elaborate, parents and teachers who have close interactions with children with CVD, can contribute valuable insights into the challenges and strengths of participants in an intervention (Huljev & Pandak, 2016). Through open communication and shared observations, stakeholders can gain a deeper understanding of how CVD may impact the various aspects of a child's life, including the academic performance, emotional wellbeing and social interactions of the individual. As holistic interventions require continuous monitoring and adjustment to ensure their effectiveness, communication and collaboration between stakeholders can track the progress of individuals with CVD who participate, identify any emerging needs or concerns, and make timely adjustments to intervention plans when needed. Such an approach may promote the overall functioning and success of individuals with CVD, empowering them to thrive in the various aspects of their lives despite the CVD-related challenges they face (Sanders et al., 2022).

In applying my knowledge of existing literature to holistic interventions, I thus designed an intervention that could potentially support the child-participants in my study. This intervention aimed to cultivate positive change within their unique systems by not only addressing individual needs but also involving the parents of the child-participants to provide them with comprehensive support. By recognising the importance of available resources and supportive systems surrounding the child-participants, this approach aligned with the conceptual framework of my study (consult Section 2.8), emphasising the influential role of a child's various supportive ecologies in assisting a child facing challenges such as CVD to cope and thrive. Consequently, the intervention I implemented sought to address both individual and environmental factors contributing to the child-participants' overall functioning. By focusing on resilience, the intervention aimed to empower children with CVD to

navigate the challenges they face more effectively, thereby potentially facilitating improvements in academic, emotional and social functioning.

### **2.6.2 Potential value of resilience-focused interventions for child functioning**

Resilience-focused interventions can promote and foster the development of protective, promotive and preventive factors (PPFPs) on a personal and social level that can support individuals in overcoming socio-emotional challenges in an adaptive and positive way (Gabrielli et al., 2022). This type of intervention focuses on strengths rather than deficits and on understanding healthy development despite potential risks and challenges (Fergus & Zimmerman, 2005). Resilience-focused interventions, therefore, have the purpose of developing and fostering positive adaptation, health and wellbeing. Common protective factors include supportive relationships, effective caregiving, self-regulation and problem-solving skills, optimism and self-efficacy, and an intrinsic belief that life has meaning (Masten, 2019). Additional protective factors can be found within an individual and across the nested ecological systems (Cameranesi et al., 2023).

According to Ungar (2015), both individual and systemic factors can be predictive of positive child development. Individual factors include characteristics such as temperament, personality type, genetic predispositions, cognitive skills and intelligence, while system factors refer to the quality of an individual's family, school or community. Ungar (2015) is of the view that systemic factors have more of an impact on the positive development of a child than individual factors. It follows that when a child's physical and social ecologies fail to provide support and elicit strengths, this may negatively impact their development.

Resilience factors include psychosocial factors such as active coping, self-efficacy, optimism, social support, emotional regulation, a powerful identity, self-esteem, positive self-image, social skills, communication skills, effective coping skills, hopefulness, leadership skills, positive thinking, positive future orientation, life skills, health and wellbeing as well as biological and systems factors that all interact with one another (Blessin et al., 2022). Furthermore, PPFPs include internal (executive function, emotional regulation, personality type, cognitive skills) as well as external (supportive systems within an individual's nested system) factors that are associated with positive and healthy adaptation as these can support and mediate the interplay of risk exposure and outcomes (Cameranesi et al., 2023). Resilience-focused interventions accordingly often centre on an individual's supportive social ecologies, with these aiming to strengthen the individual's social systems by promoting, for example, relationship building, communication and the mobilisation of resources in social ecologies that can provide support.

Masten (2019) explains that in recent years, resilience research has transformed multiple disciplines concerned with promoting wellbeing and mental health by shifting intervention frameworks from deficit models towards more holistic and comprehensive approaches that include protective and

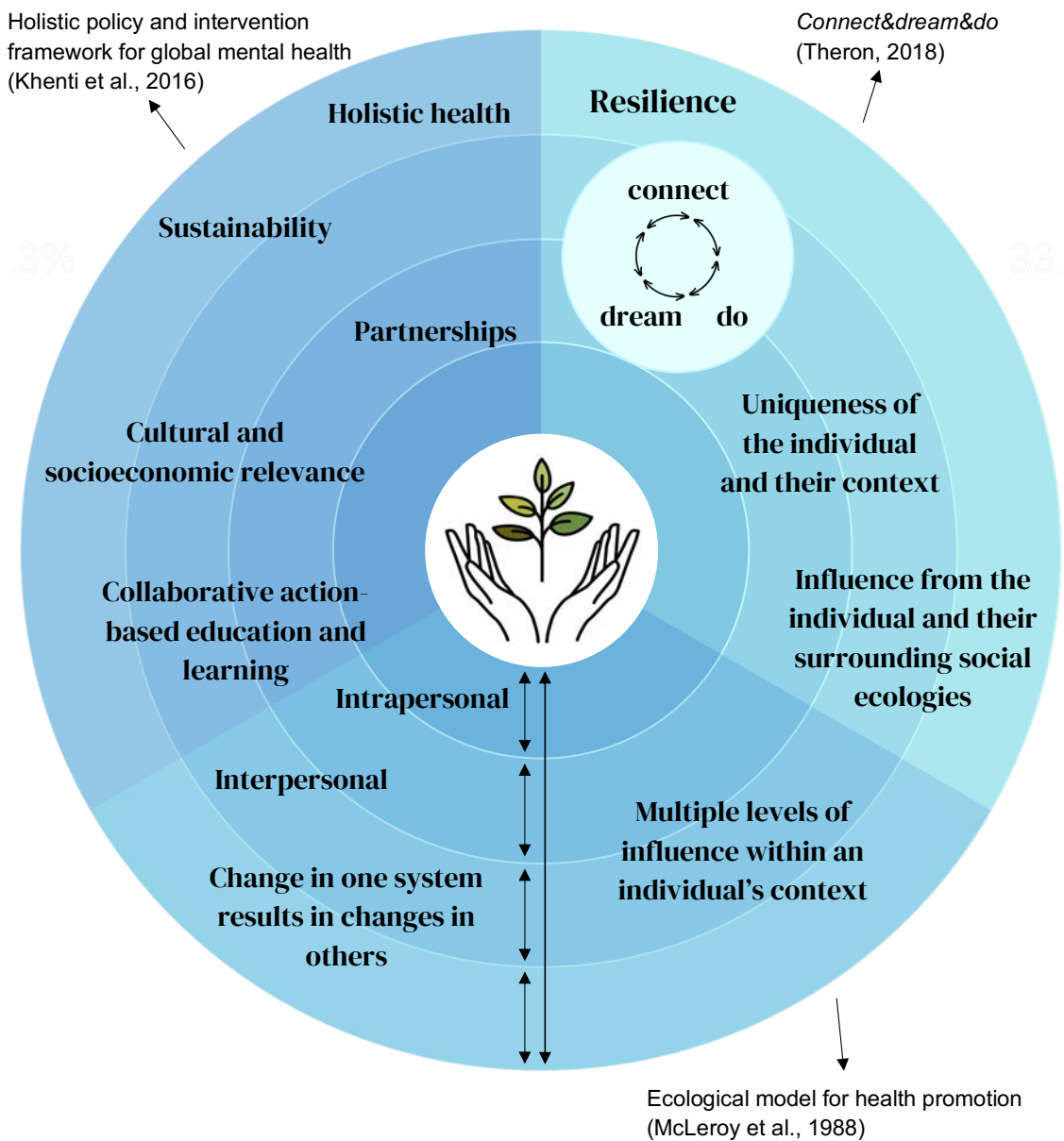
promotive factors, such as resilience, as well as vulnerabilities and risk, including those associated with health. In a systematic review of universal resilience-focused interventions targeting child and adolescent mental health in the school setting, Dray et al. (2015) found that resilience-focused interventions can reduce anxiety and depressive symptoms for children and adolescents in the short-term. Resilience-focused interventions furthermore hold the potential of encouraging the development of capacity building in a developing child that can, in turn, support the child in responding to adversities and challenges throughout life (Masten, 2019).

Against this backdrop, I developed and implemented a resilience-enabling intervention containing components of resilience, with the aim of facilitating resilience-enabling skills amongst the child-participants in support of their coping with CVD. I considered the guidelines provided by Cameranesi et al. (2023), who emphasise the development of a strong relationship between the facilitator and participants, creating a supportive environment, and building capacity by involving the important agents in the individual's social ecologies, such as the parents as important factors determining the success of resilience-focused interventions. For this purpose, I thus involved the child- and parent-participants in the pre-intervention phase, drawing from their knowledge, and thereby acknowledging their expertise. This led to the formation of a strong relationship between me and the participants that, in turn, positively influenced the implementation of the intervention with them. Due to children with CVD facing unique challenges that may impact their academic, emotional and social functioning, my aim was to equip these children with the necessary skills and strategies to cope with the challenges they face, possibly resulting in them being able to cope despite the adversity they may experience. As already stated, resilience, however, involves not only individual traits but also the support systems surrounding the child. I thus viewed a resilience-enabling intervention as particularly relevant to the context of my study, as it could address both personal and environmental factors.

## 2.7 CONCEPTUAL FRAMEWORK OF THE STUDY

I compiled a conceptual framework by integrating the ecological model for health promotion (McLeroy et al., 1988), elements from the HPIF for global mental health (Khenti et al., 2016) and Theron's (2018) theory on transactional pathways to resilience, specifically, the *connect&dream&do* mechanisms of resilience (Theron, 2018), as captured in Figure 2.12. The aim was to develop a framework that could guide me in developing a holistic intervention that acknowledged the importance of considering a child with CVD within their nested systems and placing the child's wellbeing at the centre. In this section, I first discuss the various underlying theories of the framework I compiled, and then explain my integration of these into a conceptual framework.

**Figure 2.12**  
*Conceptual framework of the study*



**2.7.1 Ecological model for health promotion**

An ecological model for health promotion (McLeroy et al., 1988) implies a reciprocal causation between an individual and the environment. In order to develop intellectually, emotionally, socially and morally, individuals need to actively participate in progressively complex and sustained reciprocal interactions with their immediate ecological settings. As such, this model focuses on identifying and utilising factors within individuals' various nested systems to promote health and wellbeing (Goodman et al., 1996).

McLeroy et al. (1988) state that it is important to identify the expected level of influence of an intervention to ensure that the necessary attention is given when developing intervention strategies

for these to be suitable and relevant. According to McLeroy et al. (1988), health promotion interventions rest on individuals' understandings, beliefs and perceptions of the challenges they face and the adoption of different strategies depending on the level of influence that is targeted. For the purpose of the current study, I developed an intervention that was employed at the intrapersonal and interpersonal levels of influence of the participants involved. Therefore, when developing and facilitating the holistic intervention, I considered the child-participants within their unique nested systems and the interactions between them. Taking these unique interactions into account, as determined during the pre-intervention phase of the study, I adapted the intervention for each child-participant so that it would be appropriate for them within their specific contexts.

Intrapersonal factors refer to the characteristics of an individual such as unique beliefs, values, education levels, attitudes, knowledge, behaviour, skills and self-concept as well as the individual's unique developmental history (McLeroy et al., 1988). Interventions at the intrapersonal level typically focus on developing and changing the characteristics of an individual, such as intention, perspective, knowledge, skills and attitudes. Such interventions generally focus on empowering individuals within their immediate environments by imparting knowledge that can lead to knowledge and skills development that, in turn, can result in positive health promotion (McLeroy et al., 1988). In undertaking my research, I accordingly attempted to remain aware of each child-participants' unique perspectives and skills, so that the information and skills imparted to them during the intervention could challenge their current beliefs about themselves, with the options of positive change implied.

Interventions at the intrapersonal level thus assume that the mechanisms for producing behavioural changes are found within the individual, rather than within the immediate social environment. Interventions can utilise various intervention strategies, such as support groups, educational programmes, mass media or peer counselling. However, the overall focus remains on empowering individuals to make positive changes in their lives that may support their overall health and wellbeing (McLeroy et al., 1988). The holistic intervention in my study accordingly focused on empowering the participants by creating change within their immediate environments through imparting knowledge and skills that could positively change their view on CVD and how to deal with it.

Interpersonal processes, however, include relationships with family members, friends, peers and acquaintances. These relationships are regarded as important sources of influence on the health-related behaviours of individuals as their influence can affect an individual's behaviour and attitude to health. People's social relationships form an essential part of their social identities as they may provide vital social resources that can include aspects such as information, emotional support and assistance in fulfilling personal and social obligations and responsibilities (McLeroy et al., 1988). Social support is accordingly regarded as essential for individuals to navigate life stress and other important aspects of their lives, in support of overall wellbeing and health. Therefore, the importance of social support and utilising the resources within their systems was emphasised throughout the

holistic intervention to empower the participants to actively cope and respond to CVD-related challenges by relying on and engaging within their social environments.

It follows that interventions focusing on interpersonal processes will typically encourage social relationships in support of the health and the optimal functioning of the individual. In this regard, the participants were encouraged to communicate with one another and develop their relationships so that they could work together in promoting the health and functioning of the child-participants.

### **2.7.2 HPIF for global mental health**

According to Khenti et al. (2016), psychosocial wellbeing and mental health stand central in individual and public health. In order to address barriers to mental health and encourage the positive development of psychosocial wellbeing, Khenti et al. (2016) developed a HPIF that focuses on capacity building in global mental health to address global mental health barriers. The HPIF includes five pillars, namely holistic health, partnerships, cultural and socioeconomic relevance, collaborative action-based education and learning, and sustainability. For the purpose of this study, I considered all five pillars when developing and implementing the holistic intervention.

Holistic health concerns the gaining of an in-depth understanding of underlying influential factors and recognising the values of individuals within their unique cultural, socioeconomic, political and historical contexts. This description informed my exploration of the complexity of the health and functioning of the child-participants by exploring the synergies between interpersonal and community factors and the influence of these on the individuals (Khenti et al., 2016). I kept in mind that all said levels are interlinked, that they are necessary for developing capacity and that they may negatively or positively influence the holistic health of the participants. Moreover, I kept in mind that holistic health includes context-specific social determinants of health at various levels and embraces the relationships between psychological, physical and emotional health in undertaking my study.

According to the HPIF (Khenti et al., 2016), the principle of partnerships refers to the establishment of reciprocal relationships that are based on respect, trust and co-leadership. I accordingly formed meaningful relationships with the participants in my role as researcher (Ferreira & Ebersöhn, 2011; Khenti et al., 2016). Next, cultural and socioeconomic relevance refers to how emotions are experienced and perceived and to the fact that these may differ across cultures and contexts, with the knowledge and understanding of mental health coming from within a specific background or community (Khenti et al., 2016). I accordingly considered the specific and unique knowledge, perceptions and experiences of the participants while maintaining an open mind, and a willingness to learn and gain knowledge from the participants within their contexts while conducting my study.

Next, the pillar of collaborative action-based education and learning emphasises the need to work and engage collaboratively with other individuals to identify and assess gaps, strengths and

opportunities in existing treatment plans and policies. Gaps can, for example, be addressed by sharing knowledge and utilising existing strengths and resources. By incorporating this pillar of the HPIF (Khenti et al., 2016), I could encourage participants to share their experiences, knowledge and perceptions in support of the learning process that followed and the overall effect of the intervention.

Finally, Khenti et al. (2016) propose that effective health initiatives can lead to meaningful sustainability through strong partnerships and effective capacity building that may, in turn, promote and ensure a long-term positive effect on functioning. Interventions can therefore focus on the holistic health of participants by encouraging the cultural adaption of activities and plans to ensure that participants develop relevant knowledge, attitudes and skills that align with their unique situations, and can support them in sustaining coping and skills development when dealing with a specific condition (Khenti et al., 2016). Inclusion of this pillar encouraged me to develop an intervention that could impart knowledge and skills for the participants to utilise and transfer to any area of their lives.

### **2.7.3 *Connect&dream&do***

Theory related to transactional pathways to resilience suggests that resilience requires input from the individual and its social ecologies while also taking into consideration the unique culture and environment. Accordingly, children can navigate towards or rely on support and resources from their social ecologies that may capacitate them to cope with challenges and adversity. All such transactions, however, need to align with the culture of the individual. This view relates to Masten's (2019) definition of resilience, suggesting that the resilience of an individual depends on the related interconnected and nested systems, conceptualising resilience as a "wellness-promoting transaction" that is shared between the individual and its social ecologies (Theron, 2018, p. 414).

According to Masten and Wright (2010), positive adjustment is embedded in certain practices, such as healthy relationships or positive attachments, the motivation to make positive choices, and subsequent experiences of success, self-regulation and cultural beliefs that offer protective resources, intelligent problem solving, and hopeful and positive future orientations. Following several research projects conducted within the South African context (Phasha, 2010; Theron et al., 2013). Theron (2018) suggests that the mechanisms of resilience can be condensed into three core transactions, namely connect, dream and do. According to Theron (2018), a resilient child will connect well, dream well and do well, with these transactions being interdependent and embedded within the child's supportive social ecologies. This implies that when children *connect&dream&do* and when role players within their social ecologies support them to *connect&dream&do*, and also *connect&dream&do* with the children, such children will be better able to positively adjust to disability, trauma or hardship. The order of the transactions does not matter, as long as the individual engages in all three activities and the role players within the social ecology partner with them.

For the purpose of the current study, *connect&dream&do* was presented to the child-participants as part of the holistic intervention. In this context, *connect* referred to “the protective system of forming meaningful relationships” (Theron, 2018, p. 417) and relied on the adaptive mechanisms of culture, religion and attachment. For a child to be well connected they need to connect on four levels, namely with themselves, spiritual beings, others and their culture. It is, therefore, important for role players within the child’s social ecologies to promote cultural and spiritual connection.

Next, *dream* refers to “the protective system of having positive expectations for the future” (Theron, 2018, p. 416), drawing on the adaptive mechanisms of self-regulation, meaning making as well as agency and mastery. For children to be able to dream well they need to see things differently, identify realistic short- and long-term goals, have a vision for the future, and hope. Role players within the individual’s social ecologies need to encourage children to dream of a better and hopeful future, teach them how to plan for it and support them as they pursue their dreams (Theron, 2018).

Finally, *do* refers to “the protective system of taking wellness-promoting action” (Theron, 2018, p. 418), drawing on the adaptive mechanisms of agency and mastery as well as intelligent problem solving. For a child to be able to do well they need to be aware of the resources surrounding and available to them, which include familial, personal, community and cultural resources. Children can record or document these resources and develop a plan on how to use them as awareness of these resources may not be enough to enable them to mobilise the resources when needed. Role players within the child’s social ecologies thus need to work with them and collaboratively identify and map available resources and how they are able to support the child (Theron, 2018).

#### **2.7.4 Integration of underlying theories into a conceptual framework**

The conceptual framework of my study supported me, as researcher and interventionist, in developing and implementing a holistic intervention that took into consideration the uniqueness of the child-participants within their specific nested systems so that resilience-enabling skills and strategies could be fostered. Based on my integration of an ecological model for health promotion (McLeroy et al., 1988), the HPIF for global mental health (Khenti et al., 2016) and Theron’s (2018) transactional pathways to resilience, specifically, *connect&dream&do*, the intervention aimed to foster resilience-enabling skills and strategies while considering the interconnectedness of individuals and their social contexts, as shown in Figure 2.12.

The framework I compiled enabled me to obtain a understanding of the child-participants within their various systems, including their family and school environments. By recognising resilience as a dynamic interaction between individuals and their social contexts, the intervention could focus on promoting positive transactions and supportive relationships to facilitate positive change. To be more specific, the intervention targeted both intrapersonal and interpersonal levels to address individual beliefs, perceptions and interactions with others. In line with the conceptual framework, the study

aimed to promote holistic health and sustainability by empowering the child-participants to address challenges and thrive within their social ecologies. Through targeted support based on the principles of *connect&dream&do*, positive changes were possible within the child-participants' intrapersonal and interpersonal levels (for example, their family system and school system), potentially fostering resilience and ultimately wellbeing (Khenti et al., 2016; McLeroy et al., 1988; Theron, 2018).

As depicted in the conceptual framework captured in Figure 2.12, individuals can be viewed as active participants in their own development, engaging in complex and sustained interactions within their immediate surroundings to foster intellectual, emotional, social and moral growth. For example, the intervention I implemented included raising awareness of CVD among peers and teachers (interpersonal level) and providing support and resources to child-participants with CVD to cope with academic and social challenges (intrapersonal level). By targeting these levels of influence, the intervention aimed to promote the health and functioning of the participants within their social and educational environments, aligning with the principles of the ecological model for health promotion.

To promote change within their interpersonal relationships, I also co-facilitated a parent guidance intervention with the parents of the child-participants. The goal was to increase parental awareness and support, with the expectation that this could positively influence the child-participants. Additionally, I developed resource material containing information about CVD and how to provide appropriate support in this context that may be disseminated within the various systems of the child-participants. This approach held the possibility of positively impacting relationships across the participants' social ecologies, further enhancing their resilience and functioning.

The HPIF served as a guiding framework for the development and implementation of the holistic intervention for individuals with CVD. By incorporating the five pillars of the HPIF, the intervention aimed to address the multifaceted needs of individuals with CVD and promote their psychosocial wellbeing. For example, the pillar of holistic health emphasises the importance of addressing physical, emotional and social aspects of health, as done in the intervention I implemented in the current study. Partnerships are another key pillar of the HPIF, emphasising collaboration between various stakeholders, as was done in my study by involving the parent-participants to ensure a coordinated and holistic approach to support the child-participants with CVD.

Next, cultural and socioeconomic relevance was addressed by taking into account the diverse backgrounds and experiences of the participating individuals with CVD, ensuring that support strategies are culturally sensitive and accessible to all. In attending to collaborative action-based education and learning, the intervention I developed and implemented incorporated interactive and hands-on activities to engage individuals with CVD and facilitate learning about colour vision and possible coping strategies for the associated challenges. To this end, the holistic intervention acknowledged that for individuals to adjust well and adapt to adversity, resources within their various

systems need to be mobilised, capacity and skills need to be developed that may promote resilience and empowerment, and change need to occur that, in turn, can encourage change and adjustment within the individuals' other nested systems (Khenti et al., 2016; McLeroy et al., 1988; Theron, 2018).

Finally, the fifth pillar of sustainability highlights the need for interventions to be sustainable and scalable over time. By integrating components that can promote long-term support and self-management skills, the intervention I developed aimed to empower the child-participants to maintain psychosocial wellbeing beyond the duration of the study and use the knowledge and skills they gained throughout their lives. Overall, by applying the principles of the HPIF, the holistic intervention implemented in this study aimed to address the complex needs of individuals with CVD and promote their functioning in a holistic and sustainable manner (Khenti et al., 2016).

As underlying backdrop, the *connect&dream&do* mechanisms of resilience informed the development of the resilience-enabling intervention, with the intervention sessions aiming to impart knowledge and skills that would align with the resilience-enabling mechanisms of *connect&dream&do*. The intervention was accordingly based on concepts that focused on the development of resilience, and that could be applied to each child-participant in a meaningful and impactful way (Theron, 2018). By fostering positive transactions between individuals and their social ecologies, the study aimed to promote resilience and wellbeing among children with CVD, ultimately empowering them to overcome the challenges they faced and to thrive in their environments.

## 2.8 CONCLUSION

In this chapter I explored the existing literature on CVD, the effect it has on development and living as well as the associated academic, emotional and social challenges that children with CVD may face. I discussed inclusive education policies as well as current attempts to address CVD-related difficulties. I contemplated the potential value of resilience-enabling holistic interventions for children with CVD, and concluded the chapter by explaining the conceptual framework.

In the next chapter, I discuss the methodological choices I made. I explain the epistemological stance and methodological approach that I followed and discuss the case study design I implemented. I explain the data generation/collection, documentation, and analysis strategies I used, and elaborate on the quality criteria and ethical considerations I adhered to.



# CHAPTER 3

## RESEARCH PROCESS AND METHODOLOGY

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### 3.1 INTRODUCTION

In Chapter 2, I reviewed the existing literature pertaining to this study and discussed the theoretical underpinnings of the conceptual framework that directed the study. In my discussion of the existing literature, I specifically focused on understanding CVD, the impact of CVD on the holistic development and wellbeing of children, inclusive education policies in South Africa, current attempts to support children with CVD, and the potential value of resilience-focused interventions in support of children with CVD. I concluded the chapter by explaining my conceptual framework.

In this chapter, I discuss and justify the epistemological and methodological choices I made to achieve the purpose of my study. I provide an overview of the research process and then explain my selected research design, selection of cases and participants as well as the data generation/collection, documentation, analysis and interpretation strategies I utilised. I conclude the chapter by discussing the quality criteria and ethics considerations I aimed to adhere to.

### 3.2 EPISTEMOLOGICAL PARADIGM

A paradigm is a set of beliefs or metaphysics that represent a worldview or general perspective that describes the nature and complexity of the real world, and the range of potential relationships in the world and their various systems (Guba & Lincoln, 1998; Lincoln & Guba, 1985). Additionally, a paradigm guides the actions of the researcher. As such, it determines how a researcher conducts the study, the relationship between researcher and participant, how they will conduct moral, ethical research and how the researcher views and defines reality (Lincoln et al., 2018). In the pursuit of gaining an in-depth understanding of children's perspectives and experiences of CVD while also developing a holistic intervention to support their specific and unique needs, I relied on social constructivism as meta-theoretical paradigm.

Creswell and Creswell (2023) state that research embedded within a social constructivist stance aims to rely on the participants' views of a phenomenon as far as possible. Social constructivism allowed me, as researcher, to gain empathic understanding (*verstehen*) into the child- and parent-participants' beliefs, viewpoints and experiences, which, in turn, enabled me to develop and implement an intervention programme that could address the specific and unique needs of the participants while taking into consideration their diverse social contexts and the supportive ecological systems within these (Schwandt, 1994; Tracy, 2020).

According to the social constructivist point of view, knowledge and reality are not found or discovered, but are rather constructed or created through interaction, communication and practice (Schwandt, 1994). Social constructivism assumes a relativist ontology that postulates that reality and knowledge are constructed and produced to make sense of people's experiences (Schwandt, 2000). Our interpretations of knowledge and reality are, therefore, not constructed in isolation or individually, but are influenced by shared, collective interactions, understandings, experiences, communications and practices found within the surrounding social world (Lincoln et al., 2018; Schwandt, 1994, 2000).

Social constructivism assumes a subjectivist epistemology that positions researchers and participants as co-creators of knowledge, understanding and reality. Researchers thus collaborate with participants to co-construct knowledge and interpret their experiences and perceptions of the studied phenomenon. Findings are regarded as the "creation of the process of interaction" between the researcher and participants (Guba, 1990, p. 27). As a researcher, I remained aware of my worldview and that my lived experiences could influence the co-generation of knowledge and interpretation of data obtained from participants. Throughout, I engaged with participants to ensure that knowledge creation reflected their unique realities.

Social constructivism employs naturalistic methodological procedures, meaning knowledge and reality are constructed within participants' natural settings (Denzin & Lincoln, 2018). Constructed knowledge is refined hermeneutically (interpretively) and contrasted dialectically (rationally) to generate consensus (Denzin & Lincoln, 2018; Guba, 1990). Methodologically, social constructivism elicits emergent meaning-making and knowledge construction. The axiological implications of this approach suggest that knowledge is transactional and instrumentally valuable, serving as a means for social emancipation and adding intrinsic value to the world (Lincoln et al., 2018).

A potential advantage of social constructivism is that researchers who adopt this meta-theory will view meaning and reality as multiple and varied, thereby being able to focus on the complexity of participants' views rather than on trying to narrow meanings down into a handful of ideas or categories (Creswell & Guetterman, 2019; Creswell & Poth, 2018). This can, in turn, allow researchers to focus on interpreting participants' views and lived experiences holistically, which may lead to rich descriptions of the studied phenomenon (Creswell, 2009). Accordingly, I was able to rely on the participants' views of the phenomenon under study and carefully consider their experiences, acknowledging that they are the experts within their own unique contexts (Creswell & Poth, 2018; Lincoln & Guba, 2000; Snape & Spencer, 2003; Tullis Owen, 2008).

A potential limitation associated with social constructivism relates to the research findings being influenced by the researcher's own motivations, interests, biases, values and perspectives that are shaped by personal background. This makes it impossible to claim that a truly objective, value-free study has been conducted (Creswell & Guetterman, 2019). To safeguard against this possible

limitation, I acknowledge that my interpretation could have been shaped by my personal, historical and cultural experiences (Crotty, 1998). I strove to maintain an open mind and discard any prejudicial perspectives I may have had, focusing on accurately understanding the meanings the participants had constructed regarding the phenomenon under study. Additionally, I kept a reflexive journal to document my thoughts, insights and assumptions. I reflected on the impact of the participants on me as a researcher, and also on the impression I may have made on them and how this could have influenced the outcome of my study (Braun & Clarke, 2022; Creswell & Guetterman, 2019).

In summary, by adopting a social constructivist paradigm, I aimed to gain a holistic understanding of the studied phenomenon by exploring the participants' unique points of view and being cognisant of their unique social contexts, for example, realising that their social systems would influence their understanding. This allowed me, as social constructivist researcher, to attempt to see the world as the participants do, to be non-judgemental, and finally, communicate their understanding of the studied phenomenon through the research findings (Tracy, 2020; Wiseman, 1996). Moreover, I relied on a social constructivist epistemology while following a qualitatively-driven mixed methods research approach as this allowed me to discover understanding and meaning through my active involvement in the research process, which, in turn, supported my interpretation of the participants' experiences (Schwandt, 1994; 2000). As researcher, I therefore sought to establish the meaning of the studied phenomenon from the participants' views (Creswell & Creswell, 2023).

### **3.3 METHODOLOGICAL APPROACH**

I followed a qualitatively-driven mixed methods research approach, QUAL ↔ quan. According to Frost et al. (2022), this research approach implies a combination of qualitative and quantitative research methods, with the emphasis being placed on lived experiences and exploring the elements that may produce change. Qualitatively-driven mixed methods research focuses predominantly on employing qualitative methods yet incorporating quantitative methods to further enrich and generate multi-dimensional findings. This research approach enables researchers to understand and explore a phenomenon holistically while considering the multidimensionality of meaning-making due to the layering and combination of the different approaches creating an integration of insights of the phenomenon (Frost et al., 2022; McBeath & Bager-Charleson, 2020).

According to Landrum and Garza (2015), by combining qualitative and quantitative research approaches, a stronger approach is created that can provide more insight and knowledge into a phenomenon than when relying on a single approach. Even though both approaches can shed light on a phenomenon, mixed methods approaches can enable researchers to gain new insights that may not be possible when following only one of the two approaches. Furthermore, mixed methods research typically results in a rich, multi-layered understanding of a specific phenomenon (McBeath & Bager-Charleson, 2020). To this end, qualitatively-driven mixed methods researchers strive to

make sense of, interpret and represent phenomena in terms of the meanings the participants attribute to them (Creswell & Creswell, 2023; Denzin & Lincoln, 2018; Yin, 2016). I accordingly aimed to make visible and bring to light the views and experiences of children with CVD as well as of their parents. I relied primarily on qualitative research methods to explore the views and perceptions of children with CVD as well as their parents, and integrated quantitative data collection methods to support the qualitative data, thereby following a QUAL ↔ quan approach. To be more specific, I relied on quantitative methods to determine the emotional and social functioning of the child-participants prior to and after implementing the holistic intervention with them, in support of my exploration of these aspects and their views through qualitative methods.

According to Creswell and Creswell (2023), qualitative research enables researchers to explore and understand the meaning that groups or individuals attribute to social or human phenomena. Yin (2016, p. 9) elaborates and states that qualitative research “involves studying the meaning of people’s lives, as experienced under real-world conditions”. Qualitatively-driven mixed methods researchers, therefore, seek to build an understanding of the studied phenomenon or population within the natural setting, based on the participants’ first-hand accounts of their experiences and not on what the researcher believes or the meaning the researcher finds within the research field.

According to Yin (2016), five distinct features distinguish qualitative research in relation to other types of research. Firstly, qualitative research is focused on studying the meaning people attribute to their lives within their real-world contexts; secondly, it specifically represents the views and perspectives of the participants; next, it explicitly attends to and accounts for “real-world contextual conditions”; fourthly, it contributes insights from existing or new knowledge constructions that may support the explanation of social thinking and behaviour; and lastly, it acknowledges the potential relevance of including multiple data sources rather than relying on one form of data (Yin, 2016, p. 9). Data is accordingly generated by relying on participants’ self-expressions, for example, their social interactions, what they say, their own opinions and views, or through data materials created by them, for example, diaries, drawings and writing. Qualitatively-driven mixed methods researchers are therefore encouraged to generate, integrate and present data from a variety of sources.

A major priority of qualitative research is that it is devoted to representing and bringing to light the perspectives and views of the research participants without losing the contextual richness of the setting (Yin, 2016). In support of Yin’s (2016) work, Creswell (2016) highlights several features of qualitative research related to exploring a phenomenon in an open-ended manner; developing a complex understanding of what is explored; lifting up the silenced voices of marginalised populations or groups; creating multiple views or perspectives of the phenomenon; and as researcher, reflecting on the experiences and biases. These features provided me with a useful guide when undertaking this research, as discussed in Table 3.1 in terms of the significant features of my study and my application of the guidelines for qualitative research.

**Table 3.1**

*Application of the features of my study in relation to the guidelines provided by Yin (2016) and Creswell (2016)*

Features of qualitative research	Application in this study
Studying the meaning of people's lives in their real-world contexts	I studied the meaning of the participants' lived experiences by exploring their perceptions within their real-world contexts. Participants were encouraged to speak freely about their experiences and were not limited by pre-established assumptions, close-ended questions or my expectations of their responses.
Representing the perspectives and views of the participants	Qualitative research differs from other methods of inquiry in that the priority is to represent the perspectives and views of the research participants. Therefore, the identified themes and ideas in the current study represent the meaning given to real-world events by the participants and not the meaning and values held by me as researcher.
Explicitly accounting for and attending to real-world contextual conditions	Qualitative research embraces the contextual conditions within the participants' lives. I strove to remain aware and sensitive of the social, cultural, environmental and institutional conditions within the participants' lives and adjusted the research process accordingly.
Contributing insights from new or existing concepts that may help explain social behaviour and thinking	I aimed to explain how children with CVD experience the world, how CVD influences their holistic functioning and whether a holistic intervention could support them. Due to the limited research on this phenomenon, this study may add valuable insights that can better explain the research participants' lived experiences and the support needed for them to thrive.
Relying on multiple data sources of evidence	I integrated multiple data generation and documentation methods, for example, PRA-matrices, interviews, written notes and drawings to gain in-depth understanding of the studied phenomenon.
Exploring in an open-ended manner	I attempted to explore the studied phenomenon in an exploratory and flexible manner whereby I remained aware of not becoming transfixed on specific questions, relationships and assumptions. I allowed the participants and their knowledge and perspectives to guide the research process to yield findings that describe their lived experiences.
Developing complex and in-depth understanding	I endeavoured to study the complexity of the studied phenomenon and obtain an in-depth understanding by gathering data from multiple participants. This allowed me to focus on the inclusion of multiple voices from several participants, gathering their unique perspectives and developing multiple themes that could, in turn, lead to rich data.
Lifting up the silenced voices of marginalised populations or groups	Limited research is currently available on the lived experiences of children with CVD and how a holistic intervention may support them. I therefore aimed to study a population group that was not often studied in the past.
Creating multiple views or perspectives of a phenomenon	I endeavoured to create multiple perspectives of the studied phenomenon by focusing holistically on the lived experiences of multiple participants. This allowed me to explore "the good, the bad, and the ugly" that could provide a rich mosaic of the participants' lived experiences (Creswell, 2016, p. 40).
Reflecting on experiences and biases as researcher	I strove to remain reflexive of how my personal biases and views of the social world could influence my ability to conceptualise the studied phenomenon. I attempted to remain present and explore what I, as researcher, contributed to this study.

In terms of the potential challenges associated with qualitatively-driven mixed methods research, nested in social constructivism, generalisable findings are not possible as researchers study the participants within their own unique, specific and natural settings in such studies (Denzin & Lincoln, 2005; Frost et al., 2022; Guba & Lincoln, 1998; Lincoln & Guba, 2000). This implies that the findings

cannot merely be applied to other settings that may differ culturally, contextually and socially. The purpose of the current study was, however, not to produce generalisable findings but to explore the participants' unique experiences to obtain an in-depth understanding of these. In order to enhance the transferability of the findings of my study, in-depth descriptive data was generated and the research process meticulously documented so that the findings could be transferred to other similar contexts. Furthermore, I collected quantitative data to support and add to the qualitative descriptive data I obtained (Guba, 1981; Guba & Lincoln, 1998; Nieuwenhuis, 2019b; Yin, 2011).

Another potential limitation of qualitatively-driven mixed methods research relates to researchers potentially misunderstanding and wrongly practising reflexivity. According to Alvesson et al. (2022), when using reflexivity, researchers need to consider multiple angles and reflect on various factors that could influence and guide their assumptions rather than allowing one angle to lead them. Alvesson et al. (2022, p. 28) refer to this as “me-ism”, where researchers allow themselves to become the focus of attention. While this may lead to rich and insightful understandings, it often entails a limiting and narrow form of reflexivity. “We-ism” however, refers to a broader sense of reflexivity where researchers focus on exploring and understanding the collective forces that influence their ability to conduct research, being their lived experiences, biases and assumptions (Alvesson et al., 2022, p. 26). I discuss this aspect in more detail in Sections 3.7.3 and 3.11. In order to safeguard against “me-ism”, I focused on my understanding of the phenomenon being based on the accounts of the participants. I attempted to remain aware of my interpretation of the participants' experiences by ensuring that meaning-making was directly related to what the participants had voiced (Alvesson et al., 2022; Frost et al., 2022; Tracy, 2020).

### **3.4 RESEARCH DESIGN AND SELECTION PROCEDURES**

In the following sections I discuss the research design and selection procedures I relied on.

#### **3.4.1 Research design**

According to Guba and Lincoln (1989), a research design refers to the structure, plan and strategy of investigation used to conduct a study and answer the formulated research questions. Hammersley and Atkinson (1995) regard a research design as a reflexive process that operates and is constructed throughout every stage of a study. Accordingly, researchers are seen to construct the design and processes within along the way as a result of implicit and explicit decisions during the research process (Flick, 2022). For the purpose of this study and to guide the research process, I implemented a collective case study research design (Stake, 2005; Yin, 2018), applying PRA principles (Chambers, 2015; Ferreira et al., 2013; Schwandt & Gates, 2018). The selected research design enabled me to conduct an in-depth exploration of the experiences of children with CVD and of how a holistic intervention could affect their functioning while establishing an active partnership with the participants that, in turn, enabled me to improve and address the holistic intervention I facilitated with

them. Within the context of the current study, the child-participants can be seen as instruments that allowed for the development of an in-depth understanding of the phenomenon under study.

Case study research is commonly used when undertaking qualitative studies as it involves the exploration of a contemporary phenomenon (case) within its real-world context to develop experiential knowledge while taking into consideration the contextual conditions that may influence the case (Stake, 2005; Yin, 2018). A case refers to a phenomenon of theoretical significance that is being explained or described. Cases may comprise individuals, organisations (for example, schools, political parties or non-governmental organisations), social groups (defined by race, ethnicity, age, sexuality or gender), or events (for example, social movements or revolutions) (Babbie, 2021; Gerring, 2017; Yin, 2018). When implementing a case study design, the boundaries of the case as well as the phenomenon under study should be clearly defined against the background of the guiding research question. For the purpose of the current study, the case refers to the bounded system of four children with CVD (child-participants) and their social contexts that include the insight from their parents (parent-participants) to better explain the specific social phenomenon.

Stake (1995; 2005) identifies three types of case study designs, namely the intrinsic, instrumental and multiple or collective case study design. An intrinsic case study is the study of a case that is of particular interest to the researcher due to its uniqueness. The purpose is not to come to an in-depth understanding of the case or to build theory or study a case that will represent similar cases (Grandy, 2010b; Stake, 1995; 2005). An instrumental case study design refers to the study of a specific case to develop insight into an issue, build theory or draw generalisations. Lastly, a collective case study design implies the study of several instrumental cases that are linked together, and that may allow a researcher to develop in-depth insight into a specific issue across multiple cases (Goddard, 2010).

According to Goddard (2010), when implementing a collective case study design, researchers may embark on a comprehensive investigation of a number of cases that are linked together in some way. I employed a collective case study design as this enabled me, as researcher, to explore the experiences of multiple participants (cases) to develop an in-depth understanding of the experiences of children with CVD and how a holistic intervention may potentially support or affect their holistic functioning. Typically, within a collective case study design, between four and 10 cases are selected, as this number is small enough to allow for an in-depth understanding but large enough to allow for meaningful insight and comparison across the cases (Gondo et al., 2010).

According to Ferreira and Ebersöhn (2013), when incorporating PRA principles, research and practice can meet as participants will accordingly be encouraged to actively participate in the research process and take ownership of solving the difficulties they face (Chambers, 2008; 2015). In utilising PRA principles, I was guided by Von Maltzahn and Van der Riet's (2006, p. 112) view that participatory research "gives people an opportunity to articulate what they feel the problems are and

to generate relevant solutions”. Chambers (2008, p. 97) concurs with this statement by stating that PRA focuses on “appreciating people’s own knowledge and ways of knowing”. I was guided by the premise that local knowledge and participation are mutually connected and that research participants can control, direct and be involved in the research process. As a result of such direct ownership and involvement by the participants, a better fit between the solutions and identified challenges may be found as the people affected by the difficulties are actively involved in developing solutions. Their conceptualisation of the phenomenon will, as a result, be prioritised over the assumptions of the researcher or the broader audience (Von Maltzahn & Van der Riet, 2006).

In the current study I was thus responsible for enabling and encouraging the participants to express and enhance their own specific and contextual knowledge (Chambers, 2015). From a PRA perspective, I regarded the participation of the child-participants as vital to the development of the holistic intervention and for understanding how the intervention influenced the lived experiences of the participants and whether there were any changes to their coping with the challenges they reported (Chambers, 2015). By employing PRA principles, I could encourage and allow the participants to reflect on their development, report on the emerging challenges they faced, and assume an active role in identifying and exploring solutions to the challenges they had identified, while developing resilience-enabling skills and strategies. To be more specific, the participants were asked for their opinions and actively encouraged to engage and share their views on the holistic intervention and what was needed to support them appropriately. The incorporation of PRA principles, in this way, enabled me to obtain an in-depth and detailed understanding of the participants’ lived experiences as well as of their views of the world.

For case study research applying PRA principles, no specific set of predetermined guidelines exist that all researchers can follow. A potential limitation of case study research applying PRA principles may therefore include that if not done thoroughly and according to systematic procedures, case study research can be regarded as questionable in terms of rigour of the findings and conclusions of the study (Yin, 2018). To safeguard against this potential limitation, I developed and adhered to systematic procedures during the data generation/collection, and analysis phases of the study as well as when facilitating the holistic intervention to ensure that the generated data would be credible. According to Babbie (2021), more criticism of case study research relates to the probability that such a study may yield limited generalisability, especially when only a single instance of a phenomenon (case) is studied. In order to reduce this potential risk and in striving for transferability of the findings that can support the development of theory and practice for other similar phenomena, I included and holistically studied four cases in my research (Babbie, 2021; Yin, 2018).

According to Gerrig (2017), a potential advantage and primary feature of case study research is that, if done correctly, such research may yield explanations and descriptions of the studied phenomenon that are detail-oriented, rich, full and complete. Another potential advantage of implementing a

collective case study design applying PRA principles is that it aligns with the social constructivist epistemological approach I adopted as it can be regarded as a good method for studying social phenomena due to the purpose of understanding lived experiences and social life (Schwandt & Gates, 2018). Yin (2018) states that case study research is especially useful when researchers are striving to explore, understand and describe a contemporary phenomenon over which the researcher has little or no control, such as in the case of the current study.

### **3.4.2 Selection of cases and participants**

Yin (2016) states that in qualitative research, cases and participants are often selected in a deliberate manner. I utilised non-probability sampling methods, namely purposive and snowball sampling. According to Babbie (2021), purposive sampling entails the selection of a sample based on the specific knowledge and experiences of a population. As such, the sample is selected based on the researcher's judgement as to whether the selected sample will be useful or representative of the phenomenon under study. Furthermore, the sample is selected due to the possibility of it yielding the richest information possible that is relevant to a chosen topic (Babbie, 2021).

One advantage associated with purposive sampling is the ability to target participants who possess the information or experiences needed to address the formulated research questions. This approach allows researchers to focus their efforts on individuals who are most likely to provide rich and relevant data, thus enhancing the quality of the study. Additionally, purposive sampling enables researchers to select participants from diverse backgrounds or with varied experiences, allowing for the inclusion of multiple perspectives in a study. By intentionally selecting participants who may offer different viewpoints or experiences, researchers can gain a comprehensive understanding of the phenomenon under investigation. This diversity can enrich the data generated/collected and provide a detailed interpretation of the findings (Babbie, 2021; Silverman, 2017; Yin, 2016).

A potential limitation of purposive sampling relates to researcher bias in participant selection. Since researchers decide which participants to include based on predetermined criteria, the risk exists of unintentionally excluding individuals whose perspectives or experiences do not align with the researcher's assumptions or expectations (Silverman, 2017). Another limitation of purposive sampling concerns its reliance on the researcher's judgment and expertise. The success of purposeful sampling therefore depends on the researcher's ability to identify and select participants who meet the criteria for inclusion in the study without being influenced by bias. If the selection criteria are too poorly defined, researchers may overlook relevant perspectives or miss opportunities to include individuals who could provide valuable insights (Babbie, 2021; Leavy, 2023; Silverman, 2017). Despite these potential limitations, purposive sampling remains a valuable method for qualitative research, particularly when researchers seek to explore specific phenomena or understand the experiences of particular groups. By carefully selecting participants based on

relevant criteria, researchers can ensure that their studies address key research questions and generate meaningful insights into the phenomenon under investigation (Babbie, 2021; Yin, 2016).

In addition to purposive sampling, I relied on snowball sampling, also called chain sampling. This approach is usually followed when members of a specific population group are difficult to locate. In this case, researchers generate data from a few members of the population that they are able to locate and then ask these members to suggest additional potential participants (Babbie, 2021; Leavy, 2023). An advantage of snowball sampling is the probability of accessing hard-to-reach populations or those with specific characteristics. This method is particularly useful when the target population is small or difficult to identify through traditional sampling methods. Additionally, snowball sampling can facilitate the recruitment of participants who may be hesitant to participate but are more likely to do so if approached by someone they know and trust (Babbie, 2021; Patton, 2015).

A possible limitation of snowball sampling is the potential for bias in participant selection. Since participants are recruited based on referrals from existing participants, the sample may not be representative of the broader population, resulting in the findings not being generalisable to the entire population of interest (Babbie, 2021; Patton, 2015). Additionally, snowball sampling may introduce social desirability bias, as participants may be more likely to refer individuals who share similar characteristics or viewpoints, potentially leading to a homogenous sample that lacks diversity. This can compromise trustworthiness, as they may not accurately reflect the range of perspectives within the target population. Snowball sampling, however, remains a particularly valuable method for accessing hidden or difficult-to-reach populations (Babbie, 2021; Patton, 2015; Tracy, 2020).

By utilising an in-depth collective case study design applying PRA principles, I was able to study multiple cases that could potentially provide insight and lead to an understanding of the phenomenon I focused on (Stake, 1995). As a result of my selected paradigms and research design, a large sample size was not needed. To be more specific, through detailed descriptions of the child-participants' contexts and their experiences throughout the holistic intervention, this study aimed to contribute to an in-depth understanding of the phenomenon under study, thereby creating awareness of how CVD may influence a child's lived experiences and how a holistic intervention may foster change. The depth in which the participants, their contexts, the research process, intervention and outcomes of the intervention are described in this thesis may strengthen the rigour of the findings.

I initiated the child-participant recruitment process by reaching out to schools to inquire about children with CVD who might be interested in participating in my study. An introductory email (consult Appendix E) detailing my study's purpose was sent to solicit interest from potential participants. Initially, one participant was recruited through this method. By employing snowball sampling, I identified several other contacts based on the EXPO project undertaken by Gerthyo Ferreira in 2019 who either had children with CVD or knew of other parents who did. These contacts, in turn,

facilitated connections with other parents within the networks of those I contacted. Through referrals from the initial contacts, five additional potential child-participants were identified.

I initially selected six child-participants, as well as nine parent-participants to be involved in this study. Due to unforeseen circumstances, two of the child-participants who were involved in Phase 1 of the study could not take part in the holistic intervention or the subsequent phases that followed. As a result, only four of the six child-participants as well as six parent-participants took part in the holistic intervention. In support of research ethics, the child-participants were assigned a number, for example, Child-participant 1, with their parents being assigned a correlating related number as well as a letter if there was more than one parent per child, for example, Parent-participant 1 or Parent-participant 1A. An overview of the selection criteria I applied in selecting the child- and parent-participants is provided in Table 3.2.

**Table 3.2**  
*Selection criteria for the two groups of participants*

PARTICIPANTS	SELECTION CRITERIA
Children (n = 4)	<ul style="list-style-type: none"> <li>• Participants needed to have CVD.</li> <li>• Participants needed to be school-going children, enrolled in either a primary or secondary school.</li> <li>• Participants needed to be able to converse in English or Afrikaans.</li> <li>• Participants should have provided informed assent prior to their participation.</li> <li>• Participants' parents should have provided informed consent before their child participated in the study.</li> <li>• Participants needed to be willing to participate in the holistic intervention.</li> <li>• Participants needed to be available for online data generation sessions.</li> </ul>
Parents (n = 6)	<ul style="list-style-type: none"> <li>• Participants needed to have children with CVD who were involved in the holistic intervention.</li> <li>• Participants should have provided informed consent prior to their participation.</li> <li>• Participants needed to be willing to participate in the parent guidance intervention.</li> <li>• Participants needed to be available for online data generation sessions.</li> <li>• Participants needed to be able to speak either English or Afrikaans.</li> </ul>

To provide further context on the demographics of the participants, Table 3.3 and Table 3.4 present an overview of the relevant demographic data for the child-participants and parent-participants.

**Table 3.3**  
*Overview of the child-participants' demographic data*

PARTICIPANT	AGE	SEX
Child-participant 1	12 years old	Male
Child-participant 2	16 years old	Male
Child-participant 3	11 years old	Male
Child-participant 4	13 years old	Male

**Table 3.4**

*Overview of the parent-participants' demographic data*

PARTICIPANT	SEX
Parent-participant 1A	Female
Parent-participant 1B	Male
Parent-participant 2	Female
Parent-participant 3A	Female
Parent-participant 3B	Male
Parent-participant 4	Female

### 3.5 OVERVIEW OF THE RESEARCH PROCESS AND PHASES OF THE STUDY

As already indicated in Chapter 1, my study formed part of a broader research initiative, involving several other postgraduate studies, including those of Kala<sup>8</sup> (2023), Naidoo<sup>9</sup> (2023) and currently, Naicker<sup>10</sup>. My study comprised four phases, as depicted in Figure 3.1, that included the development of a holistic intervention including a resilience-enabling intervention with the child-participants and corresponding parent guidance intervention, with the latter forming part of a co-student's research study. The holistic intervention was developed and implemented from June 2021 to February 2023.

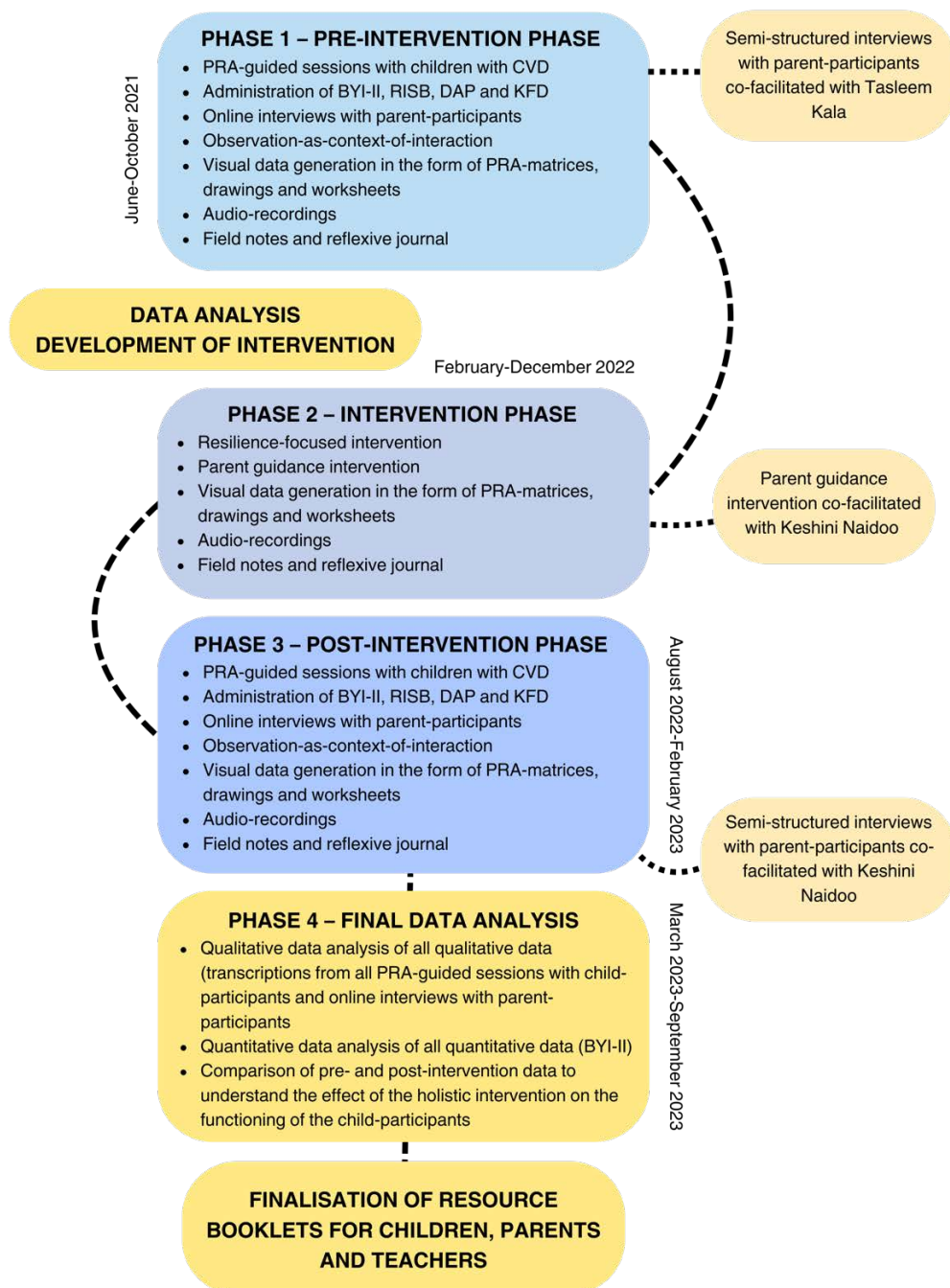
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<sup>8</sup> Kala, T. (2023). *Conceptualising a parent guidance programme in support of learners with colour vision deficiency*. Unpublished MEd dissertation. Pretoria: University of Pretoria.

<sup>9</sup> Naidoo, K. (2023). *Parents' experiences of an intervention on parent support for children with colour vision deficiency*. Unpublished MEd dissertation. Pretoria: University of Pretoria.

<sup>10</sup> Naicker, M. (2024). *Teachers' perceptions of their role in supporting learners with CVD*. Unpublished MEd dissertation. Pretoria: University of Pretoria.

**Figure 3.1**  
*Phases of the study*



As indicated in Figure 3.1, during Phase 1, I conducted pre-intervention PRA-guided sessions with the child-participants to gain an understanding of the challenges they experienced and of possible content to be included in a holistic intervention. During these initial PRA-guided sessions I introduced the research process to the child-participants, obtained their informed assent and explored their perceptions of CVD and its associated challenges through PRA-matrices and open-ended questions that led to discussions on their experiences and perceptions. I also administered the BYI-II, RISB, DAP and KFD during the initial pre-intervention PRA-guided sessions to determine the emotional and social functioning of the child-participants prior to the intervention. This data was then analysed, and the results used to inform the development of the resilience-enabling intervention.

Additionally, I worked with MEd student Tasleem Kala to conduct pre-intervention interviews with the parent-participants from June until October 2021. The purpose was to explore the parent-participants' perceptions and experiences of raising a child with CVD, the associated challenges they perceived their children to have experienced and what could be included in a parent guidance intervention for parents of children with CVD. The results from these interviews were used to develop the parent guidance intervention that was implemented during the period May to August 2022. All PRA-guided sessions with the child-participants and online semi-structured interviews with the parent-participants were audio-recorded and my observations were captured in the form of field notes, with my thoughts and reflections being documented in my reflexive journal following each session. Table 3.3 provides an overview of the PRA-guided sessions I conducted with the child-participants as well as the interviews co-facilitated with the parent-participants pre-intervention.

**Table 3.5**

*Overview of pre-intervention data generation sessions*

ACTIVITY	PARTICIPANT	DATE	MY ROLE
PRA-guided sessions with child-participants	Child-participant 1	18 October 2021	Primary researcher
	Child-participant 2	29 June 2022	Facilitator of data generation sessions
	Child-participant 3	19 November 2021	Observer
	Child-participant 4	30 July 2022	Capturer of data in the form of field notes and audio-recordings
Semi-structured interviews with parent-participants	Parent-participant 1A and 1B	30 July 2021	Co-researcher
	Parent-participant 3A and 3B	23 July 2021	Co-facilitator of sessions Observer Capturer of data in the form of field notes and audio-recordings

During Phase 2 of my study, after determining the children's levels of academic, emotional and social functioning pre-intervention, specifically in relation to the effect of CVD on their holistic functioning, I developed and implemented a resilience-enabling intervention with the child-participants and co-developed and implemented a parent guidance intervention, the latter in collaboration with MEd student Keshini Naidoo. The intervention focused on providing children with CVD and their parents with support and resources that could aid them in overcoming the experienced challenges.

The resilience-enabling intervention comprised PRA-guided sessions with the child-participants that covered specific topics focusing on the development of resilience-enabling coping skills, as discussed in more detail in Section 3.6. Each child-participant received EnChroma glasses at the beginning of the intervention to use as an assistive device<sup>11</sup>, as part of the holistic intervention. The EnChroma company (EnChroma, n.d.-a) sponsored some of the glasses for the child-participants

<sup>11</sup> One of the four child-participants did not receive EnChroma glasses as he wore normal glasses to support his eyesight and would not have been able to use the EnChroma glasses.

for the purpose of this study. This implied an incentive for the participants who benefitted by obtaining the eyewear as part of the holistic intervention they received in support of their general functioning. An assessment was done towards the end of the intervention of each individual case to determine whether or not the participants wanted to continue wearing the glasses in future, in which case they were allowed to keep the eyewear after the intervention had been concluded.

During the third phase of the study, after the conclusion of the resilience-enabling intervention and parent guidance intervention, I generated/collected post-intervention data through PRA-guided sessions with the child-participants, re-administering the BYI-II, RISB, DAP and KFD (consult Appendix F for an example of a child-participant's post-intervention data) and posing open-ended questions to elicit the child-participants' experiences and perceptions of the holistic intervention. I also co-facilitated online semi-structured interviews with the parent-participants to explore their experiences of the parent guidance intervention and how the holistic intervention had influenced their children with CVD. Table 3.4 provides an overview of the post-intervention interviews.

**Table 3.6**  
*Overview of post-intervention data generation sessions*

ACTIVITY	PARTICIPANT	DATE	MY ROLE
PRA-guided sessions with child-participants	Child-participant 1	09 December 2022	Primary researcher
	Child-participant 2	08 December 2022	Facilitator of data generation sessions
	Child-participant 3	09 December 2022	Observer
	Child-participant 4	28 February 2023	Capturer of data in the form of field notes and audio-recordings
Online semi-structured interviews with parent-participants	Parent-participant 1A	29 August 2022	Co-researcher
	Parent-participant 2	30 August 2022	Co-facilitator of data generation sessions
	Parent-participant 3A	31 August 2022	Observer
	Parent-participant 4	08 September 2022	Capturer of data in the form of field notes and audio-recordings

Finally, during Phase 4 of my study I analysed the child-participants' DAP and KFD assessments as well as scored and analysed their responses on the BYI-II to determine the child-participants' emotional and social functioning post-intervention. While these findings reflect the potential impact of the holistic intervention, it is also important to consider that some degree of change may be attributed to normal maturation over the time frame between the pre- and post-assessments. I then compared the pre- and post-intervention qualitative and quantitative data obtained from the child-participants to determine the effect of the holistic intervention on their emotional and social functioning and to understand which changes, if any, had occurred. I also analysed and compared all data obtained from the parent-participants as supplementary data to support the data obtained from the children. This enabled me to gain a holistic understanding of the value of the intervention for the child-participants as well as their supportive social ecologies. The data generation/collection

methods and process are explained in more detail in Section 3.7 further on. Once the data analysis had been completed I used the analysed data to compile this thesis and develop CVD resource booklets for people living with CVD, and for their parents and teachers.

During all four phases of my study, I remained cautious of the fact that my role was that of a researcher and not a psychologist. I was mindful of my role as researcher, ensuring that my actions aligned with the focus of my study, based on the existing literature, and being guided by the formulated research questions. If any child- or parent-participants were to require psychological support, I would have referred them to qualified external psychologists whom I had arranged prior to undertaking my study. Two of the child-participants required such therapeutic assistance, and were thus directed to practising psychologists, while I maintained my focus on my research.

### **3.6 DEVELOPMENT AND IMPLEMENTATION OF THE HOLISTIC INTERVENTION**

Based on the data obtained during Phase 1 of my study, I developed and implemented a holistic intervention that included a resilience-enabling intervention for the child-participants and a parent guidance intervention (co-developed and implemented with MEd student Keshini Naidoo), being guided by the specific experiences, perspectives and needs of the child- and parent-participants. In addition to the baseline data obtained on the children's and parents' experiences of CVD, the challenges the children were facing, and how others had responded to these challenges, I (in collaboration with Keshini Naidoo for the parent guidance intervention) was guided by available literature on the difficulties that children with impairments may face, and the possible coping skills and strategies they can rely on to succeed in life (Chakrabarti, 2018; Cumberland et al., 2004; Mashige & Van Staden, 2019; Stoianov et al., 2019; Theron, 2018; Thomas et al., 2018; Ungar, 2011) in developing the two interventions. In addition, I was guided by my conceptual framework (Khenti et al., 2016; McLeroy et al., 1988; Theron, 2018) in conceptualising and developing the holistic intervention, with the aim of supporting the specific, unique needs of the children with CVD to empower and support them as well as their supportive social ecologies, namely, their parents and in future potentially their teachers. In developing the holistic intervention, I consulted with other educational psychologists as well as my supervisor to ensure that the content of the interventions would support the optimal development of the child-participants as well as provide appropriate support to the parents. As indicated, the resilience-enabling intervention was implemented simultaneously with a parent guidance intervention. The data obtained was further used to inform the development of resource booklets for people with CVD, and for parents and teachers of such children. Consult Appendix C for *A support guide for children with CVD (colour blindness)* and Appendix D for *Supporting children with CVD: A guide for parents and teachers*. The booklet developed for parents and teachers was used to facilitate a PRA-guided workshop with teachers in April 2023 in collaboration with MEd student Melini Naicker.

The resilience-enabling intervention that I developed and implemented included eight main themes that were to be covered in a minimum of eight sessions with the child-participants, with each session lasting between 30 and 60 minutes in length. The final number of sessions I used per participant depended on the specific child-participant's time, availability and ability to comprehend the planned content during each session. Therefore, the number of sessions per child-participant varied. My implementation of the intervention with the child-participants commenced in February 2022 and concluded in December 2022. In implementing the intervention, I included PRA-guided activities that often required the completion of PRA-matrices, drawing activities and discussions. Various open access online resources were included, such as YouTube videos that could support the children who participated as well as their parents. In addition, the child-participants had the option to wear EnChroma lens technology eyewear for the duration of the intervention (or longer) to determine whether they experienced any changes in their functioning based on this supportive tool. As such, the holistic intervention aimed to address the physical and psycho-social needs of the child-participants, while empowering their parents and later their teachers to support them more effectively. In Table 3.5 I include an outline of the intervention session topics and content covered as part of the resilience-enabling intervention.

**Table 3.7**

*Overview of the resilience-enabling intervention*

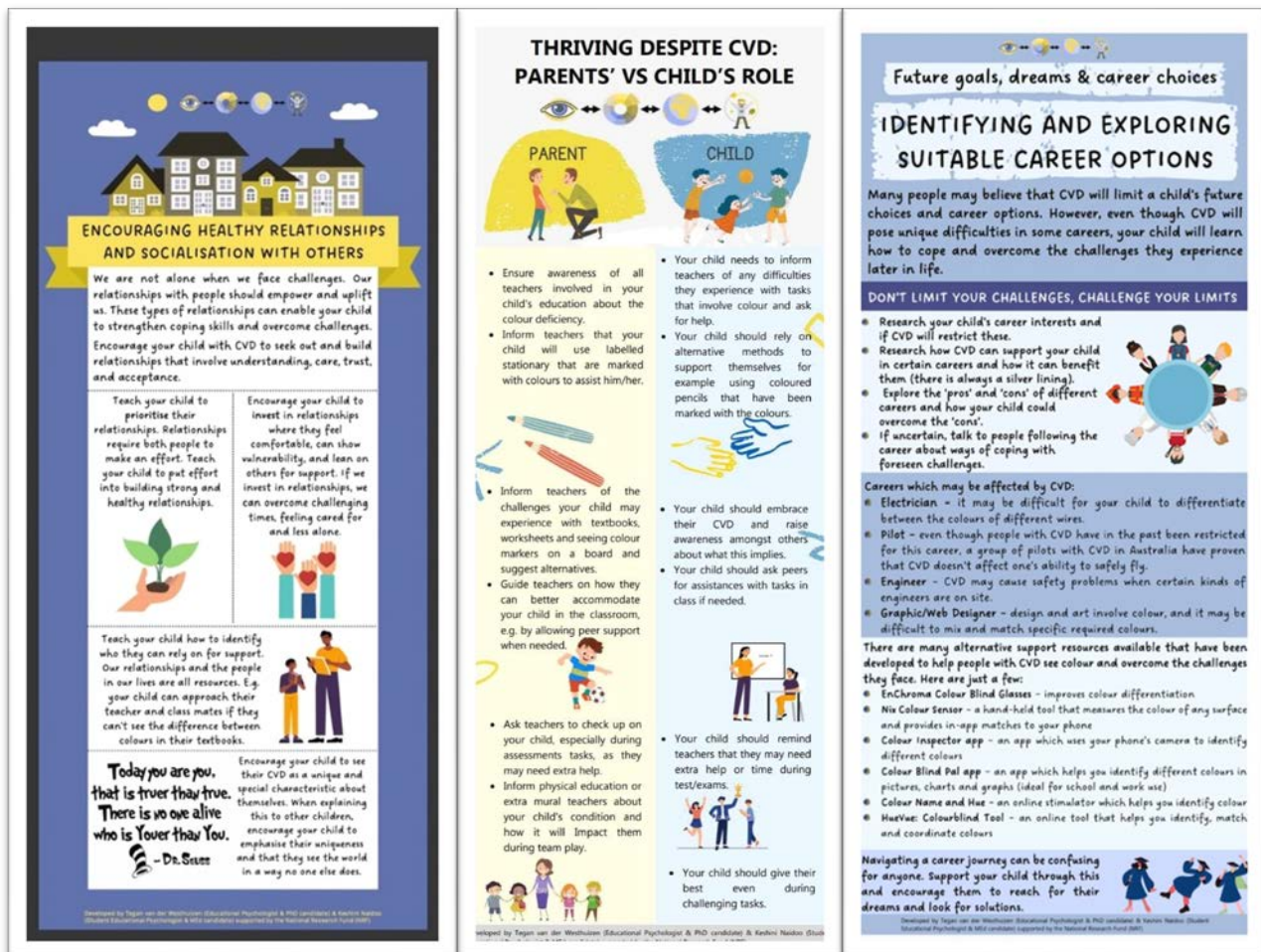
INTERVENTION SESSION	SESSION TOPIC AND OVERVIEW
1	<p><b>Topic:</b> CVD: What is it?</p> <p><b>Aspects covered during the session:</b></p> <ul style="list-style-type: none"> <li>• Discussions on CVD, what it is, what the causes are, and how it affects vision.</li> <li>• Educating child-participants on how to explain CVD to others and educating those around them.</li> </ul> <p><b>Guiding questions for the session:</b></p> <ul style="list-style-type: none"> <li>• What do you know about CVD?</li> <li>• Which challenges do you experience because of CVD?</li> <li>• How do you explain CVD to others?</li> </ul> <p><b>Resources used:</b></p> <ul style="list-style-type: none"> <li>• YouTube videos on the causes of CVD (<i>It's AumSum Time</i>, 2017; <i>Peekaboo Kidz</i>, 2020)</li> <li>• Diagrams of the eye, indicating cones and rods</li> </ul>
2	<p><b>Topic:</b> Resilience: What is it to me?</p> <p><b>Aspects covered during the session:</b></p> <ul style="list-style-type: none"> <li>• Discussions of resilience, what it is, and how one can develop resilience.</li> <li>• Identifying when the child-participants had been resilient in their lives and how strategies that enable resilience can be integrated in everyday life.</li> <li>• Relating how resilience can support the child-participants to cope with CVD.</li> </ul> <p><b>Guiding questions for the session:</b></p> <ul style="list-style-type: none"> <li>• What is resilience?</li> <li>• What makes a person resilient?</li> <li>• When have you shown resilience in your life?</li> </ul> <p><b>Resources used:</b></p> <ul style="list-style-type: none"> <li>• YouTube videos on resilience (<i>First to Draw Limited</i>, 2016)</li> </ul>

INTERVENTION SESSION	SESSION TOPIC AND OVERVIEW
3	<p><b>Topic:</b> Connect: Connect to yourself</p> <p><b>Aspects covered during the session:</b></p> <ul style="list-style-type: none"> <li>Looking at the strengths of others and how they have overcome challenges.</li> <li>Starting to think about one's own strengths.</li> </ul> <p><b>Guiding questions for the session:</b></p> <ul style="list-style-type: none"> <li>How can the use of my strengths help me overcome difficulties?</li> <li>How does this relate to me and overcoming CVD-related challenges?</li> </ul> <p><b>Resources used:</b></p> <ul style="list-style-type: none"> <li>YouTube videos (<i>EntreXpreneur</i>, 2021)</li> </ul>
4	<p><b>Topic:</b> Connect and Do: Connect to yourself, others and map resources</p> <p><b>Aspects covered during the session:</b></p> <ul style="list-style-type: none"> <li>Resources around and within individuals.</li> </ul> <p><b>Guiding questions for the session:</b></p> <ul style="list-style-type: none"> <li>What can help me overcome challenges?</li> <li>My strengths and weaknesses – how can they support me?</li> <li>When I am in need, what can I do?</li> </ul> <p><b>Resources used:</b></p> <ul style="list-style-type: none"> <li>Worksheet – Mapping resources (consult Appendix G)</li> </ul>
5	<p><b>Topic:</b> Connect and Do: Connect to yourself, others, and map resources</p> <p><b>Aspects covered during the session:</b></p> <ul style="list-style-type: none"> <li>Identifying people in the environment that can provide support.</li> <li>Identifying resources within ecological systems.</li> </ul> <p><b>Guiding questions for the session:</b></p> <ul style="list-style-type: none"> <li>Who around you can help you overcome hard things?</li> <li>How can they help you?</li> </ul> <p><b>Resources used:</b></p> <ul style="list-style-type: none"> <li>Worksheet – Mapping resources (consult Appendix G)</li> </ul>
6	<p><b>Topic:</b> Dream</p> <p><b>Aspects covered during the session:</b></p> <ul style="list-style-type: none"> <li>Goal setting and the mobilisation of resources to support the achievement of goals.</li> <li>Reframing coping strategies.</li> <li>Stop, think and choose (consult Appendix G).</li> </ul> <p><b>Guiding questions for the session:</b></p> <ul style="list-style-type: none"> <li>How can you use your resources to help you achieve your dreams?</li> </ul> <p><b>Resources used:</b></p> <ul style="list-style-type: none"> <li>Worksheet – Goal setting (Appendix G)</li> <li>Worksheet – Stop, think and choose</li> </ul>
7	<p><b>Topic:</b> Do/Communicate</p> <p><b>Aspects covered during the session:</b></p> <ul style="list-style-type: none"> <li>Effective communication strategies.</li> <li>How to communicate one's needs to others.</li> </ul> <p><b>Guiding questions for the session:</b></p> <ul style="list-style-type: none"> <li>How can you explain how you view the world to others?</li> <li>How can you explain what you need to others?</li> </ul> <p><b>Resources used:</b></p> <ul style="list-style-type: none"> <li>Worksheet – Goal setting (Appendix G)</li> </ul>
8	<p><b>Topic:</b> Do</p> <p><b>Aspects covered during the session:</b></p> <ul style="list-style-type: none"> <li>Ask for help – not being afraid to express what one needs and wants.</li> <li>Utilising what is around one to support oneself.</li> </ul> <p><b>Guiding questions for the session:</b></p> <ul style="list-style-type: none"> <li>Let's recap, what can you use within yourself and around you to help you overcome hard things?</li> <li>How can you ask for help?</li> </ul> <p><b>Resources used:</b></p>

INTERVENTION SESSION	SESSION TOPIC AND OVERVIEW
	<ul style="list-style-type: none"> <li>Worksheet – Goal setting (Appendix G)</li> </ul>

As already indicated, I collaborated with MEd student Keshini Naidoo to develop and facilitate a parent guidance intervention based on the baseline data obtained during Phase 1. This intervention was implemented over a 14 week period via a WhatsApp (mobile technology) group with the parent-participants, myself, my supervisor, and co-researcher participating in the conversation. For the parent guidance intervention, we developed informative infographics focusing on weekly topics and distributed messages to the parents on a Monday and Wednesday for the duration of the intervention. Figures 3.2, 3.3 and 3.4 provide examples of the infographics we distributed as part of the parent guidance intervention, with all relevant information included in Appendix H.

**Figure 3.2, 3.3 and 3.4**  
*Infographics that formed part of the parent guidance intervention*



An overview of the topics that were presented to the parents as part of the parent guidance intervention is included in Table 3.6.

**Table 3.8**  
*Overview of parent guidance intervention*

WEEK	DATE OF IMPLEMENTATION	TOPICS COVERED
1	16 - 20 May 2022	<ul style="list-style-type: none"> <li>• Introductory overview of CVD, and how it may affect a child.</li> <li>• Understanding how a child with CVD may view the world.</li> <li>• Specific focus on possible challenges associated with a low self-esteem and how a parent can support a child with this.</li> </ul>
2	23 - 27 May 2022	<ul style="list-style-type: none"> <li>• Resilience, what it entails and how a parent can encourage a resilience mindset in children.</li> <li>• Empowering children to use resilience-enabling coping skills in their everyday lives.</li> </ul>
3	30 May - 3 June 2022	<ul style="list-style-type: none"> <li>• Further information on developing and building a child with CVD's confidence and resilience to flourish and thrive.</li> <li>• How parents can support a child with CVD to communicate with others and explain their condition to them.</li> </ul>
4	6 - 10 June 2022	<ul style="list-style-type: none"> <li>• Deeper understanding of a child with CVD, how they see the world and what this means for parents and other family members.</li> <li>• Exploring individuals with CVD's experiences and how it influences them in their daily lives.</li> </ul>
5	13 - 17 June 2022	<ul style="list-style-type: none"> <li>• Guidelines for parents to address the challenges that children with CVD may experience in everyday life.</li> <li>• Introduction to the remainder of the intervention.</li> </ul>
6	20 - 24 June 2022	<ul style="list-style-type: none"> <li>• The possible effect of CVD on a child's emotional wellbeing.</li> <li>• Guidelines for parents on how to address the challenges their children may experience and strengthen their self-confidence and self-esteem.</li> </ul>
7	27 June - 1 July 2022	<ul style="list-style-type: none"> <li>• Guidelines for parents to support their children on an emotional level to overcome anxiety and stress, or additional challenges that may arise.</li> <li>• Guidelines for parents to support their children on an emotional level to cope with other challenges that may arise.</li> </ul>
8	4 - 8 July 2022	<ul style="list-style-type: none"> <li>• Guidelines for parents to support their children on a social level to foster good communication skills and the skill of voicing their experiences to others.</li> <li>• Guidelines for parents to support their children on a social level by encouraging healthy relationships and socialisation with others.</li> </ul>
9	11 - 15 July 2022	<ul style="list-style-type: none"> <li>• Guidelines on how parents can support their children on a social level to deal with possible teasing and even bullying.</li> <li>• Guidelines for parents on how to support their children by helping them deal with peer pressure and other social difficulties associated with CVD.</li> </ul>
10	18 - 22 July 2022	<ul style="list-style-type: none"> <li>• Tips on how parents can support their children's academic wellbeing by encouraging them to enjoy school and perform to the best of their ability.</li> <li>• Guidelines for parents on helping their children to succeed in class and participate with confidence.</li> </ul>
11	25 - 29 July 2022	<ul style="list-style-type: none"> <li>• Guidelines for parents on supporting their children's academic wellbeing.</li> <li>• Guidelines for parents on supporting and encouraging their children to see the value of participating in extracurricular activities at school.</li> </ul>

12	1 - 5 August 2022	<ul style="list-style-type: none"> <li>Guidelines for parents on supporting their children to set realistic future goals and work towards reaching their dreams.</li> <li>Guidelines for parents on identifying and exploring suitable career options for their children.</li> </ul>
13	8 - 12 August 2022	<ul style="list-style-type: none"> <li>Guidelines for parents on their role of supporting their children with CVD.</li> <li>Guidelines for parents on dealing with the frustrations of CVD and how to foster a positive outlook in their children with CVD.</li> </ul>
14	15 - 19 August 2022	<ul style="list-style-type: none"> <li>Recap of intervention and discussion of any questions parents may have.</li> </ul>

### 3.7 DATA GENERATION/COLLECTION AND DOCUMENTATION

According to Bazeley (2022), qualitatively-driven mixed methods research focuses on interpreting and understanding constructions of experiences and phenomena by combining qualitative and quantitative methods. Since the purpose of my study was to explore and describe the effect of a holistic intervention, I employed various data generation/collection and documentation methods to obtain data that would be representative of the phenomenon under study (Bazeley, 2022). I thus followed a multimodal approach whereby I deliberately integrated various data generation (qualitative) and data collection (quantitative) methods to enhance meaning-making (Bazeley, 2018). For this purpose, I used PRA-guided activities, online semi-structured interviews, observation-as-context-of-interaction, field notes, qualitative assessment measures, a reflexive journal, audio and visual strategies as qualitative methods as well as the BYI-II questionnaire as quantitative method. Lastly, to clarify and verify the results and findings of the study, I included member checking with the participants, which was done *via* email and WhatsApp messages (computer and mobile technology).

#### 3.7.1 PRA-guided activities with child-participants

Chambers (2015) describes PRA methods as visual and tangible activities that are usually conducted in small groups. Ebersöhn et al. (2019) similarly state that PRA relies on visual, concrete and colourful activities, methods and material based on the belief that visualisation will foster participation. PRA techniques include activities such as modelling, diagramming, mapping and ranking exercises that can encourage participants to engage without depending on their literacy levels, as the focus falls on the representation of ideas and perspectives by means of drawings, symbols or concrete objects. Social, mobility and resource maps that represent resources and people are also commonly explored within PRA (Chambers, 1994; 2008; 2015; Ebersöhn et al., 2019; Ferreira et al., 2013). In the context of the current study, the child-participants were presented with numerous visual activities, materials and methods that encouraged them to explore their lived experiences and share their perspectives of the challenges they faced and how to solve them. These visual methods included PRA-matrices, drawing activities, worksheets and YouTube videos.

I relied on PRA-guided sessions with the child-participants for data generation purposes as well as to implement the resilience-enabling intervention. The PRA-guided sessions lasted 30 minutes to one hour each and were conducted *via* online audio-visual platforms. These sessions were conducted one-on-one with the child-participants to gain their personal perspectives within a safe environment that was free from judgement from others (Creswell, 2016). This mode of data generation allowed me to establish a personal connection with the child-participants that may have supported their willingness to participate in the intervention and share their experiences openly.

Prior to the intervention, I conducted several PRA-guided sessions with the child-participants to establish sound rapport and introduce the research process to them. During these initial interactions, I guided the participants through the assent form, addressing any inquiries or uncertainties they expressed. In subsequent PRA-guided sessions, the child-participants completed PRA-matrices, offering insights into their perceptions of CVD and its effect on their daily lives. During later PRA-guided sessions, I administered the BYI-II, RISB, DAP and KFD assessments to establish baseline data on the child-participants' emotional and social functioning pre-intervention.

Based on the baseline data I obtained, I developed the resilience-enabling intervention that was implemented during additional PRA-guided sessions. As previously stated, my aim was to cover one topic per session; however, this was not possible due to time and logistical challenges such as limited availability of the child-participants and connectivity issues. Sessions with each child-participant were therefore sometimes shorter than initially envisioned, prompting the dispersion of topics over multiple PRA-guided sessions. Throughout, I focused on completing the intervention content rather than adhering to a limited number of sessions. In Table 3.7, I provide a summary of the number of PRA-guided sessions I facilitated with the child-participants.

**Table 3.9**  
*Summary of PRA-guided sessions with child-participants*

PARTICIPANT	TOTAL NUMBER OF SESSIONS	PERIOD OF IMPLEMENTATION
Child-participant 1	16	October 2021 - February 2023
Child-participant 2	11	June 2022 - December 2022
Child-participant 3	10	September 2021 - December 2022
Child-participant 4	11	July 2022 - February 2023

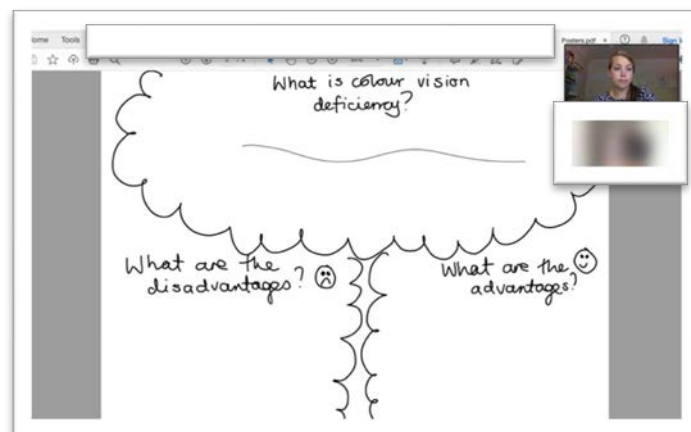
Each PRA-guided session focused on a specific intervention topic, supported by resources and YouTube videos relevant to the discussion. Guiding questions facilitated meaningful dialogue on each topic, as outlined in Table 3.5. Post-intervention, I conducted another PRA-guided session with each child-participant to generate post-intervention data on their emotional and social functioning, using the BYI-II, RISB, DAP and KFD. Finally, in a concluding session, I posed open-ended

questions to capture the child-participants' experiences and perceptions of the holistic intervention, eliciting qualitative data regarding its effects on their functioning.

Due to the COVID-19 pandemic, PRA-guided activities could not be conducted as initially envisioned or intended, as the participants were not able to meet in groups during in-person contact sessions. As a result, PRA-guided activities were tailored to what was allowed within the COVID-19 restrictions at the time. The sessions were subsequently conducted via online audio-visual platforms, namely Zoom, Microsoft Teams and Google Meet. This enabled me to include child-participants who were located in different localities than mine (Creswell, 2016), with the PRA-guided sessions being conducted with the individual child-participants separately. The child-participants were supplied with the relevant PRA-matrices and worksheets before the sessions commenced, and then we engaged in discussions while they completed the activities during online sessions. An image of one of the pre-intervention data generation sessions is included in Figure 3.5.

### Figure 3.5

*Baseline data generation session with child-participant 3*

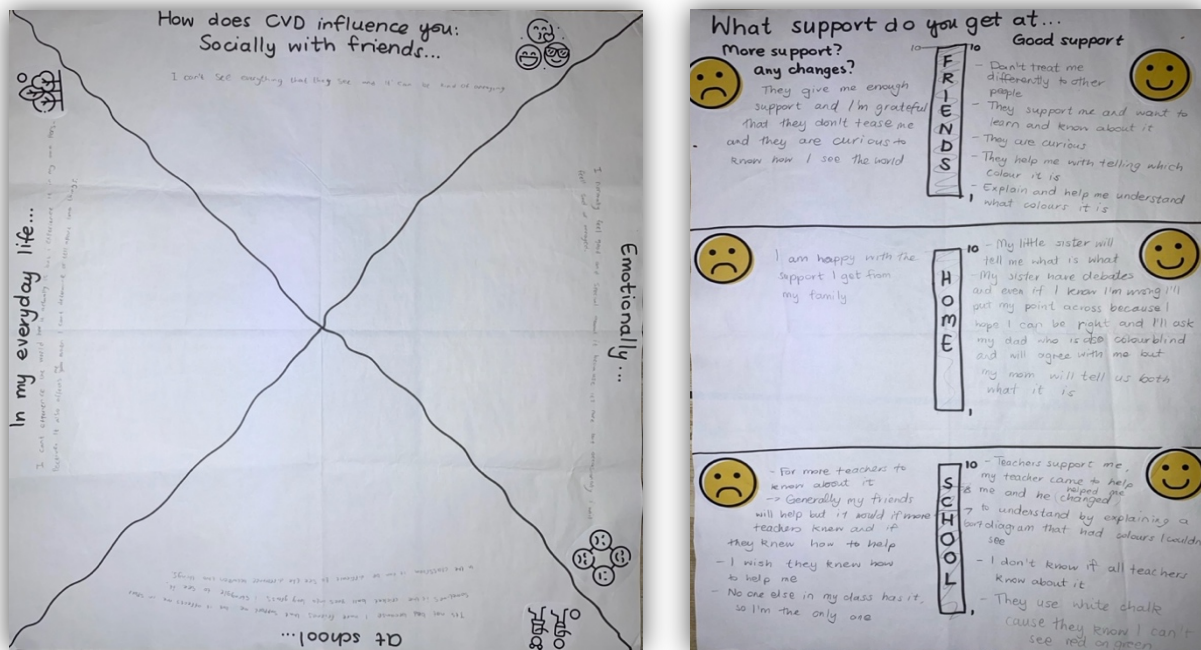


YouTube videos were incorporated when exploring and explaining concepts such as CVD and resilience during the intervention sessions, which prompted discussions on the child-participants' understanding of such concepts. These resources also encouraged reflection and discussion on the topics, leading to further insight for both myself, as researcher, and the child-participants.

PRA-matrices, drawings and activities were presented to the child-participants with the aim of gaining insight into their perspectives and understanding of CVD, how it has influenced them, the challenges they faced and the support they had received to overcome these challenges. Figure 3.6 and 3.7 provide examples of the PRA matrices that the child-participants completed by writing down their ideas on the PRA-matrices and then discussing these with me. In addition, resource mapping worksheets as well as drawing activities were completed by the child-participants during the implementation of the intervention that encouraged self-awareness of the resources within and around them and enabled them to explore concepts of resilience, such as connecting with themselves and those around them (Ebersöhn et al., 2019; Theron, 2018).

**Figure 3.6 and 3.7**

Examples of PRA-matrices completed by the child-participants



My decision to include PRA-guided activities relates to this approach being inclusive, inductive and change-oriented. In this way, the value of the child-participants' experiential knowledge was prioritised in finding ways to address the challenges they experienced as a result of CVD and developing a holistic intervention that could facilitate positive change. This approach thus involved active participation and ownership by the participants, whereby they could take action to foster change through conducting research to generate new knowledge and insights (Cornish et al., 2023; Wood, 2021). Another potential advantage of using PRA-guided activities relates to the possibility of communication being easier for the participants through the use of visual methods through which they could freely express themselves, and share their knowledge and perspectives (Leavy, 2023).

According to Chambers (2015), the quality of PRA-guided activities is important to ensure quality data that is representative of the experiences of the participants. PRA-guided activities accordingly require time, thorough planning and resources devoted to the careful consideration of how the PRA-guided sessions are envisioned and what the development of resources and PRA-matrices will entail to elicit the experiences of the participants. In an attempt to ensure quality data, I thus carefully planned and prepared for all PRA-guided sessions in advance, ensuring that they were conducted in a manner that would be conducive to gaining meaningful insights and knowledge (Chambers, 2015). Throughout the research process, my facilitation and observation techniques were guided by established quality criteria, as later discussed in this chapter, aiming to uphold rigorous standards.

### 3.7.2 Online semi-structured interviews with parent-participants

According to Brinkmann (2018), interviews have become a common avenue to producing knowledge in social and human sciences due to the detailed and personal accounts of a phenomenon that can

be obtained when interviewing participants. Interviewees often share personal information that they may not normally share when positioned as the experts within their own lives, with the researcher in search of being informed. In its basic form, a semi-structured interview, according to Nieuwenhuis (2019b), involves a two-way conversation, where the interviewer attempts to elicit information to generate data and to learn about the ideas, perspectives, experiences and beliefs of the participants.

Due to the COVID-19 pandemic all the interviews that I co-facilitated were conducted *via* online audio-visual platforms. Brown (2022) and Fan et al. (2024) state that online interviews emerged as the dominant mode of data generation during and after the COVID-19 pandemic due to social distancing and travel restrictions preventing researchers from meeting with participants in person. Keen et al. (2022) concur, indicating that COVID-19 accelerated the digitalisation of qualitative interview methodologies, resulting in the transposition of in-person interviews to virtual platforms.

In collaboration with my co-researchers, I co-facilitated online semi-structured interviews with the parent-participants (n = 7) both pre- and post-intervention. More specifically, together with MEd student Tasleem Kala, I co-facilitated the pre-intervention online interviews from June 2021 to July 2021. For the post-intervention phase, I collaborated with MEd student Keshini Naidoo to co-facilitate the online interviews during the period August 2022 to September 2022. Nine interviews were facilitated in total, each lasting between 30 minutes and one hour. Online interviews were scheduled with the parent-participants at times that suited them, and meeting links were circulated to them before the online interviews commenced.

The aim was to explore parents' views on CVD and how it affects their children's functioning. The contributions of the participants were captured by recording the online interviews. The audio-recorded interviews were later transcribed verbatim to ensure that detailed and accurate accounts of the participants' experiences, perspectives and beliefs were documented. This strategy allowed me to review the verbatim transcripts when needed and during data analysis, assisting me to uncover and better understand the rich data I had obtained (Barbour, 2018; Jenks, 2018).

Online interviews as qualitative data generation method hold several advantages. Firstly, online interviews offer increased accessibility and convenience for both researchers and participants, overcoming geographical barriers and allowing for engagement with participants on a broader level. This type of interview also provides flexibility in scheduling, making it easier to accommodate participants' availability. Additionally, online interviews can be cost-effective, as they eliminate the need for travel expenses associated with in-person interviews. Finally, this method can be particularly advantageous when studying sensitive topics, as participants may feel more comfortable discussing personal experiences from the privacy of their own environment (Brown, 2022; Fan et al., 2024; Roberts et al., 2021; Samuk Carignani & Burchi, 2022).

Potential limitations associated with online interviews include technical challenges such as poor internet connectivity as well as audio or video recording problems that may disrupt the process. Closely related, not all interviewees may be technically minded, with them potentially experiencing difficulty to resolve connectivity or other technology-related problems. I did not experience this limitation during data generation even though some technical difficulties were experienced in the form of internet connections not always being stable, which caused some interferences and delays during the conversations. Additionally, due to the South African energy crisis and occasional power failures, some participants were not able to attend interviews as scheduled due to not having power or an internet connection, resulting in the interview being rescheduled.

In terms of other potential limitations of online interviews, due to the lack of face-to-face interaction, rapport-building and the depth of responses obtained from the participants may be negatively influenced (Brown, 2022; Fan et al., 2024; Roberts et al., 2021). According to Creswell (2016), another potential limitation of online interviews relates to possible limited privacy for the interviewee. In order to safeguard against this, the participants were encouraged to conduct interviews in secure private settings, such as their homes and offices.

### **3.7.3 Observation-as-context-of-interaction**

Angrosino and Mays de Perez (2000) propose observation-as-context-of-interaction as an approach to observation whereby the researcher can develop and assume a membership role within the context of a study to observe the interactions and behaviour of the participants without influencing them. In an attempt to understand the studied phenomenon from the perspectives of the participants, I employed observation-as-context-of-interaction as described by Angrosino (2005; 2007) and Angrosino and Mays de Perez (2000), yet I was limited by the boundaries of interaction being done virtually and not in-person.

According to Wästerfors (2018), qualitatively-driven mixed methods researchers, as observers, are encouraged to enter the world of the participants and to encounter their beliefs, concerns, perspectives and experiences first-hand and up close. When following such an approach, meaning can be identified by taking note of participants' body language and gestural tones (Angrosino, 2007). In this regard, the main goal of such observing is to understand the setting, culture or social phenomenon under study from the perspective of the participants (Angrosino, 2007; Smit & Onwuegbuzie, 2018; Wästerfors, 2018). Even though I was not able to closely observe the participants, I requested that all virtual sessions included a video option, allowing me to observe the participants and their non-verbal communication to some extent.

Smit and Onwuegbuzie (2018) are of the view that qualitatively-driven mixed methods researchers should be open to learning lessons from their participants and remain cautious of the fact that it is a privilege if participants share their voices and experiences within a research process. I remained

aware of this privilege and constantly acknowledged and appreciated what the participants shared with me and what I was able to glean from observing them. Therefore, in implementing observation-as-context-of-interaction I assumed a membership role within the context of the study and recorded my observations in the form of field notes and a reflexive journal. I focused on understanding the phenomenon by immersing myself in the context and observing the participants' behaviour without influencing them. Through this method I was able to enter the world of the participants and encounter their beliefs, concerns, perspectives and experiences. In my attempt to assume a membership role, I thus gained insight into the setting, culture and social phenomenon under study from the participants' perspectives (Adler & Adler, 1987; Angrosino & Mays de Perez, 2000; Creswell & Creswell, 2023; Creswell & Guetterman, 2019).

A potential advantage of observation-as-context-of-interaction relates to the possibility of obtaining rich, contextual data when utilising this method. By assuming a membership role within the context of the study, researchers can observe participant behaviours, allowing for a deep understanding of the phenomenon under investigation. This approach thus allows researchers to capture not only what participants say but also how they behave, their body language, and the subtleties of their interactions. As a result, observation-as-context-of-interaction can offer valuable insight into the lived experiences and perspectives of the participants, providing a more holistic understanding of a research topic. Additionally, it may foster a sense of authenticity and trust between the researcher and participants (Bratich, 2018; Creswell & Guetterman, 2019; Kang & Hwang, 2021).

According to Creswell (2016), a potential limitation of observation as a data generation method relates to the possibility of the researcher becoming distracted from recording data when being an integral part of the data generation activity. By conducting all data generation and intervention sessions *via* online platforms, I was, however, able to type my field notes on my laptop as I listened and interacted with the participants. This made it easier to record my observations. Another potential limitation associated with observation is that a researcher who employs this method needs to carefully monitor their role within the participants' contexts as one can easily become too involved or detached, and over-represent their own beliefs and experiences when capturing observations of a phenomenon (Bratich, 2018; Kang & Hwang, 2021; Wästerfors, 2018). In order to safeguard against this potential limitation, I reflected on my own beliefs and assumptions in my reflexive journal and made sure to understand how my views of the studied phenomenon could have been influenced by my past experiences, constantly guarding against this from occurring.

#### **3.7.4 Field notes**

Field notes are considered to form an essential part of rigorous qualitative research and can enhance data while also providing rich context and descriptions for data analysis purposes (Creswell, 2013; Patton, 2002; Phillippi & Lauderdale, 2018). In this regard, Bailey (2018) postulates that qualitative

data is often generated through interaction and observation, with it being captured in the form of field notes. As such, field notes entail the textual documentation of a researcher's observations in the field, for example, the research participants' actions, what they said or how they responded (Babbie, 2021; Yin, 2018). Criteria for good field notes relate to thoroughness in detail, clarity in expression, using descriptive rather than prescriptive language, the acknowledgment of data as evidence, and the inclusion of the researcher's own interpretations (Tracy, 2020).

Field notes can be both descriptive and reflective in nature. I used *descriptive field notes* (consult Appendix I) to capture what happened during the sessions I facilitated with the participants; for example, noting the participants' behaviour, what they said and what happened. In addition, I used *reflective field notes* to document my own personal thoughts, insights, broad ideas and themes that emerged during observations (Creswell & Guetterman, 2019; Patton, 2015; Phillippi & Lauderdale, 2018). I compiled both descriptive and reflective field notes during all observations and interactions with the participants (Bailey, 2018; Leavy, 2023). By compiling detailed field notes I was able to ensure that the generated data was of a rigorous and sufficient quality in support of the credibility of my study (Bailey, 2018). I accordingly made a concerted effort to keep up to date with my field notes and to keep record of any descriptions or details that could potentially contribute to the findings.

According to Mouton (2022), data generation processes should be accurately and meticulously documented to ensure the quality of a study. For the purpose of data management, I accordingly kept a detailed record of the research process and kept track of fieldwork as a form of quality control in my field notes. I recorded the fieldwork process and included main decisions, planning and data generation sessions to construct a historical record of the research process that I could consult and review as needed (Mouton, 2022). I recorded the dates of all sessions and interviews, information on the interviewees, and what was discussed and completed during each intervention session. In order to keep this record, I consistently documented the research process and any changes that occurred, which formed part of my field notes. In the current study, field notes also enabled me to reflect on and describe the research participants' perspectives and how these evolved as the intervention progressed. I thus recorded my field notes during each data generation session and focused on my observations, thoughts, ideas, emerging themes and making connections between the data (Babbie, 2021; Babbie & Mouton, 2001; Hurst, 2023; Phillippi & Lauderdale, 2018).

A potential challenge associated with field notes relates to the time required to keep these documents up to date. In this regard Bailey (2018) recommends that field notes should be recorded directly after interactions and observations in the research field, with journal accounts being written as often as possible. Time constraints may, however, limit researchers to maintain their field notes and reflexive journals effectively. In order to safeguard against this potential challenge, I compiled field notes on my laptop during interviews and intervention sessions (Rau et al., 2018; Tracy, 2020).

### **3.7.5 Reflexive journal**

A reflexive journal is often utilised in qualitative research to record the thoughts, beliefs, biases, experiences and feelings of the researcher throughout the research process. It provides qualitative researchers with a means of engaging in critical self-reflection and analysis of their own role within the research process with the aim of improving the quality of the research (Annink, 2017; Braun & Clarke, 2022; Tracy, 2020). I relied on a reflexive journal to actively reflect on the interactions with the participants and observations made during the data generation/collection sessions. The journal thus served as a repository to store and document my thoughts for further reflection, interrogation and meaning-making (Braun & Clarke, 2022). This critical analysis and reflection allowed me to understand how my presence, background, knowledge, skills, values, assumptions and emotions may have influenced the systems of the research participants. As a result, I remained cautious of how I engaged with the participants and of the choices I made during the research process (Annink, 2017; McLeroy et al., 1988). This supported me in conducting ethical research that respected the participants and their unique perspectives and experiences (Canella & Lincoln, 2018; Tracy, 2020).

As such, by keeping a reflexive journal (consult Appendix J), I was encouraged to engage in an embedded, ongoing process of reflection about my research practices and the evolving assumptions I held throughout the research process. This, in turn, supported the reflexive thematic analysis I conducted as I used the journaling process to reflect on how my responses, thoughts and assumptions might have determined my engagement with the generated/collected data and to realise alternative and new interpretative possibilities (Braun & Clarke, 2021b; Dodgson, 2019).

A potential limitation of keeping a reflexive journal, similar to the challenge with field notes, relates to the possibility of this being time-consuming. To address this potential limitation, I implemented a proactive approach by dedicating time after each data generation activity to review my field notes and incorporate relevant information and insights into my reflexive journal. This practice enabled me to ensure that my reflections remained timely and comprehensive despite time constraints. Furthermore, I maintained a conscious awareness of the importance of continuously reflecting on the research process and the role that I fulfilled (Braun & Clarke, 2022; Tracy, 2020).

### **3.7.6 Audio and visual data generation and documentation strategies**

According to Creswell and Creswell (2023), audio-visual data comprises photographs, videotapes, drawings, audio-recordings, computer messages and art objects. For the purpose of this study, I included both audio and visual data. The visual data comprised photographs, PRA-matrices, worksheets and drawings created by the child-participants and served as evidence of the data generation/collection process. Additionally, audio-recordings of the participants' interviews and intervention sessions were included. The audio-recordings were later transcribed verbatim and coded for data analysis purposes (Tracy, 2020).

Creswell (2016) foregrounds the advantage of audio-visual methods of data generation as being unobtrusive and having the potential of providing the participants with an opportunity to directly share their experiences and views of reality. Tracy (2020) further suggests that audio-recordings provide a quick and convenient way of creating data, allowing researchers to refer to the recordings at any later stage if further information or clarity is required.

Creswell (2016) states that drawings as data generation method can offer researchers an open-ended data source that can be particularly useful when working with children. Closely related, Chambers (2008) suggests that drawings are especially useful as data source when using PRA, as this method may enable participants to expose emotions more easily and can reduce the stress around sensitive topics. Before taking photographs or making audio-recordings of the sessions, I made sure that the participants were informed about this and had provided their consent or assent.

Despite these advantages, a potential limitation of using visual and audio data generation strategies relates to this practice being time consuming. In addition, the equipment used to create recordings may fail, even though I did not encounter any of these difficulties. To be more specific, I outsourced the transcribing of all interviews and conversations to a third party and the devices I used for recordings did not fail. However, to avoid any potential equipment-related difficulties, I audio-recorded all sessions on two devices and stored the best quality recording of the two. A potential disadvantage associated with the outsourcing of transcriptions once again relates to time, as researchers still need to allocate time for reviewing all transcripts for accuracy (Creswell & Plano Clark, 2018; Tracy, 2020). For this purpose, I allocated specific time to review the transcripts while listening to the audio-recordings to ensure that the recordings had been completed accurately.

### **3.7.7 Qualitative assessment procedures**

The RISB (Rotter et al., 1992; Rotter & Rafferty, 1950), DAP (Goodenough, 1926; Mitchell et al., 2011) and KFD (Burns & Kaufman, 1970) were administered both pre- and post-intervention with the child-participants, and interpreted as qualitative data generation tools. The RISB is a semi-structured projective tool where participants are requested to complete sentences of which the first word or words are provided (Rotter & Rafferty, 1950). This form of projective technique provides a platform for participants to reflect their emotional and social experiences, for example, in the form of fears, beliefs, wishes, desires and attitudes in the sentences they complete. The RISB should be interpreted by a practitioner trained in its administration and interpretation, as in my case (Rotter et al., 1992; Rotter & Rafferty, 1950).

According to Mitchell et al. (2011), researchers and psychologists have over the years engaged children and adults in drawing activities that can yield rich explorations of their experiences, perceptions, reflections and views (Backett-Milburn & McKie, 1999; Guillemin, 2004; Mair & Kierans, 2007). Drawings used as a projective tool can furthermore provide an understanding of unconscious

and conscious experiences and issues that can, in turn, provide insight into the emotional and social functioning of the individual. When using drawing as a research method, participants often draw and talk or draw and write (Mitchell et al., 2011; Zlateva, 2019). In the context of this study, the child-participants were accordingly asked to draw a person, their family, a tree in the summer, winter and a fantasy tree, and then asked questions about their drawings to deduce the meaning embedded within the drawings (Mitchell et al., 2011).

### **3.7.8 Quantitative assessment measures**

The BYI-II is a valuable tool for assessing various aspects of emotional and social functioning in children and adolescents. The BYI-II consists of five self-report inventories that assess symptoms of anxiety, depression, anger, disruptive behaviour and self-concept in children and adolescents between the ages of 7 and 18 years (Beck et al., 2005). As such, the BYI-II can be used to evaluate a child's emotional and social functioning and determine aspects where support is required (Beck et al., 2005). In a study conducted by Makhubela and Mashegoane (2016) aimed at evaluating the validity of the Beck Depression Inventory-II (BDI-II) within the South African context, the authors found that the BDI-II is a valid and reliable measure that can be used to assess depressive symptoms among South African learners. In support, a review by Bose-Deakins and Floyd (2004) indicates that the internal consistency and 1-week test retest reliability of the BYI-II is acceptable across most of the inventories.

In order to determine the emotional and social functioning of the child-participants both pre- and post-intervention, I administered the BYI-II (Beck et al., 2005) on two occasions during PRA-guided sessions. Being a registered educational psychologist, I was equipped to administer the BYI-II, utilising this questionnaire as quantitative data collection tool. By administering the BYI-II both before and after the holistic intervention had been implemented, as researcher, I was able to gain insight into the effect of the intervention. For this purpose, I scored and interpreted the BYI-II scores I obtained, and compiled descriptive statistics of the scores both in tabular form and graphically (consult Section 4.7.2). This aided me in organising and summarising the data in a meaningful way (Maree & Pietersen, 2019b; Pietersen & Maree, 2019a).

The pre-intervention data informed the development of the resilience-enabling intervention. To be more specific, by analysing the initial emotional and social functioning levels of the child-participants using the BYI-II in combination with the qualitative methods, I was able to gain insight into their specific needs, challenges and strengths. This understanding enabled me to tailor the resilience-enabling intervention to address the unique circumstances and requirements of the child-participants involved. Moreover, the pre-intervention data served as a baseline reference point for comparison against the post-intervention data, with changes over time probably being influenced by the resilience-enabling intervention that was implemented.

In addition to the pre-intervention data informing the development of a targeted and responsive intervention, it also provided a means for tracking changes and evaluating the possible effect of the resilience-enabling intervention over time. This evidence-based approach ensured that the intervention was aligned with the identified needs of the child-participants and could effectively support their resilience, thereby in turn supporting their emotional and social functioning.

To be more specific, by comparing the pre- and post-intervention descriptive statistics, I could analyse the possible effect of the resilience-enabling intervention in promoting positive emotional and social wellbeing among the child-participants by determining if or where changes had occurred in these areas of functioning. To mention an example, in the case of the post-intervention scores showing a decrease in symptoms of anxiety, depression, anger and disruptive behaviour along with an improvement in self-concept scores, it may be deduced that the resilience-enabling intervention may have had a positive impact on the emotional and social functioning of the child-participants. Conversely, if there were minimal or no changes in the BYI-II scores following the intervention, it may indicate the need for further refinement or adjustment of the resilience-enabling intervention. However, it is also important to consider that normal maturation or age-related developmental changes could contribute to any observed stability in the scores over the pre- and post-assessment time frame, particularly if the metrics are assumed to be stable for the age group involved in the study.

### **3.8 DATA ANALYSIS AND INTERPRETATION**

Data was generated/collected through qualitative and quantitative methods, as described in the previous section. I analysed the two data sets separately, using reflexive thematic analysis for the qualitative data and descriptive analysis for the quantitative data. Once the data was analysed, I integrated the results to be able to address the formulated research questions.

#### **3.8.1 Qualitative data analysis of PRA-generated data, interview data, field notes and reflexive journal**

According to Braun and Clarke (2014; 2022), reflexive thematic analysis offers an accessible method for analysing, developing and interpreting patterns across a qualitative dataset. This method involves systematic processes of data coding that leads to the development of themes. Braun and Clarke (2022) regard reflexive thematic analysis as a method rather than a methodology, indicating that reflexive thematic analysis offers qualitative researchers a wide range of tools, techniques, guidelines and practices to use when organising and interpreting a dataset. Braun and Clarke (2022) furthermore posit that thematic analysis is reflexive in nature, as researchers usually critically reflect on their role as researcher, the practices and processes followed and how these could have influenced the overall outcome of a study when implementing this method of analysis. As reflexivity is a fundamental characteristic of thematic analysis, I kept a reflexive journal, wherein I critically

reflected on my thoughts, assumptions and understandings of the data throughout the research process, allowing me to critically engage with the data (Braun & Clarke, 2022).

Reflexive thematic analysis enabled me, as researcher, to adopt an attitude of qualitative sensibility that, in turn, assisted me in developing an in-depth understanding of the studied phenomenon by focusing on the complexities and at times contradictions rather than attempting to form a tidy and simple explanation (Braun & Clarke, 2021a; 2022). I was guided by the premise that knowledge and understanding stem from *listening* to data analytically and actively rather than from making assumptions and placing my own hypotheses above what is identified across the data (Braun & Clarke, 2006; 2022; Clarke & Braun, 2013).

I analysed the textual data, namely the transcripts of interviews and discussions, my field notes, my reflexive journal, the PRA-matrices and worksheets completed by the child-participants, following Braun and Clarke's (2006; 2022) six phases of reflexive thematic analysis (Mouton, 2022). These phases relate to becoming familiar with the dataset; identifying segments of data and forming initial codes; identifying and generating initial themes; developing and reviewing themes; defining, refining and naming themes; and compiling a research report (Braun & Clarke, 2006; 2022). By completing this process of analysis, I could gain an in-depth understanding of how the resilience-enabling intervention affected the functioning of the children with CVD who participated.

In following the process suggested by Braun and Clarke (2022), I thus firstly familiarised myself with the data by immersing myself in the dataset, thereby reading and re-reading the data while making brief notes and comments on the insights and ideas I had relating to the specific data item and dataset as a whole (Braun & Clarke, 2006; 2022). I made notes and used various colour highlighters to indicate my insights and ideas in the data (consult Appendix K for an example of the reflexive thematic analysis I conducted). I also relied on colour-coding to help differentiate between possible categories and combine similar code labels to form relevant codes (Creswell, 2016).

As a second step of the data analysis process, I coded the data by working systematically through the dataset and identifying segments of data that appeared relevant, meaningful or interesting, applying code labels to them. I coded with a specific focus aimed at capturing single concepts or meanings. The purpose was not simply to reduce and summarise the data, but to capture a sound analytic understanding of the information captured in the data. I systematically coded the data by consulting the entire dataset and identifying possible links between similar ideas and insights (Braun & Clarke, 2022). Once complete, I collated the code labels and grouped them into relevant codes.

Next, I generated initial themes by "identifying shared patterned meaning across the dataset" (Braun & Clarke, 2022, p. 35). For this purpose, I compiled clusters of codes that shared a core idea that could assist in addressing the research questions. To this end, I identified potential themes that would capture the essence of the data and collated all relevant coded data to these themes (Braun

& Clarke, 2006; 2022; Clarke & Braun, 2013). In this regard, Braun and Clarke (2022) argue that within a reflexive thematic analysis approach, themes are constructed by the researcher based on the research questions, data and the researcher's insights and knowledge. As such, I attempted to *listen* to the data and be guided by the dataset and not my own biases, in identifying themes.

As a next step, I reviewed and further developed the initial themes by assessing the fit of the potential themes to the dataset and critically assessing my overall analysis. Due to the emergent nature of reflexive thematic analysis, I endeavoured to remain reflexive and flexible during this phase of data analysis as the potential themes were revised, with some being combined, split and discarded. Throughout the analysis, I made notes in my reflexive journal to document my developing thoughts and ideas. I also consulted my supervisor to ensure that the potential themes were representative of the complete dataset and that my analysis of the dataset was rigorous and thorough. By the end of this phase of data analysis I had identified several themes, sub-themes and categories that portrayed patterns of shared meaning relating to the dataset (Braun & Clarke, 2022).

Fifthly, I focused on further refining and defining the themes I identified to ensure that each theme was clearly demarcated, linked well to others, and accurately represented the dataset (Braun & Clarke, 2022). I endeavoured to identify the essence of each theme and determine which aspect of the data each theme captured. I also focused on identifying relevant sub-themes and categories within each theme. Once the identified themes had been refined and defined, I decided on informative, concise names for each theme that could give the reader a sense of what each theme entailed. Lastly, I compiled this thesis to capture my analytic understanding and included data extracts in my discussion of the results in Chapter 4 to finalise my discussion of the findings in this research report (Braun & Clarke, 2006; 2022).

As an integral part of the entire research process, I fulfilled the roles of primary data generator/collector as well as data analyst. This enabled me to initiate data analysis while simultaneously generating/collecting data. My continuous involvement across the various phases of the research also provided me with invaluable insights into the context and experiences of the participants. Given the nature of my study, which involved repeated interactions with the participants for data generation with periods of data analysis and further planning in between, I remained guided by the participants throughout the research journey as is necessary in a study directed by PRA principles (Chambers, 2008; Ferreira, 2006; Fraser et al., 2016; Leavy, 2023). As a result, I completed data analysis both during the pre- and post-intervention phases.

After completing the various data analysis phases, I utilised member checking or participant validation to determine whether my interpretation of the data represented an accurate, authentic account of the participants' experiences, practices and views (Bailey, 2007; Braun & Clarke, 2022; Lincoln & Guba, 1985). Member checking entails the process of requesting participants to review

and comment on the analysis of qualitative data and provide their feedback and further input if needed. This strategy allows participants with the opportunity to add to, confirm, clarify or refute what they had previously said. In discussing guidelines for this strategy, Braun and Clarke (2022) argue that member checking can only be meaningful as a quality check for reflexive thematic analysis when researchers produce an interpretation of the data that the participants might recognise as an account of their own experiences and contributions. Member checking served to be a useful tool in the context of this study as my aim was to explain and describe the experiences of children with CVD and how a holistic intervention may affect their functioning. I conducted member checking *via* email (computer technology) and WhatsApp messages (mobile technology) with the participants in May 2024.

According to Braun and Clarke (2021b; 2022), the mere following of procedure does, however, not guarantee good reflexive thematic analysis, requiring of researchers to remain flexible and open to what the processes within reflexive thematic analysis may reveal within the dataset. In order to safeguard against this potential limitation, I focused on being flexible and reflexive throughout the entire data analysis process and grounded myself within reflexive thematic analysis theory (Braun & Clarke, 2006; 2014; 2021a; 2021b; 2022; Clarke & Braun, 2013). I accordingly familiarised myself with the process of reflexive thematic analysis, what it entailed and with the phases that I had to follow in preparation of conducting the analysis. I was careful not to place a time limit on the analysis process and therefore allowed myself adequate time to engage with the data, reflect on my insights and ideas as well as review and redefine code labels, codes and themes (Braun & Clarke, 2022).

### **3.8.2 Analysis of qualitative projective measures**

The analysis of qualitative projective measures such as drawings involves the interpretation of the symbolic content and imagery created by individuals, particularly children, in response to a given stimulus. This method is often used to gain insight into an individual's emotions, thoughts and perceptions, which may not be easily expressed verbally (Martikainen & Hakoköngäs, 2023; Zlateva, 2019). For evaluation purposes, it is considered to be a powerful tool since most children enjoy drawing, thereby avoiding linguistic barriers. Drawings furthermore provide a window into a child's feelings and thoughts about the world, as they may reflect an image of their own mind when drawing. This method is participatory in nature, as it allows the researcher to gain an understanding of how the child-participants see the world (Farokhi & Hashemi, 2011; Hsu, 2014; Zlateva, 2019).

During the analysis of the drawings created by the child-participants, I examined various elements of the drawings, including the choice of colours (or lack thereof), the presence of specific objects or figures, the use of space, and the overall composition of the drawings. Each of these elements can provide valuable clues about a child's inner world and psychological functioning (Farokhi & Hashemi, 2011; Hsu, 2014; Mitchell et al., 2011; Zlateva, 2019). Through analysis I was thus able to identify recurring themes or symbols present in the participants' drawings. These could provide clues about

the child-participants' concerns, fears or preoccupations (Amod et al., 2018; Burns & Kaufman, 1970; Machover, 1980; Zlateva, 2019). In order to maintain ethical practice, I involved the child-participants after my analysis to check my findings with them and ensure that my conclusions were accurate and respectful of their perspectives.

### **3.8.3 Quantitative data analysis**

Quantitative data analysis involves the systematic examination of numerical data to identify patterns, trends and relationships (Leavy, 2023; Maree & Pietersen, 2019c). In my study I utilised quantitative analysis to assess the child-participants' emotional and social functioning both pre- and post-intervention to be able to compare these scores, obtained on the BYI-II. This approach enabled me to identify significant changes or patterns in the data. The primary aim was to quantify any shifts in the scores as these could predict the effectiveness of the resilience-enabling intervention facilitated with the participants (Maree & Pietersen, 2019c; Pietersen & Maree, 2019b).

As indicated earlier, the quantitative data for my study was collected by means of the BYI-II, a standardised psychometric instrument. Utilising the BYI-II manual (Beck et al., 2005), I scored the data by assigning a numerical value to each response and calculating these both pre- and post-intervention (Creswell & Creswell, 2023; Creswell & Guetterman, 2019). I then used descriptive statistics to organise, summarise and compare the numerical data obtained on the BYI-II by representing the data graphically and numerically (consult Section 4.7.2). As a result, by employing descriptive statistics, I was able to effectively organise the data, identify central patterns, and visualise any changes in the child-participants' scores when comparing the scores prior to and following the resilience-enabling intervention (Creswell & Plano Clark, 2018; Leavy, 2023; Maree & Pietersen, 2019c).

A key advantage of using descriptive statistics relates to the associated simplicity and transparency of the process. By focusing on straightforward statistical measures, the analysis remains accessible and easy to interpret for both researchers and stakeholders. Additionally, descriptive statistics typically provide a clear summary of the data, enabling researchers to identify notable trends or shifts in the dataset (Bazeley, 2018; Creswell & Plano Clark, 2018; Leavy, 2023; Maree & Pietersen, 2019c). By including a quantitative instrument and analysis of the quantitative data, I was able to gain a more comprehensive understanding of the effect of the resilience-enabling intervention and the factors possibly influencing the child-participants' emotional and social wellbeing and functioning. However, this approach to analysis of quantitative data may offer limited insights into the underlying factors driving changes in the data and may not provide information about the significance of observed changes, potentially limiting the depth of interpretation and understanding (Bazeley, 2018; McBeath & Bager-Charleson, 2020). In my study, while descriptive statistics provided valuable insights into the overall trends and patterns in the data, they were unable to capture the nuanced

experiences and perspectives of individual participants. This limitation highlights the value of the complementary qualitative methods I relied on to contextualise the quantitative findings against the background of the experiences of the child-participants.

### **3.9 QUALITY CRITERIA FOR THE QUALITATIVE COMPONENT OF THE STUDY**

In my attempt to produce work of quality I adhered to Tracy's (2020) eight big-tent criteria for quality and excellence in qualitative research while simultaneously remaining aware of the quality criteria for trustworthiness as proposed by Lincoln and Guba (1985). By emphasising the importance of methodological rigour, transparency and reflexivity, these criteria can provide researchers with a systematic approach to enhance the trustworthiness of qualitative research findings (Guba & Lincoln, 1989; Lavee & Itzchakov, 2023; Lincoln et al., 2018; Lincoln & Guba, 2013). Throughout, I was guided by these quality criteria to produce good qualitatively-driven mixed methods research that is multi-layered, multifaceted and represents needs of the participants as well as the researcher while ensuring the integrity and credibility of the findings (Frost et al., 2022; Nieuwenhuis, 2019a).

#### **3.9.1 Worthy topic**

According to Tracy (2020), a worthy topic implies qualitative research that is timely, significant, evocative or relevant. Worthy topics often emerge from disciplinary priorities that are theoretically compelling. However, they may also emerge from timely personal or social events. Lincoln et al. (2018) recommend topics that provide educative and ontological authenticity, which refers to an elevated level of awareness by research participants and by the individuals in their immediate environments. Worthy studies are typically interesting and, for example, focus on research phenomena that require further research (Lincoln et al., 2018; Tracy, 2010; 2020).

I regard the topic of my study as a worthy topic as little is known about the phenomenon, implying the valuable contribution that may be made by this study. To be more specific, this study may provide the participants, myself, and other researchers with a raised level of awareness of CVD and the effects it may have, while also shedding light on the potential value of supporting a child with CVD through a resilience-enabling intervention.

#### **3.9.2 Rich rigour**

The criterion of rich rigour relates to the effort and care taken by a researcher to ensure that a study is carried out in a relevant and appropriate manner. In essence, it implies that a researcher has applied due diligence and been thorough throughout the research process (Tracy, 2020). Rigour is judged by the practice and care taken during data generation and analysis procedures. Furthermore, rigorous data analysis can be achieved by being transparent and providing the reader with an

explanation of the data generation and analysis processes as well as how the data was interpreted and organised into a final research report (Tracy, 2020).

In an attempt to enhance the rigour of my study, I spent enough time in the field to earn the trust of the participants, practised appropriate procedures when conducting PRA-guided sessions and interviews and when compiling field notes and analysing the data, and generated sufficient data to support meaningful findings (Tracy, 2010; 2020).

### **3.9.3 Sincerity**

Sincerity relates to the honesty, genuineness and authenticity maintained by researchers throughout the research process. This can be achieved through self-reflexivity, transparency, honesty and data auditing (Tracy, 2010; 2020). Being a sincere researcher thus implies that a researcher is open to the lived experiences of others, yet also willing to share aspects of their own experiences with the participants. In order to enhance the sincerity of this study, I focused on being friendly and approachable during all interactions with the participants rather than self-centred. Throughout, I strove to be kind, self-deprecating and honest (Tracy, 2020).

Broadly speaking, sincerity can be achieved through two practices, namely self-reflexivity and transparency. Self-reflexivity implies an authentic and honest awareness of one's research approach and identity as well as an attitude of acceptance and respect for the research participants (Tracy, 2020). I remained self-reflexive throughout the research process to safeguard myself against researcher bias by documenting, sharing and acknowledging my biases, thoughts, motivations and opinions. I continuously engaged in reflexive practices, such as documenting my thoughts, fears, biases and experiences in a reflexive journal that may promote exposure and self-awareness. In addition, I regularly met with my supervisor to ensure accountability for the way in which this study was executed, the data analysed, and the findings presented.

The second practice, transparency, entails being open and honest about the research process in its entirety. I gave credit where it was due throughout this thesis and acknowledged the participants, co-researchers, my research supervisor and any additional supportive stakeholders. I also maintained an audit trail that may allow other researchers to examine the data generation and analysis processes I completed and decide whether or not the findings can be linked to the data (Guba, 1981; Tracy, 2010, 2020). I furthermore include documentation of the research activities and decisions in this thesis in the associated appendices, thereby providing a self-critical account of how the research was conducted (Creswell & Miller, 2000; Seale, 1999). By implementing these practices, I further aimed to enhance the transferability of the findings of this study as discussed more comprehensively further on.

### 3.9.4 Credibility and dependability

In qualitative research, credibility refers to the plausibility and trustworthiness of the research findings (Lincoln & Guba, 1985; 1986; 2013; Tracy, 2020). Credibility corresponds to the validity criterion of quantitative research and has the purpose of establishing confidence in the findings and interpretations of a study. Good qualitative research can accordingly provide a credible account of social, cultural, communal or an individual sense of the real-world setting of a phenomenon under study (Lincoln & Guba, 2013; Richardson, 2000). In essence, credibility relates to the extent to which the findings of a study are consistent with reality and whether or not the findings are believable (Guba, 1981; Nieuwenhuis, 2019a).

Credibility can be achieved through prolonged engagement with participants, thick descriptions of the research process, context and procedures, crystallisation, multivocality and member reflections with participants (Guba & Lincoln, 1989; Lincoln & Guba, 2013; Tracy, 2020). Credibility is further enhanced by establishing sound rapport with the participants, which aligns with the participatory approach I followed, employing well-defined purposive sampling, detailed methods for data generation, and triangulation techniques by relying on various methods and integrating the data of the various data sources (Nieuwenhuis, 2019a).

Prolonged engagement implies a high level of involvement of the researcher at the site of the phenomenon to avoid misinformation or distortion, to establish and build rapport and trust that is necessary to explore the participants' meaning-making and constructions, and to facilitate the immersion of the researcher in the participants' context to ensure an understanding of their contexts (Guba & Lincoln, 1989; Lincoln & Guba, 1986). Thick descriptions entail in-depth illustrations explicating cultural and contextual meanings specific to the phenomenon under investigation by providing explicit details about, for example, the participants, research activities and processes involved (Bochner, 2000; Geertz, 1973; Tracy, 2020). Next, crystallisation entails the method of using multiple types of data through various data generation methods to review data through multiple lenses, while multivocality implies the inclusion and analysis of multiple voices to gain divergent opinions and points of view, which can enhance the credibility as well as the crystallisation of a study. Multivocality additionally refers to the researcher being self-aware of how the participants and their subjectivities may vary in terms of culture, gender identity, age, class, education or sexuality. Finally, member reflections or member checking implies the inclusion of participants in the data analysis process by sharing the findings with the participants and providing opportunities for critique, questions, affirmation and collaboration (Tracy, 2010; 2020). Member checking may yield new data that may, in turn, provide a richer and more in-depth analysis of the generated data.

I aimed to enhance the credibility of this study by compiling in-depth descriptions, relying on a range of data generation and crystallisation methods, remaining self-aware, including multiple voices and

being open to collaborating with the participants during the data analysis process (Tracy, 2010; 2020). According to Lincoln and Guba (1985), credibility and dependability are linked as credibility can ensure dependability of qualitative findings. Dependability is demonstrated through a rigorous research design and its execution, meticulous procedures of data generation and the reflective evaluation of the project (Nieuwenhuis, 2019a). Dependability aligns with reliability commonly associated with positivist approaches in quantitative studies. It concerns the extent to which the findings and interpretations of a study can be considered as being the result of a consistent and dependable research process (Lincoln & Guba, 2013).

Due to changes occurring throughout a research process that may influence how a study is conducted and that may differ from the initial research design, maintaining a reflexive journal can enhance the dependability of a study. I therefore diligently maintained a reflexive journal throughout the research process, documenting any modifications or decisions made along the way. This comprehensive record served to create an audit trail, enabling other researchers to comprehend and trace the rationale for my actions (Lincoln & Guba, 2013; Nieuwenhuis, 2019a). Consequently, this practice further facilitated my role as a reflexive researcher, enabling continuous self-awareness and a critical evaluation of my own choices, biases and assumptions. Additionally, my reflexive journal positively contributed to the data analysis process, thereby further enhancing the dependability, credibility as well as transferability of my study.

### **3.9.5 Resonance and transferability**

Resonance refers to a researcher's ability to create a text that can reverberate and impact an audience in a meaningful way (Tracy, 2010; 2020). According to Tracy (2020), resonance can be achieved through aesthetic merit, evocative writing, naturalistic generalisations, transferability and logical transference *via* strategic sampling (Tracy, 2010; 2020). Tracy (2020) is further of the view that not every researcher will achieve resonance in the same way; however, that all good quality qualitative research reports will have the aim of making an impact.

For this purpose, qualitative research should be presented with clarity and be comprehensible to different audiences (Tracy, 2020). Naturalistic generalisation implies that the readers of a study will be able to apply the study's findings intuitively within their own research contexts. When doing this, it is important that readers feel as if they have made their own meaningful applications rather than being directed by the researcher on what to find meaningful. Closely related, transferability, as outlined by Lincoln and Guba (2013), relates to the degree to which the findings of a research study are applicable in other contexts or settings and can thus be transferred to similar research contexts or participants with similar characteristics as those included in a study. Unlike generalisability, which seeks to draw broad conclusions that are applicable across diverse populations, transferability encourages individuals to establish connections between their own research or experiences and

specific elements of the study under consideration (Lincoln & Guba, 1985; Nieuwenhuis, 2019a). Transferability in qualitative research can be achieved through thick descriptions where the researcher provides comprehensive descriptions of the context so that the reader can determine whether or not the findings can be applied to related contexts (Geertz, 1973; Lincoln & Guba, 2013).

In aiming for resonance and transferability, I strove to compile a clear and artistic representation of the findings, providing detailed descriptions of the participants and their contexts, the generated descriptive data as well as the research process, rather than making overarching generalisations. The inclusion of detailed descriptions pertaining to the specific contexts of the participants may enable readers and other researchers to discern the potential applicability of transferring my research findings to other contexts or settings (Lincoln & Guba, 2013; Nieuwenhuis, 2019a).

### **3.9.6 Significant contribution**

A significant contribution implies the possibility of a study making a significant contribution conceptually/theoretically, methodologically, practically and heuristically (Tracy, 2010; 2020; Yadav, 2022). The significant contribution of a study can be seen in findings that can transform, extend or complicate a body of theory, practice or knowledge in important and new ways. I strove to enhance the contribution of the current study by focusing on the actions of developing an in-depth understanding of the phenomenon and adding insight to the field, to build on the already existing body of knowledge and ensure a significant contribution (Tracy, 2020).

To be more specific, this study can make a heuristic and practical contribution as the findings offer new information on the studied phenomenon that may enable other researchers to research and further explore the lived experiences of children with CVD and how support can influence their functioning. Additionally, this study may assist others to engage in behaviours and practices in an improved, new or more informed manner, given the findings of the study on how children with CVD can be supported and their lived experiences improved (Tracy & Hinrichs, 2017).

### **3.9.7 Ethical research practice**

Ethical research practice (consult Section 3.12 for a more detailed discussion) refers to ethically correct actions by the researcher in relation to the research participants who are involved. According to Tracy (2020), ethical practice in qualitative research implies consideration of procedural ethics, situational and culturally specific ethics, as well as the ethics of working with research participants. As already mentioned, I strove to adhere to ethical research practice throughout the study by following the ethical principles of voluntary participation, confidentiality, privacy, informed consent and assent, avoiding deception, attending to safety from harm and permission to conduct research (Babbie, 2010; Mouton, 2001; Tracy, 2020), as discussed more comprehensively further on.

### **3.9.8 Meaningful coherence**

Tracy (2020) describes meaningfully coherent studies as studies that accomplish what they set out to reach; achieve their stated purpose; interconnect literature with research methods, results and findings; and utilise methods and practices that partner well with paradigms and theories. In order to achieve meaningful coherence in the current study, I accordingly attempted to construct a study that followed a clear line of inquiry, where all literature, research methods and paradigms are interconnected and support the results and findings of the study (Tracy, 2010; 2020).

### **3.9.9 Confirmability**

Confirmability, in the context of qualitative research aligns with the objectivity criterion often associated with quantitative research and positivist methodologies (Lincoln & Guba, 2013). Confirmability occurs once credibility, dependability and transferability have been achieved (Thomas & Magilvy, 2011). It relates to the degree to which the findings and interpretations of a study can be attributed to a reliable and objective process of inquiry and data generation. Various strategies can be employed to assess confirmability and ensure the credibility of the research outcomes, such as the inclusion of an audit trail, crystallisation and reflexive journal (Amin et al., 2020; Enworo, 2023; Lincoln & Guba, 1985; 2013; Nieuwenhuis, 2019a). As indicated in previous sections, I relied on these strategies in undertaking my study in support of confirmable findings.

### **3.9.10 Authenticity**

Authenticity in qualitative research is a multifaceted concept that encompasses various ethics considerations and aims to ensure the integrity and relevance of the research process and outcomes (Lincoln et al., 2018; Lincoln & Guba, 2013). Overall, authenticity in qualitative research highlights the ethical imperative of conducting research that is fair, transformative, educative and action-oriented, ultimately striving to promote social justice and positive change in society (Amin et al., 2020; Lincoln et al., 2018; Lincoln & Guba, 2013). Authenticity is rooted in interpretivism and emphasises fairness, ontological authenticity, educative authenticity, catalytic authenticity and tactical authenticity. Fairness, as a component of authenticity, underscores the importance of including the perspectives and voices of all stakeholders involved in the research. This can ensure a balanced and inclusive representation of diverse viewpoints, thereby promoting fairness and equity in the research outcomes (Amin et al., 2020; Lincoln et al., 2018; Lincoln & Guba, 1986; 2013).

Ontological authenticity relates to the extent to which a research process allows participants to gain new insights and understanding about their social condition (Lincoln & Guba, 2013). It emphasises the transformative potential of research in illuminating previously unrecognised aspects of individuals' lived experiences, contributing to a deep understanding of social phenomena. Educative authenticity entails the facilitation of mutual learning and understanding among different

stakeholders involved in research. By creating opportunities for dialogue and the exchange of perspectives, researchers can promote collaborative learning and informed decision-making among participants, fostering a sense of shared knowledge and collective empowerment (Lincoln et al., 2018; Lincoln & Guba, 2013).

Catalytic authenticity focuses on the potential of research findings to inspire social change or action. It highlights the role of research as a catalyst for addressing social issues, sparking discussions and mobilising efforts towards positive societal transformations based on the insights gained from a study. Tactical authenticity relates to the researcher's responsibility as an agent of knowledge dissemination and advocacy for social change (Amin et al., 2020; Lincoln et al., 2018; Lincoln & Guba, 2013). Researchers play a strategic role in translating research findings into actionable recommendations and strategies for addressing social challenges, thereby contributing to the practical application of research outcomes in real-world contexts.

### **3.10 RELIABILITY AND VALIDITY OF QUANTITATIVE RESULTS**

Pietersen and Maree (2019a) state that the reliability of an instrument refers to the extent to which the instrument is consistent and repeatable, while validity entails the extent to which an instrument measures what it is supposed to measure. In reviews conducted by Bose-Deakins and Floyd (2004) as well as Makhubela and Mashegoane (2016), it was found that the internal consistency of the BYI-II can be regarded as acceptable across most of the inventories and norm groups.

The standardisation sample of the BYI-II is sufficiently representative of the diverse population of children in schools in the United States of America. While South African norms are not yet available for the BYI-II, studies have been conducted by Makhubela and Mashegoane (2016) as well as Fourie (2016) to investigate the applicability of the Beck Depression Inventory-II (BDI-II) and Beck Anxiety Inventory-II (BAI-II) in the South African context. These authors found little difference between South African participants' responses and the international norms. While further research is needed into exploring the reliability and validity across representative population-based samples, evidence suggests that the BYI-II is a valuable clinical tool for mental health clinicians and can be used to deduce emotional and social functioning across diverse population groups (Fourie, 2016; Makhubela & Mashegoane, 2016; Seppänen, 2022).

Regarding the applicability of the BYI-II in other countries, several studies have been conducted to validate these tools in various cultural contexts. For example, completed research in countries such as China, India and Brazil indicate that the BYI-II maintains good psychometric properties and can be effectively used in various contexts with minimal cultural modifications. These studies generally support the utility of the BYI-II for assessing emotional and social functioning in diverse populations, although they also emphasise the importance of ongoing validation to ensure accuracy and

relevance in different cultural settings. This broad applicability makes the BYI-II a versatile and valuable tool for global mental health assessments (Seppänen, 2022).

To be more specific, reliability evidence suggests consistent measurement over short time intervals. These inventories are grounded in a robust theoretical framework of psychopathology and corresponding treatments, bolstered by both theoretical and empirical support. Consequently, they hold significant potential for school psychologists conducting cognitive-behavioural assessments and psychotherapies with elementary and middle school children (Bose-Deakins & Floyd, 2004; Creswell & Creswell, 2023; Pietersen & Maree, 2019a).

In terms of validity, content validity of an instrument implies that items in the inventories adequately represent the constructs they intend to measure. Content validity is established through expert review and pilot testing to ensure item relevance and clarity for the target population (Creswell & Guetterman, 2019). The development of the BYI-II involved input from experts in child and adolescent psychology to ensure content validity. Next, criterion-related validity assesses the extent to which scores on an instrument correlate with other measures of similar constructs or established diagnostic criteria. In this regard, research indicates significant correlations between BYI-II scores and the measures of related constructs, supporting criterion-related validity (Beck et al., 2005; Creswell & Guetterman, 2019; Thastum et al., 2009). Lastly, construct validity evaluates whether the inventories of an instrument measure the intended theoretical constructs. This can be assessed through factor analysis that examines the underlying factor structure of inventories. Existing studies confirm the expected factor structure of the BYI scales, thereby supporting construct validity (Creswell & Guetterman, 2019).

Overall, reliability and validity studies of the BYI-II attest to this instrument being a reliable and valid measure for assessing the emotional and social functioning of children and adolescents. These findings support the utility of the BYI-II for both clinical assessment and research contexts (Bose-Deakins & Floyd, 2004).

### **3.11 MY ROLE AS RESEARCHER**

Tracy (2020) describes the qualitative researcher as a research instrument that absorbs, sifts through and interprets the phenomenon under study through participation, interviewing and observation. A qualitative researcher is accordingly seen as a central figure in the research process as it is the researcher who gathers and analyses the data and then constructs meaning to reach suitable findings and conclusions (Frost & Bailey-Rodriguez, 2020; Willig, 2022). Qualitative researchers' unique backgrounds, values and beliefs will, however, shape the way they conduct and approach knowledge, research and data analysis (Adler & Adler, 1987). Therefore, it is imperative for researchers to identify their personal assumptions, values and biases at the onset of a study (Creswell & Creswell, 2023). To this end, I remained aware and thoughtful of my own background

and thoughts, and how these could potentially influence me throughout the research process (Tracy, 2020). I was careful not to dismiss my potential influence within the research process and kept a reflexive journal for this purpose (Bailey, 2007; 2018; Braun & Clarke, 2022).

During my study I fulfilled the role of qualitatively-driven mixed methods researcher, co-researcher, interventionist and facilitator. As co-researcher, working alongside several other fellow postgraduate students, forming part of a research team, my role was to work in partnership with my co-researchers, providing support and contributing unique perspectives, expertise and insights to generate knowledge (Leavy, 2023; Tanner, 2019). Through regular meetings, brainstorming sessions and collaborative discussions, a supportive and dynamic environment was fostered that was conducive to innovation and critical inquiry during the development of the intervention and throughout the research process.

As an educational psychologist, I have also acquired specific competencies to conduct psychosocial and emotional assessments, develop resilience-enabling interventions and provide parent guidance. These skills supported me in developing and implementing the resilience-enabling intervention that was person-focused, as well as the parent guidance intervention. In order to remain focused on my role as researcher rather than psychologist, I relied on continuous self-reflection, recorded my thoughts and experiences in my reflexive journal and discussed my various roles with my supervisor (Dodgson, 2019; Olmos-Vega et al., 2023; Tracy, 2020; Tracy & Hinrichs, 2017). I made a conscious effort to remain focused on my role as researcher and not to cross any boundaries that could cause potential harm.

According to Creswell (2023), researchers may hold a place of power within the research process that may negatively influence and control the outcome of a study. To be more specific, researchers may, for example, subtly communicate an expectancy that participants may experience the need to fulfil (Mouton, 2022). I thus remained aware of the power and control I could potentially exert within the research process, being cautious of what I communicated to the participants and aiming to fulfil my role as researcher without forcing any of my own opinions or values onto the participants.

Throughout my study I established and maintained close relationships with the participants and liaised with the parent-participants to organise data generation and intervention sessions when most convenient for their children. Child-participant 4 was old enough and preferred to arrange his own diary. I aimed to be reliable and remained as unintrusive as possible by replying to messages and sending meeting links timeously to the various participants. I placed the participants' schedule above my own and strove to meet when it was suitable and convenient for them. I also ensured that I obtained the necessary permission and informed consent and assent at the start of my study.

According to Bailey (2018), a researchers' attitude, ability to establish rapport and way of being play a vital role in setting the overall tone for a research process. I attempted to adopt and maintain an

attitude of respect, patience and thoughtfulness throughout my study. I always considered the participants and how the research process could potentially influence them. As qualitatively-driven mixed methods researcher, I strove to create a safe, secure and calm atmosphere where participants could feel comfortable and safe in sharing their unique perspectives, experiences and beliefs. As the participants in my study included both children and their parents, I endeavoured to follow a holistic approach and ensure that each family member understood the research process and what it entailed.

### **3.12 ETHICS CONSIDERATIONS**

According to Mouton (2022), children represent a vulnerable population group when included as research participants, with more than minimal risk potentially being present (Creswell, 2016; Silverman, 2017). In undertaking my research, I was guided by the ethics principles of permission to conduct research, informed consent and assent, voluntary participation, protection from harm, anonymity, confidentiality, trust and respect for privacy (Babbie, 2021; Maree, 2019; Mouton, 2022).

#### **3.12.1 Permission to conduct research, informed consent, assent and voluntary participation**

Prior to commencing with the study, I obtained permission to conduct my research from the Ethics Committee of the University of Pretoria's Faculty of Education (University of Pretoria, 2024a) as well as the Faculty of Health Sciences (University of Pretoria, 2024b). As the child-participants were minors, I also obtained informed consent from their parents/caregivers and assent from the child-participants themselves before commencing with research activities, after informing them of the nature of the study (Christians, 2018; Neuman, 2020; Nieuwenhuis, 2019a). I additionally obtained informed consent from the parent-participants for their participation in the study.

In seeking their informed consent and assent, I informed the child- and parent-participants about the purpose of my research, the data generation/collection procedures, their role and the expectations of their participation, my role as researcher and the duration of their participation. Additionally, I provided contact information for the participants to reach me, described the potential benefits of the study and explained the principles of voluntary participation and informed consent (Christians, 2018; Creswell, 2016; Creswell & Creswell, 2023; Laryeafio & Ogbewe, 2023; Neuman, 2020).

Throughout my study, I respected the principle of voluntary participation and the participants' right to withdraw from the study at any time if they so wished. Two of the child-participants and their parents involved in the pre-intervention data generation/collection phase withdrew from the study due to personal reasons, with me respecting their decisions. As a researcher, I continuously treated the participants as active, willing, thinking beings who can take responsibility for making their own choices, thereby respecting their decisions and opinions (Babbie, 2021; Cannella & Lincoln, 2018; Christians, 2018; Mouton, 2022).

### **3.12.2 Confidentiality, anonymity and respect for privacy**

According to Christians (2018), researchers need to safeguard the identities of participants and the locations of research sites to avoid unwanted exposure or any form of possible harassment, and to ensure confidentiality. I guaranteed the confidentiality and privacy of the participants by ensuring that the generated data could not be linked to the participants by name and by keeping all data secure and safe at the University of Pretoria for the next 15 years (Creswell, 2016; Creswell & Poth, 2018; Maree, 2019).

I ensured the anonymity of the participants by concealing identifying personal data by assigning each child-participant a number, and each parent-participant a number with a correlating letter to their child, without compromising or destroying the usefulness of the data (Christians, 2018; Creswell & Poth, 2018; Silverman, 2017). I furthermore took the necessary steps to protect the confidentiality of the child-participants by altering the identifying information before the PRA-guided sessions were transcribed by a third party transcriber, ensuring that the data was safe and secure. All data relating to the parent-participants was transcribed by my co-researchers who took the same precautions in respect of confidentiality and anonymity (Cannella & Lincoln, 2018; Christians, 2018; Creswell & Poth, 2018; Kang & Hwang, 2021; Silverman, 2017). All digital data was anonymised, password protected and backed up (Nieuwenhuis, 2019b). Only the research team – constituting myself, my supervisor, and co-researchers as well as the third party transcriber (who also signed a confidentiality agreement) – had access to the generated data. Photographs of the child-participants that were taken during the PRA-guided sessions while they completed the PRA-activities did not include their faces or any physical indicators that might be identified and jeopardise their privacy.

### **3.12.3 Trust and respect**

According to Cannella and Lincoln (2018), the relationship between the research participants and a researcher implies both trust and power. As power imbalances may occur when conducting research with vulnerable population groups such as children, the researcher needs to remain aware of this possibility and strive to establish trusting and respectful relationships where power imbalances are avoided (Cannella & Lincoln, 2018; Creswell, 2014; Creswell & Poth, 2018; Mouton, 2022). In this regard, Cannella and Lincoln (2018) indicate that ethical considerations in research can be regarded as fluid and complex, requiring of the researcher to continuously employ reflexive strategies.

I aimed to maintain trusting and respectful alliances with the research participants by adopting an honest and open approach. I openly discussed the research process, the participants' role in the study, and also stipulated what my role and responsibilities would be at the start of the study as already indicated. Additionally, I strove to create an environment of equality, acceptance and respect where participants could feel free to express themselves without any fear of prejudice, discrimination or harm (Babbie, 2021; Cannella & Lincoln, 2018).

Establishing trust and respect with the child-participants was thus an imperative part of the research process to ensure they felt comfortable to share their experiences and perspectives. According to Battle and Carr (2021), trust underpins the relationship between the participant and researcher, with trust being regarded as the prerequisite for participants to share their world views and perspectives. This process can neither be forced nor fast-tracked and may at times be slow and time-consuming, especially with vulnerable populations, such as children and young adults (Stahl & King, 2020). I thus strove to build trust with the child-participants by openly communicating with them, taking time to engage with them and develop a thorough understanding of their individual contexts, including the child-participants in decisions regarding the schedule of the PRA-guided sessions, asking them for feedback on the sessions and where I could improve, respecting the boundaries of the child-participants and treating them as experts within their contexts (Stahl & King, 2020; Venegas, 2018).

#### **3.12.4 Protection from harm**

Researchers should guard against causing any form of harm to participants (Maree, 2019; Tiidenberg, 2018). To this end, Christians (2018) recommends that researchers ensure the security and wellbeing of the participants, both physically and emotionally. To this end, I attempted to consider all possible forms of harm, remained on the lookout for any possible risks, and strove to safeguard against these. I was cautious with the questions and statements I made when interacting with the participants and respected their contributions, being cautious not to cause any harm or discomfort (Babbie, 2021; Mouton, 2022; Venegas, 2018). I was specifically guided by this ethical principle when implementing the intervention sessions with the child-participants (Babbie, 2021; Kang & Hwang, 2021; Nieuwenhuis, 2019a).

Due to my role being that of researcher and not psychologist, I remained vigilant for any possible discomfort experienced by the child-participants due to possible emotional reactions and the associated need for psychological intervention to be able to refer such a participant to obtain professional help. After the pre-intervention data generation/collection phase, two child-participants were identified as requiring psychological support based on their scores on the BYI-II. I referred these participants to qualified psychologists to obtain the necessary support. Throughout the resilience-enabling intervention, none of the child-participants exhibited any emotional reactions or triggers necessitating other referrals or the need for psychological support. However, had such a situation arisen, I would have informed the parents of the child-participants about the need for additional support to facilitate a referral to a qualified psychologist.

In terms of the EnChroma glasses that were distributed to the child-participants as part of the holistic intervention, no long-term side effects were foreseen, with the glasses not predicted to cause any harm to the child-participants (EnChroma, n.d.-b, n.d.-c). Both the child- and parent-participants were informed about this and the associated changes in functioning as well as the potential benefits of the

glasses. In order to limit any potential stigmatisation/discrimination of the child-participants by peers, I provided the parents with an information booklet (consult Appendix L) on the study, its purpose and the reasons for the child-participants wearing the EnChroma glasses, encouraging the parents to inform the child-participants' teachers and provide them with this resource and background. The child-participants were also prepared in terms of them wearing the glasses at school and in other social contexts. I made sure that the participants had a good understanding of how the glasses worked and why they started wearing them. I also regularly checked with the participants if they had experienced any negative remarks or stigmatisation in this regard.

Due to the outbreak of the COVID-19 pandemic, most of the data generation/collection activities – interviews and intervention sessions – with the research participants took place *via* online platforms such as Zoom or Google Meet to ensure the safety of both the participants and me. For interviews that were conducted in person, I complied with the regulations of protecting oneself and others from the spread of COVID-19 as outlined by the World Health Organisation (World Health Organization, 2020). I wore a mask during these sessions and insisted that the participants followed suit. Additionally, I sanitised the area, my hands and the participants' hands with alcohol-based sanitiser (World Health Organization, 2020). I strove to maintain the utmost level of hygiene to ensure the safety and protection of the research participants as well as myself.

### **3.13 CONCLUSION**

In this chapter I discussed the research process and methodological choices I made in detail. I explained the paradigmatic choices that underpinned the study, discussed the research design and described the data generation/collection, documentation and analysis methods. I also described the quality criteria I adhered to and the ethical considerations I respected.

In Chapter 4 I report on the results of my QUAL ↔ quan study following the data analysis I completed. I discuss the qualitative results in terms of the themes and sub-themes I identified during reflexive thematic analysis and provide the results of the BYI-II in terms of descriptive statistics. I then compare the results obtained prior to and following the holistic intervention to determine the effect of the intervention.



## CHAPTER 4

# RESULTS OF THE STUDY

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### 4.1 INTRODUCTION

In Chapter 3, I discussed the methodological choices and processes that guided this study. To be more specific, I explained the meta-theoretical and methodological paradigms I utilised, the selected research design, as well as the data generation/collection, documentation and analysis strategies I employed. I also discussed the quality criteria I adhered to and the ethics considerations as well as my role as mixed methods researcher.

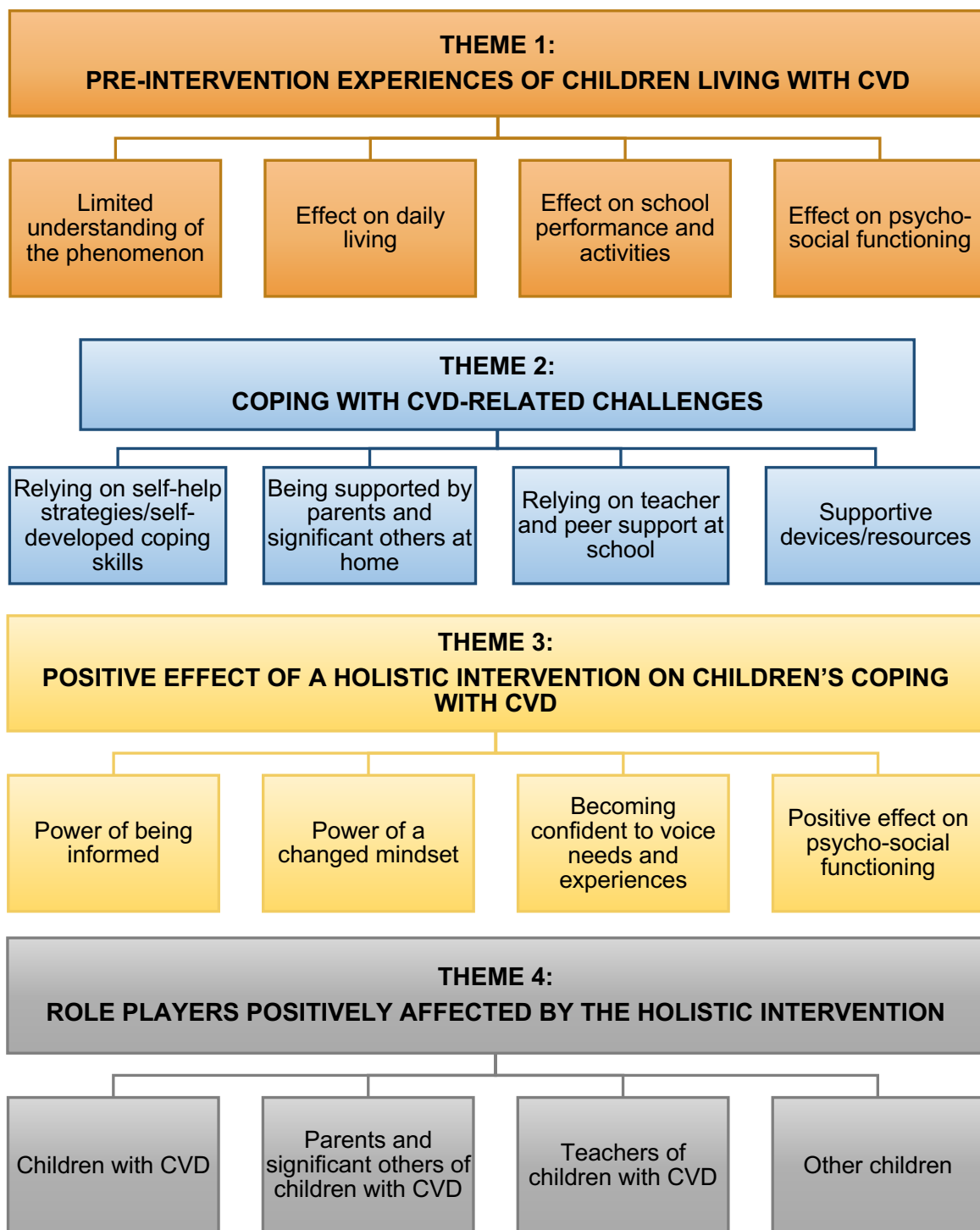
In this chapter, I present the results of the study. I first report on the qualitative results in terms of the four central themes and related sub-themes I identified following reflexive thematic analysis. Throughout, I include excerpts from the transcribed semi-structured interviews, intervention sessions, field notes, visual data, and my reflexive journal to enrich my discussion. I then present and compare the pre- and post-intervention quantitative data collected through the BYI-II. In the final part of the chapter, I integrate the qualitative and quantitative results I obtained.

### 4.2 QUALITATIVE RESULTS OF THE STUDY

The purpose of the qualitative phase of the study was to explore the experiences and perceptions of CVD of children with CVD and their parents as well as the effect of a holistic intervention that entailed a resilience-enabling intervention with the child-participants and a parent guidance intervention with the participating parents. Figure 4.1 provides an overview of the themes and sub-themes I identified and serves as an introduction to my discussion of the qualitative results of the study. In my discussion of the various themes, I stipulate the inclusion and exclusion criteria for each theme and the related sub-themes.

**Figure 4.1**

Overview of the identified themes and sub-themes of the study



*Note.* The colour palette for the themes was selected in a way that would allow people with CVD to differentiate between the various themes.

#### 4.2.1 Theme 1: Pre-intervention experiences of children living with CVD

Theme 1 consists of four identified sub-themes. As the theme and related sub-themes stem from the pre-intervention data that was generated, it captures the experiences of the child-participants as well

as the perceptions of their parents regarding the challenges that children living with CVD may experience, the impact and influence of these on daily living, school performance and related activities, as well as the effect of CVD on their psycho-social functioning. In identifying Theme 1 and the related sub-themes, I was guided by the criteria stipulated in Table 4.1.

**Table 4.1**

*Inclusion and exclusion criteria for Theme 1*

THEME	INCLUSION CRITERIA	EXCLUSION CRITERIA
<b>Sub-theme 1.1</b> Limited understanding of the phenomenon	All data referring to the limited understanding of CVD and its implications by children with CVD and/or their parents.	Data related to the potential effect of CVD on children's daily living, school performance or their psycho-social functioning.
<b>Sub-theme 1.2</b> Effect on daily living	Data referring to children living with CVD's experiences of CVD-related challenges in terms of daily living.	Data related to the negative effect of a limited understanding of CVD, or the effect of CVD on school performance or psycho-social functioning.
<b>Sub-theme 1.3</b> Effect on school performance and activities	All data relating to the possible negative effect of CVD on children's school performance and related activities.	Data related to the negative effect of CVD on daily living, psycho-social functioning or the potential consequences of a limited understanding of CVD.
<b>Sub-theme 1.4</b> Effect on psycho-social functioning	Data referring to the effect of CVD on the psycho-social functioning of children.	Data related to the potential consequences of a limited understanding of CVD as well as the potential effect of CVD on daily living or school performance.

#### **4.2.1.1 Sub-theme 1.1: Limited understanding of the phenomenon**

Sub-theme 1.1 reports on the data I obtained that indicates a limited understanding and knowledge of CVD by the child-participants and their parents. The categories that apply relate to a limited understanding by the child-participants themselves (Category 1.1.1), by their parents, siblings, and other family members (Category 1.1.2), by their teachers (Category 1.1.3), and by their peers (Category 1.1.4).

##### **4.2.1.1.1 CATEGORY 1.1.1: LIMITED UNDERSTANDING OF CVD BY CHILDREN LIVING WITH THE CONDITION**

The child-participants reported either a lack of or a limited understanding and knowledge of their visual condition. They also seemingly lacked the ability to explain their condition to others. When child-participant 4 was, for example, asked why CVD occurs, he said, *I don't really know. ... No one*

*has told me*<sup>12</sup> (PRA-S<sup>13</sup>, 17 August 2022, CP 4). Child-participant 2 seemingly displayed a similar lack of understanding when he was younger, saying, *when I was little it was also like I didn't understand it really* (PRA-S, 1 September 2022, CP 2).

In support, child-participant 1 shared uncertainty and curiosity about his condition in terms of the underlying background and exact reasons for the condition by stating, *Sometimes I do ask myself that question like why do I see colour differently, like how does it work? Because I know that the cones overlap and I know all of that, most of that information, but I just wonder how?* (PRA-S, 6 May 2022, CP 1). In the same way child-participant 3 indicated a limited understanding of CVD when asked how he would explain his condition to others, merely stating that, *I see colours differently* (PRA-M3, CP 3) and in elaborating, *some sort of thing in the back of my eye I don't have them* (I, 19 November 2021, CP 3). This narrow understanding was echoed by child-participant 4 who said, *Some of them [friends] ask how does it work, but I can't really tell them how does it work because I don't really know. So, I just tell them I can't see certain colours* (PRA-S, 17 August 2022, CP 4). In support of this contribution, I noted the following in my reflexive journal: *CP 4 seems to have a lack of knowledge surrounding CVD, what it is and how it occurs. He seems to struggle to express his condition to others and does not know how to put it into words or answer people's questions so that he feels empowered* (RJ, 24 August 2022).

The contributions of the child-participants thus point to a limited understanding of CVD by children living with the condition, as effectively summarised by child-participant 2, in the following response: *I think that's the hardest part is not actually knowing what is wrong* (PRA-S, 14 July 2022, CP 2). This participant continued by referring to the limited understanding of other people, saying that, *People also used to assume that I saw in black and white* and then recommending, *People need to also be educated on, is that it's almost like it's a spectrum. It can be different* (PRA-S, 29 June 2022, CP 2) for each person. This sentiment was supported by parent-participant 3B, who referred to *... different spectrums of the colour vision deficiency* (I, 23 July 2021, PP 3B).

In summary, I wrote the following in my reflexive journal based on my observations of the child-participants' lack of sufficient knowledge:

*It seems that there is a lack of understanding by the kids of their condition. They seem to struggle really to understand or express what it is to others on a basic level. It seems that they haven't ever been specifically taught what CVD is and how it occurs in their bodies. There*

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<sup>12</sup> In order to accommodate visually impaired and colour vision deficient readers, all verbatim data excerpts are highlighted in the theme-related colour for convenient and easy viewing.

<sup>13</sup> Henceforth, the following abbreviations apply: I = Semi-structured interview, followed by the date of the interview; PRA-S = PRA-guided session, followed by the date of the PRA-guided session; CP = Child-participant; PP = Parent-participant; FN = Field notes; RJ = Reflexive journal; PRA-M = Matrix made during the PRA-guided sessions with the child-participants, followed by the number of the poster (PRA-matrix). Responses are given verbatim and have not been edited.

*seems to be a general feeling of hopelessness and a lack of control amongst them* (RJ, 26 June 2022).

#### **4.2.1.1.2 CATEGORY 1.1.2: LIMITED UNDERSTANDING OF CVD BY PARENTS, SIBLINGS AND OTHER FAMILY MEMBERS**

In the case of the child-participants, their parents indicated a lack of sufficient understanding of why CVD occurs, and which challenges it poses to their children. Parent-participant 1A, for example, declared, *Parents lack understanding of exactly what it is and how it occurs* (I, 30 July 2021, PP 1A). In this regard, I remarked the following in my reflexive journal: *It is interesting to note that the parents do not seem fully to understand how CVD influences their children's lives and how they view the world* (RJ, 10 June 2021). Another parent-participant who also had CVD echoed this view by stating, *We grew up and we didn't know anything about CVD or colour blindness or whatever we just carried on and it was just one of those things* (I, 30 July 2021, PP 1B). Another parent added:

*I did not really appreciate just how colour-blind he was until the optometrist brought those glasses to a test one day. And she brought a little booklet with where you can see the different patterns. ... And only as we paged through that booklet, we realised how much he could not see. So, he's actually ... more severely colour vision deficient, than I would have given him credit for it* (I, 23 July 2021, PP 3B).

Due to CVD having no prominent indicators and due to a limited general understanding of the condition, parents' scope of awareness of CVD and the related difficulties it implies seemingly resulted in the participating parents not always being aware of their children's differences from peers. One of the parent-participants remarked the following in this regard: *We forget sometimes* as well as, *You can't see that there's something wrong* (I, 23 July 2021, PP 3A). This view supports the experience of child-participant 3, who said, *They don't understand it, so I think sometimes they forget* (PRA-S, 28 September 2021, CP 3).

The parents seemingly also lacked the necessary understanding of how CVD affected their children in the classroom context. Parent-participant 2A, for example, mentioned the following:

*I never knew that other children were asking him 'what colour is this?' or 'what colour is that?' and that they make him feel so different, I suppose because in our family we didn't feel it was anything that was different, so for him I didn't realise at school how different it must have been for him* (I, 8 August 2022, PP 2A).

Closely related, parent-participant 1B stated, *I don't know about the classroom just at home, I suppose. Because we not like completely educated about it, we joke about it* and in further elaboration, *You know, we only know that it's really, really affecting him unless the teachers say* (I, 30 July 2021, PP 1B). Parent-participant 1A mentioned specific examples, saying, *I did not realise also when it comes to like graphs, like doing geography and things like that, that it can also affect them and maps and you know, so it really did open up my eyes to a lot more things that I was not*

*aware of* (I, 30 July 2021, PP 1A), thereby highlighting the parents' apparent ignorance of the possible effect of CVD on their children and their performance in school.

The parents, however, suggested that with time, they were becoming more aware of their children's condition and how to support them. Parent-participant 7, for example, remarked the following: *I think I am becoming more aware ... I will tell my son, just grab that red whatever and then I will think about it and remember I can't say that* (I, 9 June 2021, PP 7).

#### **4.2.1.1.3 CATEGORY 1.1.3: LIMITED UNDERSTANDING OF CVD BY TEACHERS**

According to both the child- and parent-participants, teachers also seemingly had limited knowledge of CVD and would at times not realise that the difficulties experienced by the child-participants were related to CVD. Parent-participant 1A mentioned that her son's class teacher *... didn't even realise he was colour-blind* (I, 30 July 2021, PP 1A) after viewing his artwork and noticing the atypical use of colour. In support of this contribution, child-participant 4 stated, *I don't really think they [teachers] know a lot about colour blindness* (PRA-S, 22 November 2022, CP 4). Child-participant 1 agreed on this view and commented, *I don't think all teachers know about it* (PRA-S, 7 January 2021, CP 1).

In the case of teachers noticing a child experiencing difficulty with colour, the teacher would apparently not necessarily relate this to CVD. For example, parent-participant 1A reported that when her son *... was in Grade R or so the teacher said to me he doesn't know his colours and I was like, no man, I know he does, he's a smart boy. I couldn't understand what they were talking about, and we didn't realise at the time that he was colour vision deficient* (I, 30 July 2021, PP 1A). Child-participant 1 agreed and shared his perception of the same experience, stating the following: *When I was in younger grades, like I was struggling and my teacher thought in grade R that I didn't know my colours, so then I went, and we actually found out I was colour blind* (PRA-S, 7 January 2021, CP 1). This incident points to teachers' ability to detect that a child is experiencing difficulty with colour perception, despite the apparent inability to understand the underlying cause of such difficulty.

Closely related, the participants were of the opinion that teachers may misunderstand the difficulties that children with CVD face and as a result react negatively and without accommodation or care of children with CVD due to such a lack of sufficient understanding and knowledge of what the condition implies or how it presents. To this end, parent-participant 4 said the following about her son: *Two years ago, he couldn't distinguish between colours and so his teacher told him he's stupid and he believed that and then we tested him, and we saw that there is something wrong and by then the damage was done already* (I, 8 September 2022, PP 4).

In confirmation of this contribution and the emotional distress that children with CVD may experience when they are not accommodated or when their difficulties are misidentified, child-participant 4 remarked, *Teachers get sometimes angry when I do colour the thing the wrong colour and when*

*they don't know I'm colour-blind* (PRA-S, 17 August 2022, CP 4). In this regard, child-participant 2 stated the following: *I think it's people often like to jump to the conclusion of like, oh, they're just dumb, people like to jump to that instead of actually looking for a reason* (PRA-S, 14 July 2022, CP 2). This participant shared an example when recounting the experiences of his grandfather who also had CVD when he was a child, saying, *My grandpa told me how when he was at school, he's the same as me, he's also colour blind. So, he was told he was dumb, because he couldn't spell or read or see colour. So, it was just because it wasn't dyslexia, so they all just assumed oh well, whatever* (PRA-S, 20 October 2022, CP 2). He similarly shared his own personal experience, saying, *When I was a lot younger, people often assumed that I was dumb because I didn't know my colours* (PRA-S, 29 June 2022, CP 2).

Due to teachers' apparent limited understanding of the phenomenon of CVD, children with CVD may seemingly be exposed to discrimination and unnecessary emotional distress when teachers do not attribute the difficulties they experience to their condition. Parent-participant 4 shared such an experience related to her child, stating the following:

*He was crying a lot because he had an art project that he had to do at school and there were colours involved, and he used the wrong colours. So, I have to say it was a beautiful project he created, and I was like, wow, look what you did it's amazing, but he got 50% and he got zero for the colours part. So, there's a new teacher that is only there for this term, in the other teacher's place and she doesn't know he's colour blind* (I, 8 September 2022, PP 4).

According to the participants, in order to address this, teachers need to become more aware of CVD, how to identify this visual condition and how to support children dealing with the associated difficulties. Parent-participant 1A accordingly stated, *There definitely needs to be more awareness raised at schools and especially at the foundation level because it can really interfere with kids. It's not that they don't know their colours it could be that they are actually colour vision deficient* (I, 30 July 2021, PP 1A). Parent-participant 1A elaborated by saying, *Teachers need to be educated about the colour blindness, because then they think the child just doesn't know colours or they're being naughty* (I, 30 July 2021, PP 1A). In support of this view, child-participant 2 commented that if teachers are *aware of it, especially with math and the graphs and people who take geography, if the teachers are more aware of it, then they can definitely be more accommodating* (PRA-S, 24 November 2022, CP 2). In this regard, I mentioned the following in my reflexive journal:

*CVD does not present as a typical visual impairment or barrier to learning; therefore, it is often noticed only when parents and teachers identify behavioural changes and emotional difficulties. As a result, teachers and parents may focus on addressing these symptoms rather than the root cause due to a lack of awareness* (RJ, 26 June 2022).

In summary, parent-participant 2 said, *There is just so much awareness needed, I mean seeing that people don't even know about the prevalence in schools* (I, 8 August 2022, PP 2). In order to address

the challenges that children with CVD may face when being mislabelled and discriminated against, child-participant 2 cautioned that teachers should not *instantly jump to the fact that they're dumb, they're wrong, they should know what we see. That shouldn't be at all a thing* (PRA-S, 1 September 2022, CP 2). In confirmation of this shared experience, I noted, *The child-participants seem to struggle with the fact that people will tell them they are wrong and do not take the time to see things from their perspective* (FN, 24 November 2022).

#### 4.2.1.1.4 CATEGORY 1.1.4: LIMITED UNDERSTANDING OF CVD BY PEERS

Two of the child-participants reported a lack of sufficient understanding amongst their peers that apparently resulted in their peers teasing them or displaying discriminatory behaviour towards them as a result of their condition. In this regard, child-participant 4 stated the following: *Sometimes they don't really understand what I am seeing and then they get mad, or they want ... Sometimes it gets irritating because they ask me the whole time what I am seeing* (PRA-S, 24 August 2022, CP 4). Child-participant 1 similarly indicated, *I think it's a lack of understanding for some people and people don't really think about it before they actually ask or say it. They just think oh colour blind, can't see colour or, okay, what colour is this?* (PRA-S, 6 May 2022, CP 1).

Due to this apparent lack of understanding by their peers, the child-participants seemingly experienced emotional distress and even felt alienated. In this regard, child-participant 4 remarked, *It makes me feel unhappy because they know I'm colour blind, but they are teasing me about this because they don't understand that I can see certain colours, but not all the colours* (PRA-S, 17 August 2022, CP 4). As such, the child-participants apparently experienced a lack of control and frustration that was compounded when they were not able to explain CVD to their peers as well as due to their peers' lack of awareness and sufficient knowledge. Child-participant 4 explained this view in the following way: *I told them to stop, but the most questions they ask is how does it work? But I can't really tell them, so they keep asking* (PRA-S, 24 August 2022, CP 4). In confirmation, parent-participant 2 mentioned the following:

*The fact that the kids hound them for some reason feel that being colour deficient is some sort of magical trick. ... like asking them over and over again, what colour do you see? Or how do you see this colour? It's horrible, I think it's quite exhausting for them as well* (I, 33 August 2022, PP 2).

It seems clear that the child-participants were frustrated and even emotionally triggered due to their peers' lack of understanding as to how the child-participants viewed the world. Child-participant 1 stated, *it triggers me in this way where he's like what colour is the grass? And then I just felt so annoyed for no reason or like upset when people ask me, 'oh what colour is this?' I just don't feel comfortable and I just don't really like when people ask me that* (PRA-S, 6 May 2022, CP 1) and:

*... you say colour blind, so they think you can't see colour at all and people just don't understand what it is. So, I guess it's that and the fact that they're like what colour is this to say like oh, if I say it's green they'll be like oh, you're not colour blind or something like that. And they won't understand and won't be as open to listening as some people would* (PRA-S, 6 May 2022, CP 1).

Child-participant 4 shared similar experiences, saying, *They will ask me what colour is this ... Sometimes they give an object which is black, so I can see it is a black object and I say it is black they will say to me but you're not colour blind* (PRA-S, 24 August 2022, CP 4). Another participant specifically mentioned his experience saying, *I was annoyed when the people are asking me what the colour is* (PRA-S, 19 November 2021, CP 3).

#### **4.2.1.2 Sub-theme 1.2: Effect on daily living**

This sub-theme focuses on the challenges experienced by the child-participants in their everyday lives as determined pre-intervention. The majority of the child-participants indicated that they experienced a number of challenges that influenced daily living, with the parent-participants confirming these reports due to them witnessing such challenges experienced by their children.

Participants firstly reported on the challenges related to dressing, based on the children experiencing difficulty to select items of clothing based on colour. They would reportedly assume that an item was a specific colour, only to often find out that it was a different colour, thereby misidentifying colours. With regard to this experienced challenge, child-participant 2 stated the following:

*I have a light green shirt that when I bought it, I thought was white. And I carried on thinking it was white until one day I came downstairs wearing it and I was like, 'oh, you know, I really thank you for buying me this shirt, mom, I really love this white shirt.' She said 'that's not white, that is green'* (PRA-S, 29 June 2022, CP 2).

In support, child-participant 3 shared the following similar experience: *My mom bought me a pink shirt once with a skull on it, I thought like ... from Marvel, so I thought it was grey, so I liked it until she said 'oh, you have your pink shirt on,' and I was like, 'My what?'* (PRA-S, 9 September 2022, CP 3). This incident reportedly resulted in child-participant 3 becoming *... sceptical when my mom buys me blue shirts* (PRA-S, 9 September 2022, CP 3). Overall, the challenge related to clothing apparently contributed to frustration and emotional distress amongst the children with CVD. Child-participant 2, for example, explained, *It's tough times you have to overcome, especially something little like is the shirt red?* (PRA-S, 14 July 2022, CP 2).

Closely related, another participant reported on the challenges he had experienced when buying other colour-related items, such as stationery. In this regard, child-participant 2 said the following:

*I would go to stationery shops to buy pens and I would pick the purple pens instead of the blue pens. And then I would get all the way up to the counter and then get home and*

*realise that they were purple and not blue. And I couldn't use them at school, so we'd have to go back and buy blue pens* (PRA-S, 29 June 2022, CP 2).

Next, CVD seemingly posed several challenges related to driving and distinguishing between different road signs based on corresponding colours. Child-participant 2 stated the following in this regard: *I'm going to start studying for my learner's test soon ... I'm a bit worried about like different colours of signs and things that I might not be able to see* (PRA-S, 14 July 2022, CP 2). Even though the other child-participants were not of an age where this was a direct concern, parent-participant 1B noted that his friend who had CVD *doesn't see the robot. He sits at the robots* due to him reportedly not being able to notice the colour changes in traffic lights (I, 30 July 2021, PP 1B). Parent-participant 3B similarly predicted the following regarding his son suffering from CVD:

*He is definitely going to have a bit of difficulty as he grows up with traffic lights for instance because in the daylight if there's a lot of light sunlight on the light he cannot see whether the red or green is on he cannot see ... so as he grows up there are things that he's going to struggle a bit with* (I, 23 July 2021, PP 3B).

Other examples of reported challenges experienced by children with CVD in their day-to-day lives are captured in contributions such as, *I asked my child to pass me a R20 note and I said to him, the brown one and he looked at me all confused and said but they all look the same* (I, 30 August 2022, PP 2) and, *It was an awareness after 17 years of living with this coloured blind person that I still was like, oh my goodness of course you can't see the colours they are all kind of blending into one another* (I, 30 August 2022, PP 2). According to parent-participant 1A, coloured toothbrushes and sponges potentially caused similar difficulties, specifically within their family where both her husband and son (child-participant 1) were colour vision deficient and experienced difficulty in identifying their own such items. In this regard, parent-participant 1B confirmed, *That's exactly a very big problem* and, *My son with CVD may use something of his [brother] or his toothbrush, and then these boys break out in a fight* (I, 30 July 2021, PP 1B). Parent-participant 1A similarly stated, *I bought them those sponges to bath with. And I have to make sure that my son with CVD's one is different to the others because then it becomes an issue* (I, 30 July 2021, PP 1A).

The daily living challenges captured in the following excerpts relates to the child-participants' perception of the world, with them viewing the world differently than other typically sighted people:

- *I can't really see things that other people see. So, they see something and then I can't see it. Sometimes you feel like left out, but I don't really feel like that. It just feels like I wish I could see what they see* (PRA-S, 7 January 2022, CP 1).
- *Some things just look so dull, like trees and all that, it looks like, oh this has no colour, it's just like bleh* (PRA-S, 7 January 2022, CP 1).
- *You cannot tell the difference between certain colours and some colours are hard to identify even by themselves* (PRA-S, 29 June 2022, CP 2).

- *I can't see a full rainbow* (PRA-S, 18 November 2022, CP 3).
- *The one thing that bothers him about it, is that he cannot see a full rainbow. Yeah, he expresses his dismay about that fairly regularly* (I, 23 July 2021, PP 3B).
- *I can't experience the world how it actually is but I experience it in my own perspective. It also affects me when I can't determine or tell apart two things* (PRA-M5, CP 1).
- *One time I thought my dog was green with brown spots* (PRA-S, 19 November 2021, CP 3).

Another potential area where participants reported challenges in daily living relates to them watching sport on television, especially, football. Parent-participant 1A, for example, noted the following:

*When they're watching soccer, sometimes, my husband and son with CVD will say, oh, they're wearing I don't know what colour and we laugh, everything is mauve for my husband. And we will just all laugh because we like, it's not that colour guys. This is the colour of the kit* (I, 30 July 2021, PP 1A).

#### 4.2.1.3 **Sub-theme 1.3: Effect on school performance and activities**

The child-participants indicated several challenges that they were experiencing pre-intervention within their academic environment as a result of not being able to identify colours and utilise these as typically sighted children would do. A child-participant summarised his multi-level negative experience in the following manner:

*For school I don't think it is nearly as easy as a normal kid's life because it doesn't make it really easy. My life and someone else's without colour problems at school is very different, because my friends tease me sometimes about it. And the teachers get angry with me because I can't see colours when they don't know I can't see colours* (PRA-S, 24 August 2022, CP 4).

Child-participant 4 elaborated by stating, *The other children don't have to memorise the whole colour wheel, they just know what colours go where, they don't have to mark the crayons* (PRA-S, 16 November 2022, CP 4) and, *... other children don't get teased, or the teachers don't get angry with them because of they can't see colour* (PRA-S, 24 August 2022, CP 4). In summary, I noted that:

*CVD adds another dimension of difficulty to the school context, where children living with CVD are impacted by challenges other children are not exposed to, which results in their sometimes experiencing more challenges at school, which, in turn, may cause them to experience school as a negative and trying environment* (FN, 24 August 2022).

I furthermore reflected on this in the following manner: *Children with CVD experience the world so differently to how we assume, and they constantly face small challenges they need to overcome and adapt to without typically sighted people realising* (RJ, 25 August 2022).

Closely related to the experiences of child-participant 4, child-participant 2 reported incidences where CVD had caused him emotional distress and had negatively impacted his experience as well

as his ability to learn within the school environment when colour was used in teaching. This participant referred to subject-related examples, stating, *In maths we use graphs and sometimes our teacher makes the graphs different colours so we can see the difference in colour of the graphs, but that doesn't help me* (PRA-S, 1 September 2022, CP 2). He elaborated, saying *... in geography ... we had maps and stuff and I would worry about that* (PRA-S, 1 September 2022, CP 2).

As a result, the participants were seemingly negatively affected in terms of their academic performance when they were not able to use colour correctly. In reporting on such experiences, the participants made contributions such as the following:

- *In elementary school we always had to say what colours of the rainbow that we had to colour it in, but I never got full marks for my rainbow, so it's annoying* (PRA-S, 19 November 2021, CP 3).
- *I just can't see colours, so sometimes I get bad marks* (PRA-S, 19 November 2021, CP 3).
- *Art was the biggest like monster because of being colour blind* (PRA-S, 24 November 2022, CP 2).
- *I had a task in my art class, but I got ... I did very bad because I got zero out of twenty for colour* (PRA-S, 16 September 2022, CP 4).
- *I don't know if I'm going to do it right, colour it right, and then I'm going to lose ten marks or something like that* (PRA-S, 16 November 2022, CP 4).
- *In Life Science when we have to do experiments colour changes are often very important and so I can't see the colour changes, so I can't record them or I don't really know what's going on sometimes, so that's sometimes difficult* (PRA-S, 29 June 2022, CP 2).
- *I don't feel very comfortable with that because it's not nice because I know I'm doing all the homework but I know I'm doing it wrong. Because at after school when I wait for my mom and dad to come pick me up, I usually do my homework so that I don't have to do it at home and then there's no one there to help me with the colours if I must do colouring or a graph* (PRA-S, 16 November 2022, CP 4).
- *With the projector when they [teachers] use PowerPoints and they'll often use like a red on a black or something like that and I can't see it* (PRA-S, 29 June 2022, CP 2).
- *We have a chalkboard and then if the teacher writes in red chalk, I can't see what the teacher is writing* (PRA-S, 18 October 2021, CP 1).

In confirmation of the child-participants' reports on the challenges often experienced in specific subjects, parent-participants 3A and 3B shared their concern that when their son (CP 3) *... gets into geography, if the contour lines and the background are going to be a similar colour, he's not going to see the contour lines* (I, 23 July 2021, PP 3B) as well as *... a subject geography where it's maps, where they use different keys that will probably be a problem* (I, 23 July 2021, PP 3A). In this regard, parent-participant 3A referred to the importance of informing teachers of such challenges, saying, /

*... have to go and remind the teachers that he doesn't understand colour, like we do so his project is not gonna be blues and greens and yellows and reds because he doesn't see it, he focused much more on the picture that he draws than the colour* (I, 23 July 2021, PP 3A).

One of the child-participants shared a personal view of not being entitled to accommodation within the classroom environment if being the only one with CVD. This participant stated the following: *I think I'm the only one in my class, I think, I don't know about my grade, but at least in my class I'm the only one that's colour blind, so I think it's... It feels not fair that they change it just for me, I think. So, I just deal with it* (PRA-S, 29 June 2022, CP 2) and, *... it's hard to be accommodated for if I say I am the only person in my grade or maybe of two even. Then, I guess, it's really hard to be accommodating for just two people out of like 60 students* (PRA-S, 1 September 2022, CP 2).

Several of the participants noted CVD-related challenges when engaging in sport activities such as experiencing difficulty to distinguish between different coloured sports kits and identifying a red cricket ball on green grass. These challenges apparently affected the child-participants' experiences of playing sport. Child-participant 1, for example, explained how CVD had influenced his playing cricket, by stating, *The cricket ball, when it's gone into long grass, whenever somebody hits the ball far and then it goes into the big, long grass then I struggle so much to find the cricket ball* (PRA-S, 7 January 2022, CP 1) as well as, *With cricket, the ball is red, the grass is green. I mean it's contrasted, but when the ball goes in long grass, it's over for me, I can't find it* (PRA-S, 9 September 2022, CP 1). Child-participant 3 confirmed that the cricket ball *... blends in very well* with the grass (PRA-S, 19 August 2022, CP 3), with child-participants 1 and 2 additionally referring to the challenge of differentiating between the colours of team players' uniforms. In this regard, child-participant 1 stated the following: *Sometimes if you're playing sports, sometimes kit will just look different and some kit will look similar* (PRA-S, 7 January 2022, CP 1) and child-participant 2 commented, *When I was younger and I played soccer or things like that and then the different bibs, it was definitely very hard to tell the difference there* (PRA-S, 14 July 2022, CP 2).

#### **4.2.1.4 Sub-theme 1.4: Effect on psycho-social functioning**

All four child-participants seemingly experienced psycho-social challenges as a result of suffering from CVD. To be more specific, they mentioned experiencing difficulty with, for example, their self-concept, self-confidence, feelings of being different and isolated from others, as well as feelings of anxiety and concerns of overcoming CVD-related difficulties. Child-participant 4 indicated the experience of conflicting feelings about his self-identity and how he viewed himself, stating, *... sometimes I think I'm unique with it and sometimes when I struggle because of it I think it's a disability* (PRA-S, 16 November 2022, CP 4) and also, *I don't think it's a normal life. It is like a normal life to other people like it's not the same life if you have colour vision deficiency and not colour vision deficiency. And sometimes I don't really think I can see the beauty of the world because of it* (PRA-

S, 24 August 2022, CP 4). In support of this view, child-participant 1 stated, *I generally always just feel good about it, because I'm rare, not a lot of people have it ... only sometimes it's just like emotionally ... You just emotionally just get annoyed* (PRA-S, 7 January 2021, CP 1).

Another challenge identified by the participants relates to them being teased and bullied by their peers and family members as a result of their CVD (as also briefly captured in the previous section), with this causing emotional distress and frustration. The participants shared the following:

- *It irritates me very much because some kids they will ask me five times in a row and then the next time they, the same kid, will ask me again and then another kid then and so it goes on* (PRA-S, 24 August 2022, CP 4).
- *Sometimes people tease you. Some people don't. People don't tend to really do it, but people used to do it a bit like tease you about it or like make you feel bad about it* (PRA-S, 7 January 2021, CP 1).
- *... it makes me feel angry about it because I don't want to be colour blind. ... it's irritating because my friends ask me the whole time what colour it is* (PRA-S, 24 August 2022, CP 4).
- *And then when people say this or something similar to this, it just triggers me in a way that I just don't understand how, but it triggers me in this way where he's like what colour is the grass? And then I just felt so annoyed for no reason or like upset when people ask me oh what colour is this? I just don't feel comfortable, and I just don't really like when people ask me that* (PRA-S, 6 May 2022, CP 1).

CVD reportedly also limited the participants' career options, which once again caused feelings of frustration and unfairness. In this regard, participants shared the view that, *... there's a disadvantage, I wanted to become an army jet pilot* (PRA-S, 19 November 2021, CP 3). In support of this view, child-participant 4 mentioned the following: *I really wanted to become a pilot and because of it I can't become a pilot* (PRA-S, 24 August 2022, CP 4). Parent-participant 3A similarly commented that they were informed by the optometrist who diagnosed their son that he *... won't be able to become a pilot or like she said, an electrician* (I, 23 July 2021, PP 3A). Additionally, CVD seemed to limit the independence and control that the participants could exert over certain situations as they constantly had to rely on others for support. In this regard, child-participant 2 stated, *I often have to ask other people for help. Which is it's not too bad because ... But sometimes it gets annoying when I have to constantly ask what colour is that?* (PRA-S, 29 June 2022, CP 2).

Next, the child-participants indicated feelings of longing and sadness due to them not seeing the world as typically sighted people do. In this regard, child-participant 4 stated, *It makes me feel sad sometimes because I can't see the same thing as the world see. Like if someone says that's a nice picture, I don't know because I don't know if it is a very nice picture to me, because I can't really see what they see* (PRA-S, 24 August 2022, CP 4). Child-participant 1 shared similar experiences, explaining, *Sometimes it's just like I kind of get annoyed and I can't see this and like I wish I could*

*see this ... I wonder how other people see the world who do not have colour blindness* (PRA-S, 7 January 2021, CP 1).

In another case, child-participant 2 indicated that he had experienced the fear of rejection by others because of his CVD. He stated, *I often get ... a fear of rejection that came along with it because you were scared that oh, you know I'm different. People might not like me because of that, or they'll ask too many questions that I don't know and things like that* (PRA-S, 28 July 2022, CP 2). Closely related, child-participant 4 indicated a longing for people to support and accommodate his differences, stating, *My big wish is for all this is that everyone will help me with my colour blindness, but some don't really care about it, when I ask them* (PRA-S, 17 August 2022, CP 4), with this view being echoed by participant 2, saying, *It would be nice when ... There won't be any negative stuff. That they won't ask me what colour is this and tease me about it* (PRA-S, 17 August 2022, CP 2).

Two of the child-participants indicated feelings of insecurity and invalidation when others doubted their CVD status as a result of them still being able to identify certain colours. In this regard, child-participant 2 shared the view that, *I sometimes used to worry that people thought I was faking it for some reason ... I was worried that people would for some reason I'd say, oh, you know I'm colour blind and they'd go no, you're not* (PRA-S, 28 July 2022, CP 2). Child-participant 1 shared a similar experience, noticing the following: *You do get some people they say are you faking? Are you lying? Because they don't believe it exists or they're just trying to make you feel bad, or some people just like say no you're lying to us. You can see colour* (PRA-S, 18 October 2021, CP 1). Child-participant 1 furthermore said, *Sometimes it goes unnoticed, sometimes it just slips under the radar and people don't really recognise it or notice it. So, it's hard sometimes when people don't recognise things and then I struggle to do something like view something* (PRA-S, 9 December 2022, CP 1). I reflected on these reports of not being recognised or believed by others in the following way:

*Child-participants often do not feel heard or seen by others when there is a lack of understanding of how CVD influences them. It seems people make inaccurate assumptions about CVD because it is not something that is physically visible by others that causes them to feel that their difference and difficulties are not valid or worth taking notice of* (RJ, 22 August 2022).

When sharing their general experiences of being colour vision deficient, child-participant 3 merely mentioned, *I felt different from other people* (PRA-M7, CP 3). Overall, the other child-participants agreed that they felt different from others and often out of place. In this regard, child-participant 2 shared the following regarding his thoughts and feelings of being colour vision deficient, with this resulting in him feeling different and isolated:

*I'd say like ... feeling different and feeling ... like the word you used earlier, alienated. ... when I was younger, I knew I was colour blind but I didn't fully understand how different that made me to other people, that is. ... I always thought it was this thing and I didn't*

*really know how to deal with it because I obviously I couldn't make it go away* (PRA-S, 24 November 2022, CP 2).

One participant was of the view that teachers would *never* (PRA-S, 9 September 2022, CP 3) provide the necessary support to children with CVD to overcome the challenges they faced. Child-participant 4 stated that he did not receive sufficient support from peers, by saying, *Sometimes my friends, sometimes they will give me the wrong colour* (PRA-S, 17 August 2022, CP 4). This experience of not receiving suitable support when asking for help implies that children with CVD may be hesitant to ask for support when they need it most.

#### 4.2.2 Theme 2: Coping with CVD-related challenges

This theme, with its four related sub-themes, captures the qualitative results I obtained on the coping strategies and resources that children with CVD rely on when aiming to overcome the challenges they face as a result of CVD. Table 4.2 provides an overview of the inclusion and exclusion criteria I relied on in identifying the sub-themes.

**Table 4.2**

*Inclusion and exclusion criteria for Theme 2*

THEME	INCLUSION CRITERIA	EXCLUSION CRITERIA
<b>Sub-theme 2.1</b> Relying on self-help strategies/self-developed coping skills	Data referring to the self-developed strategies that children with CVD often rely on to cope with CVD-related challenges.	Data related to the support received from parents, significant others, teachers, peers or assistive devices to cope with CVD-related challenges.
<b>Sub-theme 2.2</b> Being supported by parents and significant others at home	All data referring to the support received by children with CVD from their parents and significant others at home.	Data related to the self-developed coping strategies children with CVD rely on or the support they receive from teachers, peers and assistive devices.
<b>Sub-theme 2.3</b> Relying on teacher and peer support at school	All data referring to the support received by children with CVD from their teachers and peers at school.	Data related to the self-developed coping strategies children with CVD mobilise or the support they receive from their parents or assistive devices.
<b>Sub-theme 2.4</b> Supportive devices/resources	Data related to the support offered by supportive devices and resources.	Data related to the self-developed strategies children with CVD utilise or the support they receive from their parents, teachers and peers.

##### 4.2.2.1 *Sub-theme 2.1: Relying on self-help strategies/self-developed coping skills*

Based on the data obtained from the participants, it is clear that children living with CVD often rely on self-developed coping strategies in addressing the challenges they face. In this regard, I commented, *CVD is often seen as something children must adapt to on their own rather than a condition requiring accommodation* (RJ, 26 June 2022). Such self-developed coping strategies mentioned by the participants ranged from the child-participants making small adaptations that allowed

them to function in ways better aligned with those of typically sighted peers to asking others for help and support when needed, using humour, and adopting a positive attitude towards their condition. The child-participants seemingly made the most of the adaptations in the various situations they faced to cope within a world filled with colour. In this regard, parent-participant 3A remarked that her son *... made all the adaptations definitely, so we literally became aware that he does certain stuff differently* (I, 23 July 2021, PP 3A). Parent-participant 1A agreed and shared a practical example of her son making adaptations to overcome the challenges he faced with distinguishing the colours of toothbrushes within the family. The parent stated, *My son with CVD actually keeps his toothbrush on the windowsill. Because he can get confused with that* (PRA-S, 30 July 2021, PP 1A).

Several of the child-participants shared the view that the attitude and outlook that they adopted regarding their condition had shaped their perception and supported them in developing an optimistic attitude to CVD. They specifically referred to humour as an adaptive coping strategy to help them focus on the lighter side of their condition. In this regard, child-participant 2 commented the following:

*And then emotionally, as I said before, I often laugh at myself, so sometimes it makes me happy, I guess. And then also my friends, not in a mean way, but like I'll joke with them about it as well. ... I think that's why I think it's important to have a sense of humour about it otherwise it's just unpleasant. ... I like to laugh at myself, actually, I think it's funny sometimes* (I, 29 June 2022, CP 2).

Child-participant 2 added, *Sometimes you've just got to overcome those things and try to learn how to accept yourself rather than have other people accept you* (PRA-S, 14 July 2022, CP 2). In support, parent-participant 1B, who is also colour vision deficient, stated, *I think the important thing from our side is we just make light of the situation now. We just try to laugh about it and have a good time about it because what else can you do* (I, 30 July 2021, PP 1B). Closely related, parent-participant 1B emphasised that it is important to change how one thinks about CVD, making the following comment: *I think we need to change the name. We need to make it CVA - colour vision awesomeness* (I, 30 July 2021, PP 1B). In response to these contributions I noted the following:

*Humour and a change of mindset can be used as a positive adaptive coping strategy that can allow children with CVD to acknowledge their difference and reduce the negative stigmatisation associated with having a difference. This may, in turn, hopefully decrease the negative feelings they may feel towards themselves and help them overcome the adversity they are experiencing* (RJ, 9 September 2022).

In further support of these ideas, child-participant 2 made the following contribution:

*You have to get more comfortable with yourself and realising that there's nothing wrong with you. You are colour blind, that doesn't mean that there's something wrong with you. You just need to overcome it like everything else, because it's just an extra challenge that colour blind people experience* (PRA-S, 28 July 2022, CP 2).

In addition to adopting a changed mindset, the child-participants reportedly developed strategies that supported them in identifying colours and trying to decipher or decode the colours they viewed against the typical colour spectrum. Parent-participant 3B, for example, explained how his son with CVD relied on this strategy, by saying the following:

*... has taught himself in a lot of respects, has taught himself to know what colour it is, even though he cannot see it ... so instead of when I asked him what do you see this is X, instead of telling me what the colour is he sees, he would look at it, and he would study it. And then he would venture a guess as to what he thinks it should be* (PRA-S, 23 July 2021, PP 3B).

In addition, child-participant 2 indicated, *I've learned to always check the label* (I, 29 June 2022, CP 2) in order to determine colours. Child-participant 4 similarly mentioned, *I wrote which colours goes where on the colour wheel and then I memorised it* to complete it correctly; however, this *requires more work than the average, normal kid* (PRA-S, 16 November 2022, CP 4).

It therefore seems apparent that the child-participants spontaneously developed coping strategies to compensate for being different, and to be able to function without external accommodations within, for example, the classroom environment. As an alternative route, some of the participants seemingly coped by shifting the focus away from colour when colour is used. In explaining these strategies, the child-participants made the following contributions:

- *I must colour the colour wheel with the right colour, so I... In my handbook I write... I wrote which colours goes where on the colour wheel and then I memorised it. And then I took the marked crayons and I just colour it, but it requires more work than the average, normal kid* (PRA-S, 16 November 2022, CP 4).
- *Every time colour is an issue. I just ignore it. I don't know. That's also why I'm not... Colour is not important to me in everyday things. So, like I mismatch clothes not just because I can't see them sometimes, but because I don't really look at it. So, I just ignore it. I've come to ignore it* (PRA-S, 14 July 2022, CP 2).

#### **4.2.2.2 Sub-theme 2.2: Being supported by parents and significant others at home**

All four of the child-participants indicated that their parents provided them with support and had enabled them to overcome specific CVD-related challenges. This report is captured in the following excerpt taken from my reflexive journal: *In terms of support received, it seems that the participants receive the most of their support and constant support from their parents and siblings* (RJ, 30 July 2021). The following contributions by the child-participants confirm them being supported by their parents and significant others at home:

- *I often got my mom to check it, to check that I used the right colours* (PRA-S, 29 June 2022, CP 2).

- *My little sister will just tell me what it is and say no, it's this* (PRA-S, 7 January 2021, CP 1).
- *My mom because she helps me with colours and put names on my crayons. Not really nobody else because our other family is far away. And my dad doesn't really know how to help, but he cares* (PRA-S, 22 November 2022, CP 4).
- *My older brother because he's finished school so he knows all about exams and studying and whatnot. So, he's definitely one that can help me* (PRA-S, 16 September 2022, CP 1).
- *Dog, mom, sister, dad* (PRA-S, 18 November 2022, CP 3).

All four the child-participants identified their mothers as primary source of hands-on support. They identified practical support provision in the form of, for example, their mothers labelling their pencils with the corresponding colours, informing teachers of their children's CVD and supporting the child-participants when they experienced emotional difficulties. The participants, for example, commented that they received *... good support* (PRA-S, 17 August 2022, CP 4) from their mothers, clarifying, *My mom marks my crayons and pencils with the colour's name on it, so when I must colour a certain thing, I read a name and then I colour it* (PRA-S, 17 August 2022, CP 4). Parent-participant 2 similarly recalled supporting her child in this way, saying, *I remember taking my child's coloured crayons and writing light blue, dark blue just because otherwise he would struggle* (I, 33 August 2022, PP 2).

The child-participants seemingly appreciated it when their parents, specifically their mothers, supported them by informing their teachers about the possible difficulties experienced within the classroom as a result of CVD. In this regard, child-participant 4, for example, said, *I was also very lucky because my mom would tell my ... Like for art, my mom would always make sure to tell my art teachers that I was colour blind* (PRA-S, 29 June 2022, CP 4). Child-participant 4 similarly reported that his mother *... called the school* (PRA-S, 16 September 2022, CP 4) to sort out an incident. Even though most of the participants seemed to be grateful for this support by their parents, child-participant 3 reported that when his mother went to his school to address the CVD-related difficulties he was experiencing, it created a *... huge hoo-ha* (PRA-S, 29 July 2022, CP 2) that he would have preferred to avoid, due to this experience drawing unnecessary attention to him.

In addition to practical support and informing the school about their children's condition, the child-participants indicated that they received emotional support at home and experienced a sense of comradery with their family members, specifically those who also had CVD. In this regard child-participant 1 indicated that his father and he were *... like partners in crime* due to them both having CVD (PRA-S, 7 January 2021, CP 1). In support, parent-participant 1B mentioned that when they played games together, especially UNO, *Cheating is going on properly there. Because it's not really cheating, because we both believe that that one is green, and that's actually red and whatever. And we just play the game. So, you know, we just make light of it* (I, 30 July 2021, PP 1B). Child-participant 2 shared a similar experience as his grandfather was also colour vision deficient, with his parent commenting the following in this regard: *He has like another person he can talk to at home. I*

*think that when he was younger, he was quite proud, he shared something with his grandpa* (I, 33 August 2022, PP 2). To this end, child-participant 2 made the following contribution:

*It's quite nice sometimes when he's here when I'm able to joke about it with him, it's like an inside joke almost. And then I'm able to compare things with him and then sometimes he'll get the same one. And then it just makes me feel normal ... I'm also able to also with my grandpa have interesting conversations about it and describe it as well* (PRA-S, 29 June 2022, CP 2).

Child-participant 2 furthermore stated, *I'm able to laugh about it with my mom and my grandparents* (PRA-S, 29 June 2022, CP 2). It therefore seems apparent that shared experiences with other family members with CVD supported the child-participants in coping with the challenges they faced. In this regard, I noted the following: *CP 2 noted that people who know him and know he has CVD who are familiar with his condition accommodate his needs accordingly* (RJ, 29 June 2022, CP 2).

According to child-participant 3, he experienced understanding and respect from his parents who seemed interested in understanding how he viewed the world. In this regard, parent-participant 3B emphasised the following, *I often tell him, don't tell me what you think it should be. Tell me what you see because I want to understand what he sees* (I, 23 July 2021, PP 3B).

Both child-participants 1 and 3 indicated that they were also supported by their siblings. In this regard, parent-participant 1B shared, *He's got an older brother, so if his brother feels if we're going out and he feels oh he's not dressed good enough. He will say no, wear this or wear that so we also have that kind of a support system* (I, 30 July 2021, PP 1B). Closely related, child-participant 1 remarked, *My little sister will tell me what is what* (PRA-M9, CP 1), declaring, *I am happy with the support I get from my family* (PRA-M9, CP 1). I further remarked that CP 1 *... is happy to ask his sister for help when he needs it* (FN, 14 February 2023).

From the parents' side, their willingness to advocate and support their children with CVD was clear. In this regard, parent-participant 2, for example, commented, *I've always put that he's colour deficient. God help any teacher that gave my boy a hard time about him being colour blind I would have sliced and diced them before they even knew what hit them* (I, 33 August 2022, PP 2), thereby indicating a level of protection for their children with CVD.

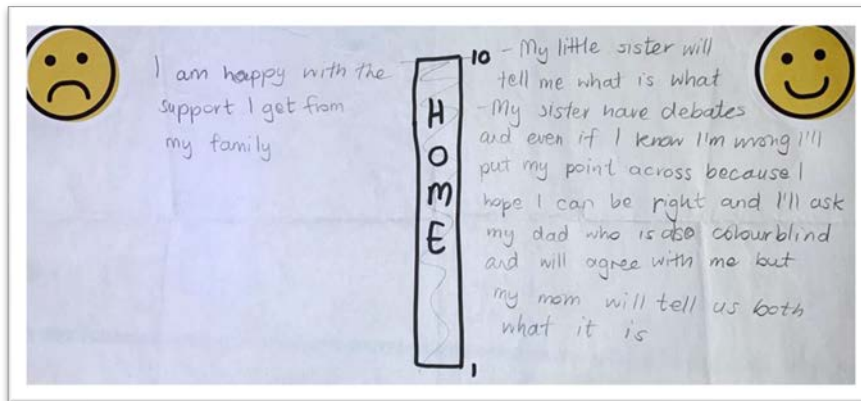
The early intervention and support from parents apparently positively influenced the optimal development of the child-participants and minimised the potential CVD-related challenges they faced as they developed. In this regard, child-participant 2 noted, *I was very lucky that because my mom picked up on it so early, because she knew that my grandpa was colour blind so she assumed, I got tested early* (PRA-S, 14 July 2022, CP 2) and as a result of this, the participant received *... early intervention ... my mom was already very aware of my colour blindness and was already very accommodating* (PRA-S, 24 November 2022, CP 2). Based on the reported early intervention and

support received from his mother, child-participant 2 seemed to have a well-developed sense of self and showed resilience when coping with challenges. He shared a piece of advice that his mother had taught him on how to deal with stress, saying that he would approach situations by thinking, *One bite at a time, which is part of something that my mom always says to me when I'm stressed. She always says how do you eat an elephant? One bite at a time* (PRA-S, 15 September 2022, CP 2).

Overall, the child-participants thus indicated the experience of receiving adequate support from their parents and significant others within their home environment. Figures 4.2, 4.3, 4.4 and 4.5 capture the level of support they reportedly received from members within their home environments.

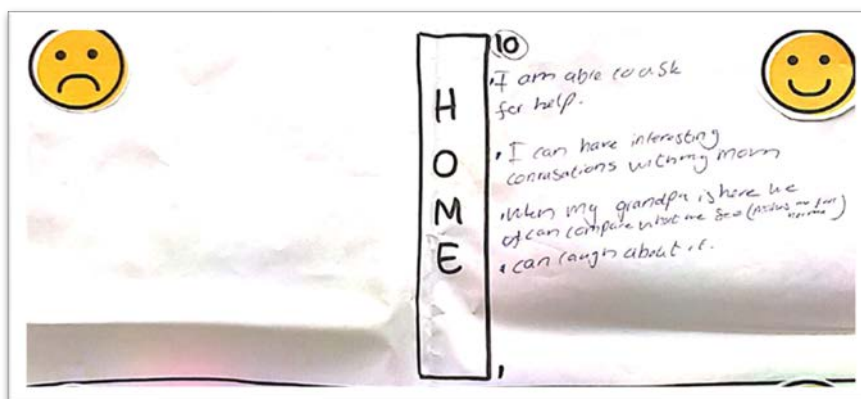
**Figure 4.2**

*Support received from parents and significant others as experienced by CP 1 (PRA-S, 18 October 2021, PRA-M9, CP 1)*



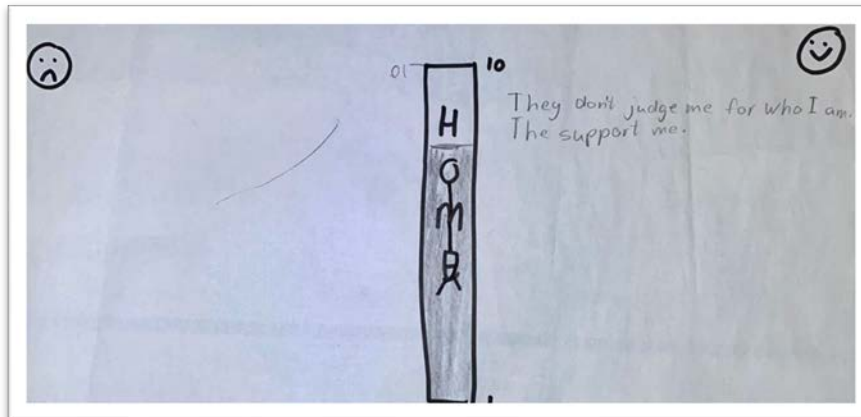
**Figure 4.3**

*Support received from parents and significant others as experienced by CP 2 (PRA-S, 29 June 2022, PRA-M10, CP 2)*



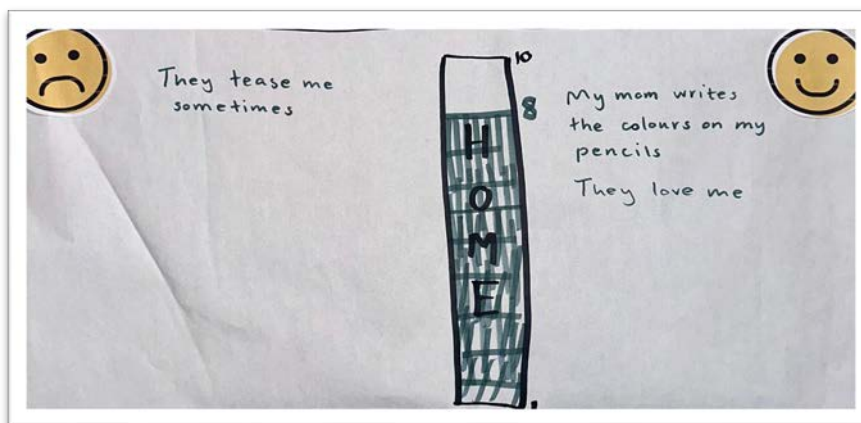
**Figure 4.4**

Support received from parents and significant others as experienced by CP 3 (PRA-S, 19 November 2021, PRA-M11, CP 3)



**Figure 4.5**

Support received from parents and significant others as experienced by CP 4 (PRA-S, 17 August 2022, PRA-M12, CP 4)



#### 4.2.2.3 Sub-theme 2.3: Relying on teacher and peer support at school

All four of the child-participants indicated that they had received support from their peers within the classroom environment for colour differentiation and when involved in activities that involved colour. Excerpts such as the following attest to this reported experience:

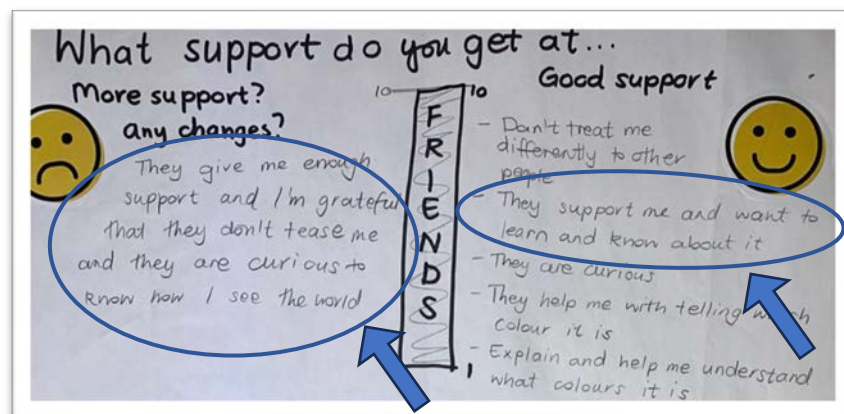
- *My friends will help me. If I need help, I'll ask the person next to me, behind me, whoever, and they're always willing to help* (PRA-S, 7 January 2021, CP 1).
- *I would just ask my friends and say well what colour is it* (PRA-S, 29 June 2022, CP 2).
- *My friends just say which colour it is, then I can actually see the difference between them* (PRA-S, 19 November 2021, CP 3).
- *They help me with the colours* (I, 19 November 2021, CP 3).

- *Sometimes they help me with the colours. When I do homework or anything like that then I and I ask them. And sometimes when the teachers get angry with me, they say that I am colour blind* (PRA-S, 17 August 2022, CP 4).
- *He has got his own colour buddy and he's very proud of it and if he struggles and the teacher isn't nearby to help, he will say I need a red colour pencil and then the colour buddy will say that is a red, so that is how it works* (I, 8 September 2022, PP 4).

In addition to being supported by peers to differentiate and identify colours in class, some of the child-participants indicated that they had received emotional support from peers when sharing their collective experiences with one another. To elaborate, child-participant 2 provided the following explanation: *With my friends, sometimes we start talking about how I see the world and then they'll start talking about how they see it, and then we often compare and that can be quite interesting sometimes* (PRA-S, 29 June 2022, CP 2). Child-participant 1 shared a similar view and stated the following about his friends: *They give me enough support and I'm grateful that they don't tease me and they are curious to know how I see the world. ... They want to learn and know about it* (PRA-M9, CP 1), as depicted in Figure 4.6.

**Figure 4.6**

*Support received from friends as experienced by CP 1 (PRA-S, 18 October 2021, PRA-M9, CP 1)*



In elaboration, child-participant 1 indicated that he was able to overcome challenges because of the support he had received from his friends. He remarked, *It's not bad because I have friends that support me* (PRA-S, 7 January 2021, CP 1) and *Don't treat me differently to other people* (PRA-M9, CP 1). Child-participant 4 agreed and shared the view that friends *Support me emotionally* (PRA-S, 22 November 2022, CP 4). In confirmation, I reflected on this form of support received by the child-participants in the following way:

*Friends can be a great support to children living with CVD as they provide them with a community where they feel loved, respected and accepted. When friends do not allow this and do not provide a safe space for children with differences, they can feel alienated and alone* (RJ, 10 September 2022).

The participants shared mixed experiences regarding teachers and the support they had been receiving from teachers at school. Even though it appeared as if the child-participants had received some support from teachers, they were allegedly not accommodated adequately and in a way that allowed them to feel completely safe within the school environment in terms of the use of colour. In this regard, child-participant 1 commented, *Generally my friends will help but it would be great if more teachers knew and if they knew how to help. ... I wish they knew how to help me* (PRA-M9, CP 1). Child-participant 3 similarly indicated that he had not received sufficient support from his teachers and often experienced them as being unwilling in accommodating him in the classroom. When asked whether his teachers accommodated his CVD in the classroom, this participant simply indicated, *No* (PRA-S, 19 November 2022, CP 3). In elaboration, his parent said, *Sometimes I need to go and remind his teachers that he doesn't understand colour* (I, 23 July 2021, PP 3A) and, once teachers became aware *... they do support him* (I, 23 July 2021, PP 3A). In support of this report, I noted the following in my reflexive journal: *Support is also received at school, but it is often initiated by the child when needed, as teachers may not always remember to provide support or know when it is appropriate to do so* (RJ, 30 July 2021).

At the other end of the spectrum, child-participant 2 was reportedly informed by his teacher that he could apply for a concession or accommodation for CVD. His teachers then apparently supported him in applying for this with the IEB. In this regard, the participant's parent explained, *My child got his accommodation at school for his colour blindness. It was approved and everything, like it was the first time the school had ever put it through. I mean on an IEB level they are recognising CVD* (I, 33 August 2022, PP 2). This action implied that in an examination or test setting, child-participant 2 was granted permission to ask people what colour they were seeing and *... someone will be there to tell you what colour it is* (PRA-S, 29 June 2022, CP 2).

In summary, the participants indicated some levels of support received from teachers, especially when the teachers were made aware of the CVD. Excerpts such as the following attest to this experience:

- *I get good support when they know I am colour blind, I can go to their desk and they will tell me what colour it is* (PRA-S, 17 August 2022, CP 4).
- *Teachers support me, my teacher came to help me, and he helped me understand by explaining a diagram that had colours I couldn't see* (PRA-M9, CP 1).

#### **4.2.2.4 Sub-theme 2.4: Supportive devices/resources**

Even though limited reference was made to the use of supportive devices and resources, some participants indicated the use of such devices and resources in overcoming some CVD-related challenges. Participants, for example, referred to settings in games that are CVD-friendly and can be activated to make playing easier due to the ability to view alternative colours. Child-participant 1,

for example, stated, *In games people have, they have settings that you can change how they have certain options if you are colour blind* (PRA-S, 9 December 2022, CP 1). In confirmation, child-participant 3 said the following: *That's one of the reasons why Minecraft is one of my favourite games because One of the big Minecraft YouTubers, is colour blind, they made a setting for colour blind users that you can get* (PRA-S, 19 November 2021, CP 3).

The participants furthermore indicated that some organisations assist in creating awareness and making changes that can support people with CVD. In this regard, parent-participant 1B said, *I actually found out that there's a colour blindness Association in the UK* (I, 30 July 2021, PP 1B).

Three of the child-participants were provided with EnChroma glasses to wear for the duration of the intervention. These participants seemingly experienced positive differences in colour perception when wearing the glasses that, in turn, also positively influenced their emotional functioning. The following excerpts attest to this:

- *It helps me, yeah, so it's not like it will completely shift a certain colour. It would definitely help me to see it, can I say, more normal, like in a more normal way. But it definitely makes it more vibrant and makes me see it like wow, this is, this looks so nice* (PRA-S, 9 December 2022, CP 1).
- *Sometimes it just looks so black. Sometimes certain places just look so bland and dull, it's just like one shade all around, then when I put the glasses on, I can notice there's a few differences and that it's actually more vibrant* (PRA-S, 9 December 2022, CP 1).
- *It's just, it's helped me develop as in saying like wow, the world looks nice and I'm blessed to have an opportunity to see. Because I mean it's just a pair of glasses, but that's not just a pair of glasses, it's something that helps me see the world because I am different and I see the world different to other people* (PRA-S, 9 December 2022, CP 1).
- *They make the colours brighter so I can recognise and see them better* (PRA-S, 24 August 2022, CP 4).
- *It makes nature more beautiful because the colour is more beautiful* (PRA-S, 17 August 2022, CP 4).
- *He was quite focused on the glasses because he said he could see the colours much more clearly and distinguished from other colours than before the glasses, so that really helped. It really helped a lot* (I, 8 September 2022, PP 4).
- *I wear it with cricket so I can see the ball better* (PRA-S, 19 August 2022, CP 3).
- *... would wear the glasses and then he would say he couldn't believe this thing looks the way it does* (I, 29 August 2022, PP 1A).

Child-participant 4, however, reported experiencing some challenges when wearing the glasses for long periods of time. In this regard, he stated, *I see more colours, more brighter and it helps me*

*much more, but sometimes it hurts my eyes when I wear them for too long* (PRA-S, 24 August 2022, CP 4) and he experienced *... very big headaches* (PRA-S, 8 December 2022, CP 4) when wearing the glasses. As a result, this participant stopped wearing the glasses consistently. In compromising for the side effects he reportedly experienced, he implemented the following strategy: *After like 30 minutes the headache begins, so you can quickly put them on, look at the colour and then take them off. Yeah, but they work, they make some colours for sure brighter so you can identify them* (PRA-S, 8 December 2022, CP 4).

#### 4.2.3 Theme 3: Positive effect of a holistic intervention on children’s coping with CVD

In Theme 3, I report on the participants’ experiences of the intervention that was implemented as part of my study, and the value of the intervention, based on the data generated during and post-intervention with both the child- and parent-participants. In Table 4.3, I include the inclusion and exclusion criteria that apply to Theme 3.

**Table 4.3**  
*Inclusion and exclusion criteria for Theme 3*

THEME	INCLUSION CRITERIA	EXCLUSION CRITERIA
<b>Sub-theme 3.1</b> Power of being informed	All data referring to the power of being informed as well as the positive effect of this on children with CVD and others within their supportive systems.	Data related to the power of a changed mindset, children with CVD developing the confidence to voice their needs and experiences, or the positive effect of the intervention on their psycho-social functioning.
<b>Sub-theme 3.2</b> Power of a changed mindset	Data indicating the value of a changed mindset as a result of the holistic intervention that was implemented.	Data related to the power of being informed, children with CVD developing the confidence to voice their needs and experiences, or the positive effect of the intervention on their psycho-social functioning.
<b>Sub-theme 3.3</b> Becoming confident to voice needs and experiences	Data referring to the child-participants developing confidence and as a result being able to voice their needs and experiences to others.	Data related to the power of being informed and of a changed mindset, or of the positive effect of the intervention on the psycho-social functioning of the child-participants.
<b>Sub-theme 3.4</b> Positive effect on psycho-social functioning	All data referring to the positive effect of the intervention on the psycho-social functioning of the child-participants.	Data related to the power of being informed, a changed mindset or of the children with CVD becoming confident to voice their needs and experiences.

##### 4.2.3.1 Sub-theme 3.1: Power of being informed

Sub-theme 3.1 focuses on the power of being informed of a child’s CVD. The categories that apply to this sub-theme relate to the value experienced by the child-participants themselves when being informed of their condition (Category 3.1.1), the value for their parents, siblings and other family members (Category 3.1.2), and the value for their teachers and peers (Category 3.1.3).

#### 4.2.3.1.1 CATEGORY 3.1.1: VALUE OF BEING INFORMED FOR CHILDREN LIVING WITH CVD

The child-participants highlighted the importance of being informed of their CVD, having knowledge of their condition and understanding their associated support needs as well as how this knowledge may positively influence their ability to manage their condition and obtain support. In this regard, child-participant 4 mentioned, *I think it is important to know so I can manage it better than I'm doing now* (PRA-S, 17 August 2022, CP 4). This participant furthermore referred to the importance of people with CVD understanding the causes of the condition and how to explain these to others. By having such knowledge and feeling empowered the participants were seemingly better able to support themselves and inform others, as captured in the following contribution: *I think if I know I can express myself better and help me in different situations what I must say to some people and explain it better to some people who ask what is colour blindness* (PRA-S, 17 August 2022, CP 4) and, *... if I can tell them precisely what it is and things, then I think it will help* (PRA-S, 24 August 2022, CP 4). This view was echoed by child-participant 1 who stated, *People have asked questions and I haven't really known how to answer them because I never understood it, but I feel like now I understand a bit more about it* (PRA-S, 9 December 2022, CP 1).

The child-participants furthermore indicated that as a result of being informed and armed with knowledge, they were subsequently able to reframe their perception of their visual condition and understand the causes and that their CVD was due to factors beyond their control. This realisation seemingly positively influenced their self-image and supported their feelings of empowerment and self-confidence. Child-participant 4 elaborated on the value of being informed, saying, *I've learned that if you are colour blind that it is not always a bad thing* (PRA-S, 8 December 2022, CP 4). Child-participant 2 effectively summarised his similar experience as follows:

*I think it's very important for not only the people around you, but for the actual person that is colour blind to research about themselves. I think it's really helped me in understanding that ... It's not something that's wrong with me necessarily. It's not my fault. It's no one's fault. So, I think, it's really helped me in that sense* (PRA-S, 14 July 2022, CP 2).

In reflecting on these experiences shared by the child-participants, I compiled the following notes:

*The power of being informed facilitated positive change for the child-participants as having knowledge and understanding of their condition positively influenced their ability to manage their CVD and communicate effectively with others. I think it highlights that being informed not only enhances their communication skills but also significantly boosts their confidence and self-perception. The participants' insights highlight the crucial role education has in empowering individuals with CVD, which leads to a sense of control over their condition, and the ability to reshape their self-image in a positive light. This realisation affirms the importance of providing comprehensive information and support to individuals with CVD and other differences to promote their overall wellbeing and self-efficacy* (RJ, 15 December 2022).

The participants indicated that, by having a greater understanding of CVD, they felt more at ease when people asked them questions as they were able to respond and engage with the questions after being informed of CVD during the intervention. Being informed seemingly resulted in a sense of calmness and security, where the participants felt comfortable and confident to share their knowledge and experiences with others. In this regard, child-participant 2 stated the following: *People often ask a lot of questions at school, but I've grown to understand why. ... So, I didn't look at it from their perspective, but now as I've gotten older, I've been able to look at it from their perspective. ... So, I'm happier to answer their questions now* (PRA-S, 29 June 2022, CP 2). In support of this experience, child-participant 4 declared the following:

*I can tell the teacher more about colour blindness because I'm more learned and because I know more. And it can help me in some situations. And I can inform my new friends about it and tell them so they know ... I can inform them and tell them what colour blindness is and what it does and why is it, why am I colour blind* (PRA-S, 8 December 2022, CP 4).

Based on their reports, I noted the following: *When child-participants are given supportive resources, they feel empowered as these act as an aid that supports them when explaining their condition to others and enables them to share knowledge and explain how CVD affects them* (FN, 16 September 2022). The child-participants therefore seemingly felt empowered to share their knowledge with others to facilitate positive changes in their lives and in the lives of other children living with CVD. In this regard, child-participant 1 provided the following summary:

*Like me telling my teachers, me telling my friends and stuff, when they go out into the world and they meet more people with CVD, they already understand through me or through whoever they've met, say maybe somebody else you've done this intervention with. They already understand what CVD is and how to deal with people who have it and how they can better describe things, better show them things, and try and put themselves in our shoes and see how we see the world so that we can try and see how they see the world* (PRA-S, 9 December 2022, CP 1).

Parent-participant 4 shared this view and indicated that the resilience-enabling intervention had *... empowered my child* to make positive changes in his life (I, 8 September 2022, PP 4). Another participant echoed this view and felt that the intervention fostered *empowerment through knowledge* (PRA-S, 24 November 2022, CP 2). Closely aligned, parent-participant 4 felt empowered by the parent guidance intervention and shared the experience of relying on newly gained knowledge from the intervention to support her younger son with CVD, as captured in the following contribution:

*I spoke to my child about it, but I could not explain it to him like the way you did it, because afterwards he came home and told me. I did the same with the youngest one. So, I took him then and explained to him in a much easier way. This is what happens and so you are not that different from all the other kids, you are actually special* (I, 8 September 2022, PP 4).

In summary, the child-participants thus apparently benefitted from being informed about CVD and what it entails. Child-participant 2 remarked, *... knowledge is power ... knowledge is something no one can take away from you* (PRA-S, 15 September 2022, CP 2), thereby highlighting the enduring value of understanding CVD. Based on his contribution, I commented in my field notes that this participant *... emphasised the empowerment gained from knowledge, expressing that it enabled him to navigate his experiences more effectively* (FN, 29 June 2022). New knowledge thus seemingly empowered the child-participants to navigate their world more effectively, advocate for their needs, and find strategies to cope with the challenges they experienced. By being informed of their CVD, the child-participants could thus become active participants in managing their condition and safeguarding their wellbeing throughout their lives.

#### 4.2.3.1.2 CATEGORY 3.1.2: VALUE OF BEING INFORMED FOR PARENTS AND SIGNIFICANT OTHERS

The parent-participants indicated that the parent guidance intervention positively influenced them and increased their understanding of CVD, enabling them to develop a greater awareness of the challenges their children faced, and subsequently equipped them to better support and guide their children. In this regard, I noted the following in my reflexive journal: *Parents generally reported that the parent guidance intervention had a positive influence on them, particularly in terms of their understanding of CVD, how their child saw the world, and potential support strategies they could implement* (RJ, 9 September 2022). In support, parent-participant 1A stated the following:

*I did not know much about it [CVD], I mean for us, because my husband is colour vision deficient, which we knew, but it wasn't something that we would go into depth about as we thought it was just something that was funny to us, you know, and we always joked about it, but it definitely made it more serious for us in terms of like getting more information about it and also how they see the world because I was a bit irritated like I was like, when you look at it, why? Why are the pictures that you sent so dull? [Referring to the images included in the parent guidance intervention]. And then I realised that this is how colour vision deficient people see the world. And I was becoming irritated by why it is not bright enough, you know. So, they actually opened my eyes as well* (I, 29 August 2022, PP 1A).

Parent-participant 1A indicated the value of gaining a broader understanding by explaining how this assisted her to gain insight into the life of her child, stating, *I didn't realise that kids can actually get bullied because CP 1 has been fortunate that he hasn't been bullied in terms of being colour vision deficient* (I, 29 August 2022, PP 1A). Closely related, I compiled the following field notes: *As soon as parents develop greater awareness and start to show an understanding of their child's difference, they are better able to relate that, in turn, may allow their children to feel more at ease and accepted* (FN, 29 August 2022), thereby also implying a positive effect on parent-child relationships if parents were better informed.

By being more aware of CVD and what it implies, the parent-participants were reportedly able to also support their children by making adjustments such as the following:

- *I am also more aware of the colours that I buy for him* (I, 29 August 2022, PP 1A).
- *Being aware the whole time actually just helps to kind of be reminded the whole time. That's what I find for myself because I still fall in the traps. I still tell him, you know, the red one or the green one or the blue one or whatever. Even this afternoon, he wanted new highlighters, and I took out the highlighters for him and I gave him a green one, a yellow, pink and a blue one. And then I realised, I have to take away one either the yellow or the green ones because they're going to look exactly the same to him. So, it's like small, small things like that* (I, 9 June 2021, PP 7).

In addition to them becoming more aware of the possible consequences of CVD, the parents reportedly benefitted from the newly gained knowledge as this enabled them to explain CVD to their children as well as to their teachers. Parent-participant 4, for example, commented *... what our parents need to understand, to be able to explain it to the kids, but to explain it to the teachers as well, I think that is really important* (I, 8 September 2022, PP 4).

The parent-participants similarly indicated that the parent guidance intervention empowered them with information and increased levels of confidence to advocate for their children's needs within the school context. In this regard, parent-participant 3A said that the knowledge gained from the intervention *gives you a bit more power that you are in the right and that you can go, and question stuff and you can go to them because you have professional advice* (I, 31 August 2022, PP 3A). In support, parent-participant 4 referred to the value of *the videos and the information that you put on the group, I took it to the little one's teacher and explained to her* (I, 8 September 2022, PP 4). In reflecting on these experiences shared by the parents, I noted the following:

*Through the parent guidance intervention, parents gained a better understanding of their children's specific needs related to CVD. This boosted their confidence in supporting their children and advocating for their learning needs. They felt empowered to ensure their children received the necessary accommodations and recognised their role in securing these adjustments* (RJ, 9 September 2022).

Parent-participant 4 explained that she shared detailed information and examples with her child's teacher after becoming more informed of CVD. She said the following:

*... the interesting thing for me was understanding how colour blindness actually works physically. So, to understand the cones of the eye and to explain it that way to the child as well and to the teachers, because afterwards I went to my youngest one's teacher and I've explained it to him and some of the videos I shared with her so that she can also see how it works. So, yes that helped me, the whole inside of how colour blindness works physiologically. The whole part on self-esteem and self-resilience. It also helped, so those three I worked on a lot with my children* (I, 8 September 2022, PP 4).

In addition to sharing their newly gained knowledge with teachers, the parent-participants indicated that their increased awareness of CVD and the difficulties it presents for children could create an understanding amongst others, encouraging them to *share the information and make people aware of it. And parents will get their children tested. So, I think that's also a nice thing that came from the whole thing [the intervention]. And support and being a bit more forward with colour blindness* (PRA-S, 31 August 2022, PP 3A).

Overall, the parent-participants therefore indicated that the information and visual images shared with them during the parent guidance intervention brought about a deeper level of understanding, specifically in terms of how their children with CVD perceived and experienced the world. In this regard, parent-participant 2 said, *I'm just starting to see the way my child can see the classroom and the way he sees the board, and everything is so different. It just dawned on me, I didn't think of it and wasn't aware of this, I just never thought about it* (I, 30 August 2022, PP 2). This participant's awareness stemmed from her review of the contrasting images of what a typically sighted person would see *versus* what a person with CVD will see. The participant stated, *I kind of knew and I researched it, but until you actually see the pictures of what you're seeing and the fact that it's coming to you as information is quite important* (I, 30 August 2022, PP 2).

To summarise, the parents and significant others in the lives of the child-participants reportedly benefitted from being better informed of CVD and understanding the impact of CVD on their children's lives. This newfound knowledge apparently improved their ability to support and guide their children more effectively, allowing them to make informed decisions regarding daily adjustments and potential accommodations required within the school environment. Parents also reported increased confidence in advocating for their children's needs within the school setting, recognising the importance of such advocacy in ensuring appropriate support. Closely aligned, the intervention reportedly facilitated better communication with teachers and a deeper appreciation of the challenges faced by children with CVD.

#### **4.2.3.1.3 CATEGORY 3.1.3: VALUE OF BEING INFORMED FOR TEACHERS AND PEERS**

The child-participants reported that their teachers' increased awareness and knowledge of CVD and how to support children with CVD resulted in the teachers taking action to better accommodate the specific needs of the child-participants. According to the child-participants, teachers were better able to implement suitable strategies that could support them to overcome some of the difficulties faced in the classroom after being informed. In this regard, child-participant 1 stated that his teacher *... came to help me because he knew about it* (PRA-S, 7 January 2021, CP 1). Child-participant 4 similarly remarked, *Some will help me when I ask them* (PRA-S, 22 November 2022, CP 4).

The parent-participants confirmed these experiences, pointing out that teachers who were informed of their children's specific needs were able to act in the best interest of the children and better

accommodate their needs. Parent-participant 4 referred to the following example, where the parents had informed the teacher:

*We need to seat him at a place where there is more sufficient light and stuff like that. She immediately moved him and so she is much more aware of the need to accommodate these children in a certain way in order for them to be part of the class. So, it really helped ... so, with this process, the teacher immediately gave him a colour buddy ... and he feels very proud about it* (I, 8 September 2022, PP 4).

Child-participant 2 shared a similar view and believed, *If teachers were more aware of that, then maybe they'll be more sympathetic towards if there is someone colour blind in their class or the possibility that there could be, even if they don't know necessarily* (PRA-S, 1 September 2022, CP 2). In support, parent-participant 1A indicated that teachers who have been made aware of CVD can gain a better understanding of the condition and how it can influence learners. In this regard, the participant commented that the intervention:

*... created more awareness, especially at school you know, and in terms of the teachers, because a lot of teachers don't understand CVD because there are so many kids that are not diagnosed or, you know, people are not aware of it, so it helped with school and the teachers ... and it creates awareness obviously with his peers* (I, 29 August 2022, PP 1A).

In this regard, parent-participant 4 also indicated that, once her son's friends had been informed of CVD they were able to support her son more effectively. The participant stated the following:

*His friends also now know he is colour blind. So, he explained to them how it works and what happens. So, everyone is like we are going to help you. 'How do you see this colour, this is how we see this colour.' So, this created an openness about it that was not there before. It is really an openness between the friends, and I see it with my younger one as well* (I, 8 September 2022, PP 4).

Due to teachers' increased awareness and understanding of CVD, the child-participants reportedly experienced increased levels of support and accommodation in the classroom. Teachers, having gained insight into CVD, were as a result able to implement strategies and adjustments that could address the child-participants' specific needs, such as seating them in well-lit areas and providing them with colour buddies. According to the parents, informed teachers were better equipped to act in their children's best interests. In addition, an increased awareness among peers and friends could also benefit children with CVD in terms of being better understood and supported by others.

#### **4.2.3.2 Sub-theme 3.2: Power of a changed mindset**

The participants indicated that their perception of CVD changed as a result of the intervention they had participated in, with this reframing their thinking and outlook on the condition and its implications. The child-participants seemingly moved from experiencing feelings of pessimism and even anger about their condition to accepting it and being willing to focus on the positive. In explaining this

changed mindset, child-participant 2 remarked, *I shouldn't feel different, and I should actually feel unique instead of different, instead of alienated. And that there's nothing wrong with being different* (PRA-S, 24 November 2022, CP 2). In support of this contribution, child-participant 4 noted, *I feel really good because I know it is not a disability that I have colour blindness and that I am special too* (PRA-S, 8 December 2022, CP 4). Child-participant 3 similarly stated, *There's a bit more special about me than I thought* (PRA-S, 9 December 2022, CP 3).

Overall, the resilience-enabling intervention seemingly supported the child-participants in realising that CVD did not define them and that they could view their condition as a unique difference that could support them in various ways and that they deserved to be accommodated for. In support of this realisation, child-participant 2 said the following: *It's not my fault. There's just something ... It's my colour blindness. I'm not constantly thinking 'oh I'm stupid because I don't know my colours'* (PRA-S, 24 November 2022, CP 2). Another participant added, *... because I know some jobs it is good to have colour blindness and I realised I'm special, because not everyone has colour blindness* (PRA-S, 8 December 2022, CP 4). In further support, child-participant 2 noted pre-intervention, *I think I'm the only one in my class ... that's colour blind ... It feels not fair that they change it just for me, I think. So I just deal with it* (PRA-S, 29 June 2022, CP 2) yet commented post-intervention, *... if the teachers are more aware of it, then they can definitely be more accommodating* (PRA-S, 29 June 2022, CP 2).

When asked which advice they would give their younger selves based on their experiences after the intervention, the child-participants' responses highlighted and again confirmed the positive change in their mindset. They expressed a newfound understanding of themselves, greater acceptance of their differences, and increased levels of self-compassion. Child-participant 2, for example, remarked, *I would definitely tell myself that there's nothing wrong with me. It's not your fault, it's just a difference and there's nothing wrong with being different. And to turn it into a uniqueness* (PRA-S, 24 November 2022, CP 2). Child-participant 4 similarly said the following: *I would tell myself it is not a disability; you can get through it. And it's nice because it has its perks too. It is not a disability ... and you have your strengths and weaknesses to help you in difficult situations* (PRA-S, 8 December 2022, CP 4). In response to the same prompt, child-participant 1 shared the following contribution:

*You view the world in your own way, so don't take people's criticism and negative things that they say about the way you see the world because you're unique. You're your own person. ... It's just the way you were born. ... It's important to try and think what you like about your life and then continue to do those things, because that's important for your mental and physical health and spiritual health as well, psychological health* (PRA-S, 9 December 2022, CP 1).

In terms of this reported changed mindset on viewing CVD in a positive way rather than as a deficit, I noted the following in my reflexive journal:

*It seems the child-participants have unknowingly internalised the belief or have been forced to adopt the narrative that there was something wrong with them, and that they needed to adapt to the world around them rather than be accommodated. However, once they were empowered with knowledge, coping strategies and the understanding that they deserve empathy, understanding, acceptance and respect for their differences, their mindsets began to change and shift. The child-participants started to rewrite their narrative, moving towards a more hopeful and positive reality (RJ, 10 September 2022).*

In addition to becoming more accepting of and feeling more positive about their CVD, the child-participants apparently experienced a shift from being self-critical and insecure to feeling empowered and being more aware of their strengths and abilities. In explaining this experience, child-participant 2 stated, *I see myself in a certain light and that's not always correct. ... So, any like negative things that I see myself in are not always necessarily true, I think that [the intervention] kind of confirmed that* (PRA-S, 24 November 2022, CP 2). This participant continued by referring to the value of *... talking about my strengths because I had a lot more than I thought I did ... it filled me with more confidence than I had in myself, so I think that definitely helped* (PRA-S, 24 November 2022, CP 2). In support, another participant commented that the resilience-enabling intervention helped *me to express myself as in I can know personally what I'm good at, what I don't like, what my strengths are* (PRA-S, 9 December 2022, CP 1).

Closely aligned with the child-participants gaining self-confidence and accepting their condition, they seemingly moved from perceiving their view of the world as lacking value to acknowledging and valuing their different perception of the world. Child-participant 2 explained this as follows:

*... it's more about saying, oh, I get that you see it that way, that's alright. I see it this way and majority of us see it this way, but that's alright, you know ... not necessarily saying I'm right, you're right or I'm right, you're wrong. Just saying it's fine and, I guess, colours aren't that important, they're not the end of the world* (PRA-S, 1 September 2022, CP 2).

In support of this contribution, I reflected as follows: *... what's important to remember is that you see the world differently, but you still see beautiful things* (FN, 24 August 2022). I further noted in my reflexive journal, *... the child-participants' have changed their perceptions regarding how they view the world, now acknowledging that there is value in what they see, and that even if their view is different, the world can still be beautiful and interesting* (RJ, 10 September 2022). A parent-participant similarly commented, *... we on the same boat, but our ocean is different. So, we all see things differently and experience things differently* (I, 8 September 2022, PP 4). This same parent provided her son with another analogy to help him explain his difficulties to his teacher and shift the teacher's perspective. She advised him to say the following: *... go tell the teacher it's going to be difficult for you to run the comrades if you only have one leg or if you're in a wheelchair and that is how I felt when I did bad in this project, I did my best* (I, 8 September 2022, PP 4).

Next, the participants indicated how they had moved from feeling isolated and different, to realising that there were others who experienced the same difference as they and that as a result of their

participation in the holistic intervention they were not alone in the challenges they faced. The child-participants seemingly found the intervention to be *... quite helpful* (PRA-S, 24 November 2022, CP 2) in terms of it being *... informative in that ... there are other people out there that also suffer from it and that also sometimes struggle with it. And so, I'd say that it's been nice to also know that I'm not alone* (PRA-S, 24 November 2022, CP 2). The parent-participants similarly indicated that through their involvement in the parent guidance intervention, they came to realise that other parents were experiencing similar challenges with their children with CVD, and that they were not alone in the challenges they faced. In this regard, parent-participant 3A stated, *You feel that other parents go through the same things and that there are other kids that are also getting mocked* (I, 31 August 2022, PP 3A). Parent-participant 4 similarly remarked that the intervention supported her in knowing *... that there's other parents as well that feels the same* (I, 8 September 2022, PP 4).

In general, the intervention apparently encouraged a positive shift in how the parent-participants supported and approached their children. In this regard, parent-participant 3A noted the following:

*I think the whole thing was valuable, but I enjoyed the part about how you look at your child, meaning how you support him with positive feedback ... we used a lot was about how you relate to your child. That for me was the most important. Learning about how do you discipline, how do you reinforce, or are you very positive or are you more negative* (I, 31 August 2022, PP 3A).

This contribution highlights the value gained by the parents to support and build their children's self-esteem, while always taking into consideration the influence of their CVD. I reflected on this positive change in my reflexive journal in the following way:

*I have noticed a positive shift in the parent-participants' mindsets. Initially, they did not understand the need to consider their child's CVD when providing support, solving problems, and reacting to situations. Now, they see the importance of adapting their behaviour and reactions to their children, always being aware that CVD plays a role in all aspects of their child's life* (RJ, 9 September 2022).

According to the parent-participants, the mindset of the friends of the child-participants also changed as a result of the intervention, with their friends becoming more understanding and supportive. Parent-participant 4, for example, said, *I think it's such a beautiful thing to have them involved it's amazing so they're not laughing and teasing him anymore. They're helping with a whole focus shift of everything* (I, 8 September 2022, PP 4).

In summary, the intervention seemingly facilitated a shift in the mindset of both the child-participants and their parents regarding CVD. The children transitioned from feelings of pessimism, anger and self-criticism to acceptance, self-compassion and a positive outlook on their condition. They began to see their differences as unique strengths and no longer felt isolated or abnormal. This shift was mirrored by their parents who learnt to provide empathetic and supportive environments for their

children, recognising the importance of accommodating their needs. This newfound understanding similarly fostered a supportive approach and understanding among the children's peers.

#### 4.2.3.3 *Sub-theme 3.3: Becoming confident to voice needs and experiences*

The holistic intervention reportedly empowered the child-participants to voice their needs and experiences in a confident manner. This newfound confidence, in turn, positively influenced their lives, enabling both the child- and parent-participants to advocate for themselves and one another. To elaborate, the child-participants learnt how to articulate the challenges they experienced and the support they required, while the parent-participants felt empowered to support and uplift their children. In this way, the intervention fostered a proactive attitude, encouraging the participants to seek suitable accommodations and advocate for changes within their environments. Parent-participant 4 summarised this positive effect in the following way: *The information I've given them, the information you've given him that this whole intervention has given him. He now feels empowered by it and strong enough to stand up for himself* (I, 8 September 2022, PP 4).

As an example, child-participant 4, with the support of his parent, was able to overcome an incident at school by implementing strategies acquired during the intervention. To elaborate, when child-participant 4 received *... zero for colour* in a task (PRA-S, 16 September 2022, CP 4) due to his inability to see colours clearly, his parent encouraged him to explain his perspective to the teacher. She explained, *I told him go to the teacher and speak to her and explain to her how you felt like, tell her this is my best, but this is my best with my disability* (I, 8 September 2022, PP 4). In response, child-participant 4 went to his teacher, as captured in the following report: *I told her that I got zero marks for the colour and that she just must know that I am colour blind, so I struggle to see colour. And my mom and dad don't do my task for me, I must do them myself ... so she said she will mark it again* (PRA-S, 16 September 2022, CP 4). This conversation therefore demonstrates how this child-participant was able to confidently voice his needs, which marked a change from his previous tendency to simply accept situations without complaining. In summary, parent-participant 4 said the following about the intervention:

*... it's really empowered him to understand this is where I come from, this is who I am and this is how I'm going to deal with this instead of just crying and moping he has a plan in mind, in place to deal with this ... this [the intervention] had helped him a lot. ... He is looking at his challenge in a very different way than he did previously* (I, 8 September 2022, PP 4).

As a secondary outcome, parent-participant 4 remarked that the intervention had also positively influenced her younger son's self-image as she was able to support him to develop the ability to voice his needs and advocate for himself. The parent-participant stated the following: *It really helped self-image wise to help him to be a voice for himself, to go to the teacher and say this is my problem I am having or to put his hand up and say I can't see the colours could anyone please help me* (I, 8

September 2022, PP 4). Parent-participant 3A shared a similar experience involving her son who faced a CVD-related difficulty at school. After developing confidence and a sense of empowerment during participation in the intervention, she reportedly felt that her son deserved to be accommodated and directly addressed the challenge with his school. Parent-participant 3A explained this as follows:

*I actually went to school ... because this one child kept on mocking P3 and I asked the school why they allowing this and whether they going to do something or if I should take it to the parents ... then literally the next day they called in all the grade ... and then the school literally spoke to them on mocking about the glasses and mocking them about being different. They told them that they have different challenges. Then actually the school went a step further and actually I think the kids benefited from that (I, 31 August 2022, PP 3A).*

The child-participants seemingly valued the ability and confidence they gained to share their experiences and needs with others as it brought about change and accommodation within their lives. As a result, they seemed eager and willing to share their experiences with others following their participation in the intervention. In this regard, parent-participant 4 stated, *Before this whole intervention he wouldn't have even told me. He would just be like just leave it I am ... but now he is more like I am going to tell (I, 8 September 2022, PP 4).* Parent-participant 4 furthermore shared that her son became *much more open about the fact that he has a barrier so in the past, he would have had it and just be over it. Now it's like, this is who I am, and this is how I see things so, he would come and explain to us how he sees the world (I, 8 September 2022, PP 4).* In support, child-participant 1 stated that his skills developed throughout the intervention, saying the following: *... really helps me to express myself ... I've never spoken with anyone about it, so it's helped me to understand it more in a sense that. ... How can I word this, in a sense that I now know how to speak to people about it and it's helped me in that sort of aspect (PRA-S, 9 December 2022, CP 1).*

Closely aligned, the participants indicated a shift from feeling undeserving of support and accommodation within the classroom to realising that their differences should be acknowledged and that they had a right to receive the necessary support. In this regard, parent-participant 4, for example, mentioned that her son *... was crying, and he said this is unfair and this is the first time that he was realising this is unfair. All the other times he was like this is how it works, not anymore, he was like so it's unfair and we're going to do something about it (I, 8 September 2022, PP 4).* As a result of developing confidence and understanding the importance of voicing ones' needs, child-participant 1 seemingly developed a sense of moral obligation not only to stand up for himself but also to use his voice to the benefit of others with CVD. In this regard, the participant said:

*Some children with CVD are afraid to speak up and with other things some people are afraid to speak up. So, that's what's important for us, to speak up, but also for people to understand. ... I always just want to make a difference and change the world in a way for colour blind people, because I have it and it's like my experience and I want people to have an easy experience (PRA-S, 2 September 2022, CP 1).*

Child-participant 1 felt confident to share his experiences with his peers by placing one of the CVD pamphlets created for the intervention on a notice board at his school. He explained, *I stuck the poster on the board and some people will go read it. If someone asks me a question, I'll just go to the pamphlet on the board and I'll read what it says then to them and I'll make them understand to whatever level they need of understanding* (PRA-S, 9 September 2022, CP 1). In this regard, I noted the following: *He seems to have found the intervention very empowering as it has helped him understand his own power and how he can use his own internal resources and those resources around him to make positive changes in his life* (FN, 9 December 2022). Parent-participant 4 mentioned that she had also disseminated the CVD pamphlet to both her sons' teachers, saying, *We've printed it out so in my child's profile at school ... they can see yes, he's colour blind ... I took the booklet also to my little one's teacher for her to have a look and to keep so there's really much more awareness at the moment, I think it really helped* (I, 8 September, PP 4). Another example of the participants' active engagement in sharing their experiences with others is captured as follows:

*One thing I have done with my friends is I went online on the EnChroma website, they have the tests that you do with the circle and the numbers. So at school I had my iPad, I just like go on it and then my friends sitting around and I'm like okay everyone, if you want to, come take it. ... So people are doing it and then like when they see me do it, I'm like this is how I see it. I don't see this number, or I see this. It's just interesting so people can learn about it* (PRA-S, 9 December 2022, CP 1).

#### **4.2.3.4 Sub-theme 3.4: Positive effect on psycho-social functioning**

The resilience-enabling intervention and parent guidance intervention seemingly resulted in positive changes in the psycho-social functioning of the child-participants. By addressing both the emotional and social aspects of living with CVD, the intervention apparently fostered a sense of self-awareness, acceptance and positive self-identity amongst the child-participants. Additionally, it helped the child-participants to develop resilience-enabling skills, as captured in the following remark made by child-participant 4: *I for sure benefited because I learned more things that can help me through difficult times* (PRA-S, 8 December 2022, CP 4). Closely related, child-participant 2 stated that the intervention *really helped teach me, expand my knowledge on things that I already kind of was aware of. Because of the talks of resilience ... it helped me ... it brought to light the things that I didn't know* (PRA-S, 24 November 2022, CP 2). According to child-participant 2, people experiencing differences (such as CVD) may benefit from knowledge and the development of resilience-enabling coping strategies to overcome and deal with the challenges related to their differences, specifically CVD. In this regard, the participant commented as follows:

*If you have any difference, I feel like it's an important part of learning to deal with It ... I feel like that's the only way you can get through life if there's any sort of difference that you have or any sort of challenge, which is what it is, it's a challenge. So, I feel like resilience is definitely very important* (PRA-S, 24 November 2022, CP 2).

In support of this view, child-participant 1 also reflected on the importance of resilience-enabling coping skills to overcome challenges as well as the importance of the intervention in helping him identify how he had coped previously and how he could use the newly acquired resilience-enabling skills to cope better in future. He said the following:

*I've never spoken to anyone about my experiences, so now it's helped me to see how I handle those situations. And then moving away from colour vision deficiency, the wider experiences I've had with other aspects in life and using resources and being resilient. And having to play that out in the real world and in real life situations, after I've learned about it and before I've learned about it* (PRA-S, 9 December 2022, CP 1).

The child-participants reported an increase in terms of their self-awareness, specifically relating to their ability to understand their own feelings, identify their strengths and weaknesses, and know how to apply this knowledge to better support themselves. One of the participants explained the importance of developing self-awareness in the following way: *Self-awareness is the first step to improvement, self-improvement, I think. Because if we're aware of certain things that aren't beneficial to us that we do, we can take the steps in order to try to stop ourselves from doing it* (PRA-S, 24 November 2022, CP 2). In response to this, I noted in my field notes, *CP 2 has experienced an increased self-awareness, enabling him to recognise his strengths rather than only focusing on his weaknesses and limitations as he had done pre-intervention* (FN, 8 December 2022, CP 2). In further support, child-participant 2 commented, *The thing that helped the most out of everything was discussing my strengths and weaknesses* (PRA-S, 24 November 2022, CP 2), with me stating, *He seems to not be as hard on himself as he was at the start of the intervention, he is able to see the effort he puts in and not only measure his self-worth by the outcome* (FN, 8 December 2022, CP 2).

Another participant shared a similar experience of his development of an increased self-awareness and commented that the intervention sessions *... helped me to know myself much better* (PRA-S, 8 December 2022, CP 4). Child-participant 4 elaborated by saying, *The information about colour blindness and my toolbox, my strengths and weaknesses and the jobs colour blindness can help you to be better* (PRA-S, 8 December 2022, CP 4), referring to these as important aspects he gained from the intervention. In response to this comment, I remarked, *He has developed a greater awareness of who he is and how he can support himself* (FN, 8 December 2022, CP 4).

Closely aligned, child-participant 2 also reflected on how the sessions had increased his emotional awareness and allowed him to explore and understand his feelings about himself, saying, *It was only at the beginning that I started to realise that it's very possible that there were certain feelings that I felt when I was much younger are due to being colour blind, like emotionally* (PRA-S, 24 November 2022, CP 2). In response to this, I commented that the intervention seemed to have fostered *... emotional upliftment* (FN, 24 November 2022). Another participant reflected on the importance of such an understanding of his own feelings to be able to positively communicate with others. He namely said, *I need to understand how I feel so I can communicate with others how I feel, so they*

*know how to communicate with me* (PRA-S, 9 December 2022, CP 1). I reflected on these contributions in the following way: *During the intervention, participants were given a space to explore how CVD had influenced them emotionally throughout their lives. They did not need to pretend it did not bother them, and as a result, they felt emotionally empowered to consider their own feelings and make positive changes* (RJ, 15 December 2022).

In addition to mentioning increased levels of self-awareness and emotional awareness, the participants indicated that the holistic intervention supported the development of the child-participants' self-image. In this regard, parent-participant 4 stated that the intervention supported her son and *... really helped self-image wise to help him to be a voice for himself* (I, 8 September 2022, PP 4). In support, a child-participant expressed the same view and stated, *I think much better of myself* (PRA-S, 9 December 2022, CP 3). Another child-participant similarly noted, *I learnt that I'm probably better than I see myself* (PRA-S, 24 November 2022, CP 2), with this participant further commenting that the intervention sessions *... made me realise that I'm more than I think I am ... It's nice because, I guess, I don't think extremely highly of myself, I guess. So, it's nice to know that I'm wrong* (PRA-S, 8 September 2022, CP 2). Closely aligned, parent-participant 4 also mentioned that her son now *... has much more self-confidence* (I, 8 September 2022, PP 4).

Another positive outcome of the intervention relates to the participants learning to identify and utilise resources within their social ecologies to support them in overcoming CVD-related challenges. One of the child-participants highlighted this benefit by explaining how recognising and effectively utilising multiple support resources not only helped him address some challenges he faced but also resulted in a greater sense of accomplishment and self-confidence. He said the following:

*I was proud of myself for thinking about who can I ask for help and what resources can I use. ... There's a certain resource for a particular situation. So, in this situation my friends they couldn't help. ... My family, they can help but they don't know what I'm doing ... you could say the teachers were the most applicable in this situation* (PRA-S, 29 July 2022, CP 1).

Child-participant 1 indicated that an understanding of how to mobilise other people for support had resulted in him feeling less isolated and more empowered, as he no longer felt that he had to deal with everything by himself. This insight did not only increase his awareness of available support options but also equipped him with practical strategies to actively seek help, thereby reducing feelings of isolation and enhancing his overall experience of resilience. In this regard, he said:

*It's helped me because I've haven't really, no one's really like told me about how to use people as your resources ... it's really helped me to learn how to use people as my resources and learn that I actually have so many people around me and so many resources around me to help me and guide me ... I don't have to do everything by myself* (PRA-S, 9 December 2022, CP 1).

This child-participant shared an example of him relying on external resources for support, explaining that, *During exams or when I was finding my workload too much and I was under pressure, and I was really stressed ... I learned how to use my teachers as a resource to help me* (PRA-S, 9 December 2022, CP 1). In this regard, I noted the following about CP 1: *He seems to have found the intervention very empowering as it has helped him understand his own power and how he can use his own internal resources and those resources around him to make positive changes in his life* (FN, 9 December 2022, CP 1). Another participant similarly remarked that the intervention had positively supported his understanding of how to mobilise resources by saying, *I know how to use these people as resources really well* (PRA-S, 9 December 2022, CP 2).

According to parent-participant 3A, the intervention led to noticeable improvements in her son's emotional functioning as a whole. She observed, *I think he definitely felt less anxious and a bit more optimistic* (I, 31 August 2022, PP 3A). Similarly, another participant highlighted how the resilience-enabling skills he obtained as a result of the intervention had positively impacted his emotional functioning, noting that, *For example, if I start to overthink about certain things, I can catch myself and become more resilient, compose myself, and overcome the challenge instead of worrying about it* (PRA-S, 24 November 2022, CP 2).

In addition to applying their newly gained skills when dealing with CVD-related challenges, the child-participants reportedly used the knowledge they gained to face other difficult situations, with this boosting their self-esteem, self-perception and feelings of self-worth. Child-participant 1 illustrated this idea by sharing his experience of feeling overwhelmed by his workload. After seeking support from his teacher, he reportedly experienced a deep sense of pride, which was also shared by his parents. Child-participant 1 explained this incident as follows:

*My mother was also happy; she said well done for asking for help. My teacher sent a message to my mother saying that I came and spoke to them about my workload, and she was proud of me for doing that. Now, looking back, I feel very proud of myself because I know many people, even adults, would be too scared to ask for help if they were struggling* (PRA-S, 29 July 2022, CP 1).

According to the participants, the intervention also positively influenced the development of communication skills and the participants' ability to openly communicate with and express their needs to others. Parent-participant 4, for example, indicated, *The communication between me and the teacher improved a lot because there is much more openness and the information on how to deal with it in the classroom and for the child to deal with it in the classroom. That really helped a lot* (I, 8 September 2022, PP 4). In support, another participant stated that the intervention enabled him to *... understand how to communicate my feelings to others* (PRA-S, 9 December 2022, CP 2). Closely related, parent-participant 2 stated that the intervention *... opened communication for my child and me* (I, 8 August 2022, PP 2). One of the child-participants elaborated by saying, *It's just helped me to communicate with them about my colour vision deficiency, but not only that, also in*

*certain aspects of life ... I always tell them if I'm feeling a certain way, if they want me to do something or ask me a question, I'd say I'm feeling like this* (PRA-S, 9 December 2022, CP 1).

Child-participant 1 elaborated on the importance of developing supportive communication skills and said the following: *I feel like it's important to let other people know how you're feeling, because that can help you massively in life. I think that's an important life skill to learn how to communicate with others and to communicate especially about your own personal feelings* (PRA-S, 9 December 2022, CP 1). This participant continued by referring to the value he attributed to the development of good communication skills for sound relationships with others, saying, *They can piece the puzzle together and see how we see the world and just communicate with them and learn each difference and then you can grow closer and bond better with someone that way* (PRA-S, 9 December 2022, CP 1).

With regard to the effect of the supportive resources provided as part of the holistic intervention, the three child-participants who wore EnChroma glasses indicated that the glasses had had a positive impact on their emotional and social functioning. Child-participant 3, for example, remarked, *It's so nice to see colours and be able to tell them apart ... I'm much happier when I wear them* (PRA-S, 9 December 2022, CP 3). Similarly, child-participant 1 indicated that the glasses had boosted his confidence, enabling him to more easily explain his experiences of CVD to others. He said the following: *I was wearing my glasses and ... talking to this one boy and then we got talking about my glasses ... And then I had to explain. I showed him the diagram of how the cones overlap, and then I eventually got him to understand ... how it works* (PRA-S, 9 September 2022, CP 1). This participant added that wearing the glasses had positively altered his mood, saying, *When I put the glasses on it was like wow, it changes ... the mood* (PRA-S, 9 December 2022, CP 1). Additionally, child-participant 3 reported that the glasses made him *... feel more in control* contrasting with how he *... just felt a little bit different* before using the glasses (PRA-S, 19 November 2021, CP 3). This sentiment of excitement and contentment was echoed by child-participant 4, who simply stated, *It's just very nice* (PRA-S, 17 August 2022, CP 4), as well as by another participant who remarked, *It's very exciting* (PRA-S, 7 January 2021, CP 1).

In summary, I stated in my reflexive journal, *Collectively, the child-participants seem to have found the intervention valuable and believe it contributed positively to their emotional and social functioning and growth* (RJ, 15 December 2022). Closely aligned, one of the child-participants explained his perceived value of the intervention in the following way:

*Say you're playing a game and then you need a certain something to complete that mission, but somehow you face that mission without that thing. You've got to unlock it. And I feel like maybe the sessions might have been that thing to unlock what I've needed to face certain situations. Because this year alone when we started the sessions ... There's been a few situations, and I'm sure we've touched on them, of how I've actually used it in real life and how I will continue to use it if it ever comes about* (PRA-S, 9 December 2022, CP 1).

#### 4.2.4 Theme 4: Role players positively affected by the holistic intervention

In Theme 4, I report on the participants' experiences of the parties benefitting from the holistic intervention. I rely on data generated with the child- and parent-participants during the final phase of my study and structure my discussion in terms of the four identified sub-themes. Table 4.4 provides the inclusion and exclusion criteria relevant to Theme 4 and its identified sub-themes.

**Table 4.4:**  
*Inclusion and exclusion criteria for Theme 4*

THEME	INCLUSION CRITERIA	EXCLUSION CRITERIA
<b>Sub-theme 4.1</b> Children with CVD	All data referring to the intervention's positive impact on the participating children with CVD.	Data related to the positive effect of the intervention on the parents, significant others, teachers and peers of children with CVD or on other children.
<b>Sub-theme 4.2</b> Parents and significant others of children with CVD	All data related to the intervention's positive effect on parents and significant others of the participating children with CVD.	Data related to the positive effect of the intervention on children with CVD, their teachers, peers or other children.
<b>Sub-theme 4.3</b> Teachers and peers of children with CVD	All data related to the intervention's positive effect on teachers and peers of the participating children with CVD.	Data related to the positive effect of the intervention on children with CVD, their parents, significant others or other children.
<b>Sub-theme 4.4</b> Other children	All data referring to the intervention's positive impact on other children experiencing differences.	Data related to the positive effect of the intervention on children with CVD, their parents, significant others, teachers or peers.

##### 4.2.4.1 Sub-theme 4.1: Children with CVD

The participants shared the view that the holistic intervention positively influenced the functioning of the participating children living with CVD. The following excerpts attest to this result:

- *I for sure benefited* (PRA-S, 8 December 2022, CP 4).
- *I think it's helped me* (I, 9 December 2022, CP 1).
- *I don't even really think there's many negative comments because I haven't found anything bad about the sessions* (I, 9 December 2022, CP 1).

All four child-participants involved in the holistic intervention indicated that the intervention positively affected them, and that they found value in participating in it. The child-participants were requested to rate the resilience-enabling intervention out of 10 to determine their perceived value of the intervention. The rating scale was explained as a zero meaning that the intervention was not valuable at all, to 10 meaning that the intervention was of great value to the participant. Child-participants 2 and 3 rated the intervention 8 out of 10 (PRA-S, 24 November 2022, CP 2; PRA-S, 9 December

2022, CP 3), while child-participant 4 rated the intervention 9 out of 10 (PRA-S, 8 December 2022, CP 4) and child-participant 1 rating the intervention 10 out of 10 (PRA-S, 9 December 2022, CP 1).

The parent-participants agreed that the resilience-enabling intervention had positively affected their children with CVD by empowering them and supporting them on a psycho-social level. This experience of the resilience-enabling intervention by the parent-participants is captured in the following contributions:

- *It's really empowered him. ... this had helped him a lot. ... For me as a parent it empowered my child* (I, 8 September 2022, PP 4).
- *He now feels empowered by it and strong enough to stand up for himself and I'm so happy about that* (I, 8 September 2022, PP 4).
- *I think he definitely felt less anxious and a bit more optimistic* (I, 31 August 2022, PP 3A).

When asked to make recommendations for improvement of the intervention, child-participant 2 indicated that the holistic intervention could have been even more beneficial in supporting his emotional and social functioning if he had received the support when he was younger. In this regard, he stated that the intervention would have benefitted him more *If I was younger, I think, definitely if I was younger* (PRA-S, 24 November 2022, CP 2).

#### **4.2.4.2 Sub-theme 4.2: Parents and significant others of children with CVD**

The participants shared the view that the holistic intervention positively influenced the child-participants' parents and significant others in their lives. The following excerpts attest to this:

- *It was honestly very great. I learned a lot* (I, 31 August 2022, PP 3A).
- *I would just like to say that the intervention was brilliant. It was really well constructed and had so much valuable information. It was just such a great experience, and I really enjoyed it* (I, 31 August 2022, PP 3A).
- *It really helped me* (I, 8 September, PP 4).
- *It was definitely a positive experience* (I, 29 August 2022, PP 1A).

In addition to mentioning a general positive experience of the intervention, the participants indicated that the holistic intervention increased the levels of awareness of CVD of parents and significant others as well as their knowledge of how they could more effectively support children with CVD. The following excerpts provide examples of these experiences of the parents:

- *I really think everything was helpful and I also feel you can't get too much information and because what doesn't help me will help another mum or dad. ... what will help me won't definitely help the next one but to me it was helpful, it was really helpful* (I, 8 September 2022, PP 4).

- *It really opened my eyes because I did not think of things like career choices and things like that when it came to being colour vision deficient* (I, 29 August 2022, PP 1A).

Besides the value gained from the intervention, one of the parents indicated that the intervention was similarly valuable and positively influenced her support of her other son who also had CVD. In this regard, parent-participant 4 stated, *My youngest one is 7 and is also colour blind. So, I can use this with him now. So, I used it for both boys* (I, 8 September, PP 4). Additionally, this participant mentioned, *I applied it to my little one. I know he wasn't a part of this whole programme, but I spoke to him about it a lot because he had a very low self-esteem ... I could use this knowledge to help him* (I, 8 September 2022, PP 4). Child-participant 4 echoed this view, saying that he could use the knowledge and skills he had gained from the intervention to support his younger brother: *I can talk to him and help him when he struggles* (PRA-S, 22 November 2022, CP 4). Commenting on this occurrence, I captured the following in my reflexive journal:

*An additional exciting outcome of the intervention is the ripple effect it has created, extending its benefits beyond the immediate participants to influence others in their lives. The knowledge and skills gained by the participants have been shared with others, indirectly benefitting additional children* (RJ, 15 December 2022).

Some of the parent-participants indicated that the knowledge and skills they had acquired as a result of the intervention would have been helpful and useful when their children with CVD were younger. They shared the belief that early intervention is necessary, and that the holistic intervention could have provided them with the appropriate knowledge and tools they needed to effectively support and guide their children with CVD during their early childhood years. In this regard, parent-participant 4 indicated, *If I had this information 13 years or six years ago in the past, it would have helped me a lot to deal with the teachers and to deal with everything* (I, 8 September 2022, PP 4). In support, another parent-participant stated, *... if I had something like this available to me when my son was younger it would have been amazing and made things a lot easier ... The intervention did make me more aware now and that's quite irritating cause I needed that info before* (I, 33 August 2022, PP 2).

Two parent-participants who worked in the healthcare profession commented that the intervention was helpful; however, they shared the belief that it could be more beneficial for parents who had less knowledge or awareness of possible supportive measures to implement with their children. In this regard, parent-participant 4 said, *I think other parents would benefit more, because of the work I am in I am already more focused on focusing on yourself, self-esteem and resilience and everything of the child, but especially other people and other parents would definitely benefit from this* (I, 8 September 2022, PP 4). Another participant remarked, *I did my masters in emotional intelligence when I was pregnant with him and his first couple of years and some of the information I did know because of my profession, so we use it a lot, self-image and self-resilience ... but I think for other parents that would be quite helpful* (I, 8 September, PP 2).

In line with the parents' positive experiences of the intervention, child-participant 2 explained that his mother had always been *... very aware of my colour blindness and was already very accommodating* (PRA-S, 24 November 2022, CP 2). However, the intervention deepened his mother's understanding and awareness of the specific challenges he faced. In this regard, he stated, *When you did the intervention with her, she kind of like I would struggle with something and then she'd go 'oh yeah, that's probably because of that, I've never thought of that before'* (PRA-S, 24 November 2022, CP 2). This contribution captures the child-participant's view of the value of the holistic intervention for his parent in terms of the parent's understanding and support to him.

#### 4.2.4.3 **Sub-theme 4.3: Teachers and peers of children with CVD**

The participants indicated that teachers of the child-participants also benefitted from the intervention as they allegedly became more aware of CVD, the difficulties it presents and how they can support and accommodate children with CVD. The following excerpts attest to this perception:

- *I took the booklet also to my little one's teacher for her to have a look and to keep so this really much more awareness at the moment, I think it really helped* (I, 8 September 2022, PP 4).
- *... it helped with school and the teachers were also very interested in hearing about it* (I, 29 August 2022, PP 1A).
- *I sent some of the stuff to the teachers, because I really think some of the teachers can also guide children with this, this type of* (I, 31 August 2022, PP 3A).
- *Especially the positive reinforcement. I think it's also important for teachers because teachers work with so many children and are rushed and so they've got a lot of academic stuff to get through. I already sent some of your info through to the teachers* (I, 31 August 2022, PP 3A).

In addition to the parents sharing the information gained from the parent guidance intervention with their children's teachers, some participants apparently also shared the information with other teachers they know. In this regard, parent-participant 3A, for example, said, *I even shared some of the information with the teachers I know because I felt it was so valuable and that they needed to know about this kind of stuff* (I, 31 August 2022, PP 3A).

The participants also indicated that the intervention could be beneficial to the peers of children with CVD. In this regard, parent-participant 4 stated, *I think it's such a beautiful thing to have them involved it's amazing so they're not laughing and teasing him anymore. They're helping with a whole focus shift of everything* (I, 8 September 2022, PP 4). This parent furthermore stated that the information from the intervention could be *... empowering for his friends* (I, 8 September 2022, PP 4). In support, parent-participant 1A stated, *It creates awareness obviously with their peers and stuff like that* (I, 29 August 2022, PP 1A) while another parent was of the view that teachers could *implement that in their class even if it is just in general for the other kids as well* (I, 31 August 2022, PP 3A).

#### 4.2.4.4 Sub-theme 4.4: Other children

The participants seemingly believed that the knowledge and skills gained from the intervention could positively support other children, including children with differences, for example, those experiencing learning or behavioural difficulties. In this regard, parent-participant 3A commented, *It was really something that I could actually apply to all children. So that for me was really, really informative. I really enjoyed that. It was not only about the colour blindness. It just was really a very comprehensive and supportive tool* (I, 31 August 2022, PP 3A). In support, another participant stated the following:

*I think you can also apply some of those principles to not only colour vision deficient kids because my friend has a daughter who is a dyslexic, so some of the things I was like, OK, you can actually extract some of that information and apply it to some other kind of a challenges or disabilities that your child might be experiencing* (I, 29 August 2022, PP 1A).

In another example, parent-participant 3A reportedly experienced a situation at school with her son being bullied, resulting in her utilising the skills she had gained from the intervention to approach the school. As a result of this interaction the school allegedly *... called in all the grade sixes and then the school literally spoke to them on ... mocking them about being different* (I, 31 August 2022, PP 3A). The parent added, *Maybe some children benefited from it and hopefully the kids will think twice before mocking a child for being or for having a disability, or even just maybe being a bit different* (I, 31 August 2022, PP 3A).

The participants shared the view that the intervention could positively affect other children with CVD within the school environment. If they were to share their knowledge and resources gained from the intervention with those around them, especially teachers, other children with CVD and learning differences could benefit in the future. In this regard, child-participant 2 stated that an awareness created by the intervention could support *... not even just for that child, but for any future students that they have* (PRA-S, 24 November 2022, CP 2). Another participant similarly noted, *It's also going to help people coming up in the future and it's going to help everybody, every different person* (I, 9 December 2022, CP 1). In elaboration, child-participant 1 stated the following:

*This is something that's going to help those people to understand themselves better and understand how they can teach people about CVD. Teach people about how they can better themselves and better their explanations and better their answers to other people if they don't know the answer or if they want to find a different way* (I, 9 December 2022, CP 1).

In support of this view held by the child-participants, parent-participant 3A believed that the intervention could lead to positive changes for other children with CVD. She stated, *I think because of colour blindness and speaking up, more people will actually understand and also share the information and make people aware of it and parents will get their children tested. So, I think that's also a nice thing that came from the whole thing* (I, 31 August 2022, PP 3A). Another child-participant

similarly mentioned, *Telling my teachers, me telling my friends and stuff, when they got out into the world and they meet more people with CVD, they already understand through me or through whoever they've met, say maybe somebody else you've done this intervention with* (I, 9 December 2022, CP 1).

### 4.3 QUANTITATIVE RESULTS OF THE STUDY

Quantitative data was generated both pre- and post-intervention in support of the qualitative data, with the secondary aim of comparing the pre-intervention and post-intervention quantitative results to gain insight into the possible value of the resilience-enabling intervention. Quantitative data was obtained through the BYI-II and projective assessment measures administered both pre- and post-intervention with the participants.

#### 4.3.1 Results obtained from the BYI-II

The BYI-II was administered with all four child-participants involved in the holistic intervention both pre- and post-intervention to gain an understanding of their emotional and social functioning before and after participating in the intervention. These two data sets are compared for all four participants to gain insight into the effect of the resilience-enabling intervention on their functioning and identify any changes observed in terms of self-concept, anxiety, depression, anger and disruptive behaviour. Tables 4.5 to 4.8 and Figures 4.7 to 4.10 summarise the BYI-II scores obtained by the participants pre- and post-intervention and indicate the differences between these scores per participant.

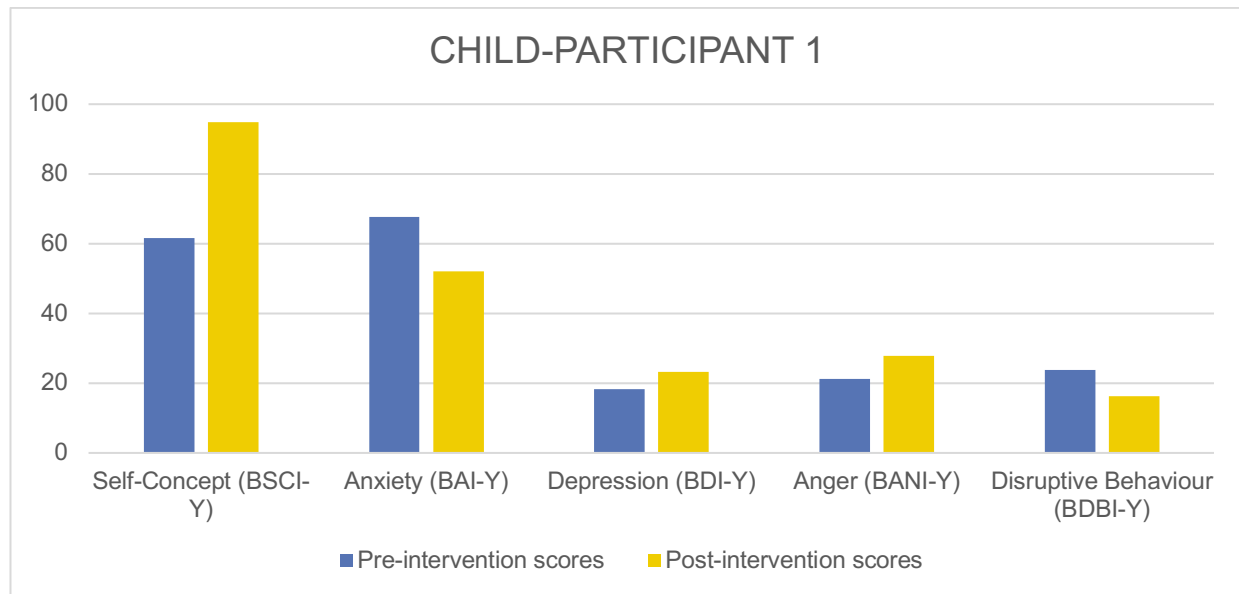
**Table 4.5**

*Pre- and post-intervention BYI-II scores and differences for child-participant 1*

CHILD-PARTICIPANT 1 BYI-II SCORES					
Inventory	Pre-intervention/ Post-intervention	Percentile score	Interpretive Guidelines		Difference
Self-Concept (BSCI-Y)	Pre	61.6%	Average	+33.3%	Increase by 33.3%
	Post	94.9%	Moderately elevated		
Anxiety (BAI-Y)	Pre	67.7%	Average	-15.7%	Decrease by 15.7%
	Post	52%	Lower than average		
Depression (BDI-Y)	Pre	18.2%	Much lower than average	+5%	Increase by 5%
	Post	23.2%			
Anger (BANI-Y)	Pre	21.2%	Much lower than average	+6.6%	Increase by 6.6%
	Post	27.8%			
Disruptive Behaviour (BDBI-Y)	Pre	23.7%	Much lower than average	-7.5%	Decrease by 7.5%
	Post	16.2%			

**Figure 4.7**

Comparison of pre- and post-intervention *BYI-II* scores for child-participant 1



As indicated in Table 4.5 and Figure 4.7, the results obtained pre- and post-intervention indicate a significant difference in the scores for child-participant 1's self-concept and anxiety inventories. This indicates that child-participant 1 moved 33.3% higher in self-concept within the sample population and experienced a decrease of 15.7% for anxiety symptoms. These results suggest that the resilience-enabling intervention had a significant positive effect on child-participant 1's self-concept, the development of his self-esteem and his overall levels of anxiety. The post-intervention results on the depression, anger and disruptive behaviour inventories fall within the Much lower than average range, suggesting scores that are age appropriate and not areas of concern.

**Table 4.6**

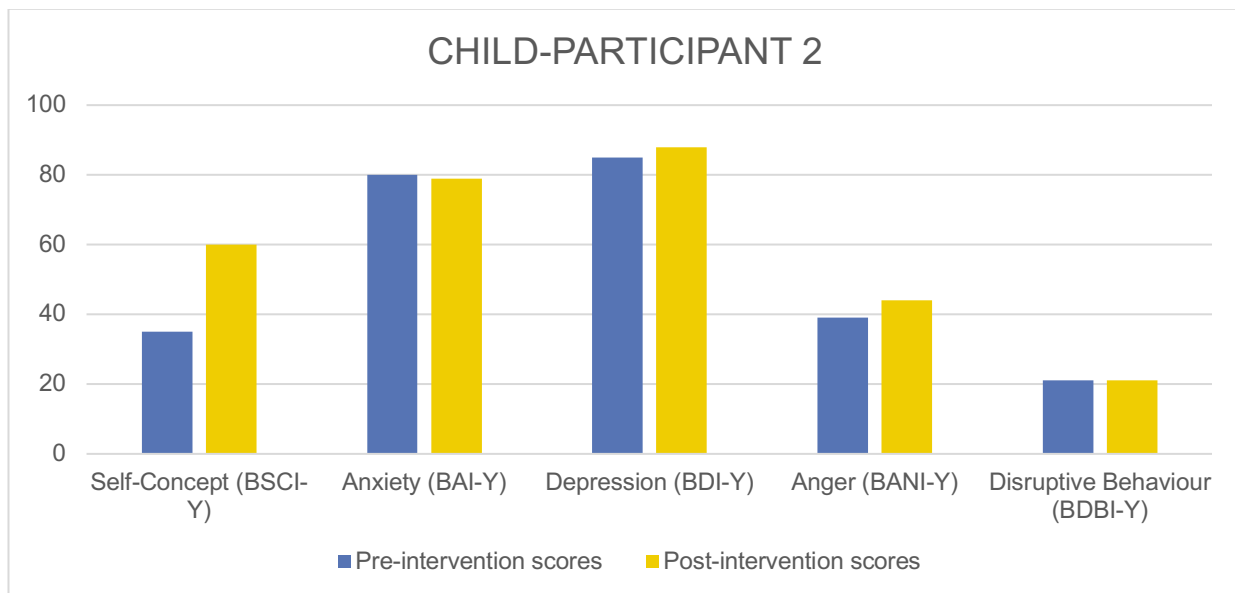
Pre- and post-intervention *BYI-II* scores and differences for child-participant 2

CHILD-PARTICIPANT 2 <i>BYI-II</i> SCORES					
Inventory	Pre-intervention/ Post-intervention	Percentile score	Interpretive Guidelines	Difference	
Self-Concept (BSCI-Y)	Pre	35%	Much lower than average	+25%	Increase by 25%
	Post	60%	Mildly elevated		
Anxiety (BAI-Y)	Pre	80%	Mildly elevated	-1%	Decrease by 1%
	Post	79%			
Depression (BDI-Y)	Pre	85%	Mildly elevated	+3%	Increase by 3%
	Post	88%			
Anger (BANI-Y)	Pre	39%	Lower than average	+5%	Increase by 5%
	Post	44%	Average		

CHILD-PARTICIPANT 2 BYI-II SCORES					
Inventory	Pre-intervention/ Post-intervention	Percentile score	Interpretive Guidelines	Difference	
Disruptive Behaviour (BDBI-Y)	Pre	21%	Much lower than average	0%	No change
	Post	21%			

**Figure 4.8**

Comparison of pre- and post-intervention BYI-II scores for child-participant 2



As indicated in Table 4.6 and Figure 4.8, the results obtained pre- and post-intervention indicate a significant increase in the score for child-participant 2's self-concept scale, pointing to the participant experiencing a positive increase of 25% in terms of the symptoms associated with a healthy self-concept. This result suggests that the resilience-enabling intervention had a significant positive effect on child-participant 2's self-concept and the development of his self-esteem. The differences between his pre- and post-intervention results on the anxiety, depression, anger and disruptive behaviour inventories are not significant and are therefore not regarded as areas of concern.

**Table 4.7**

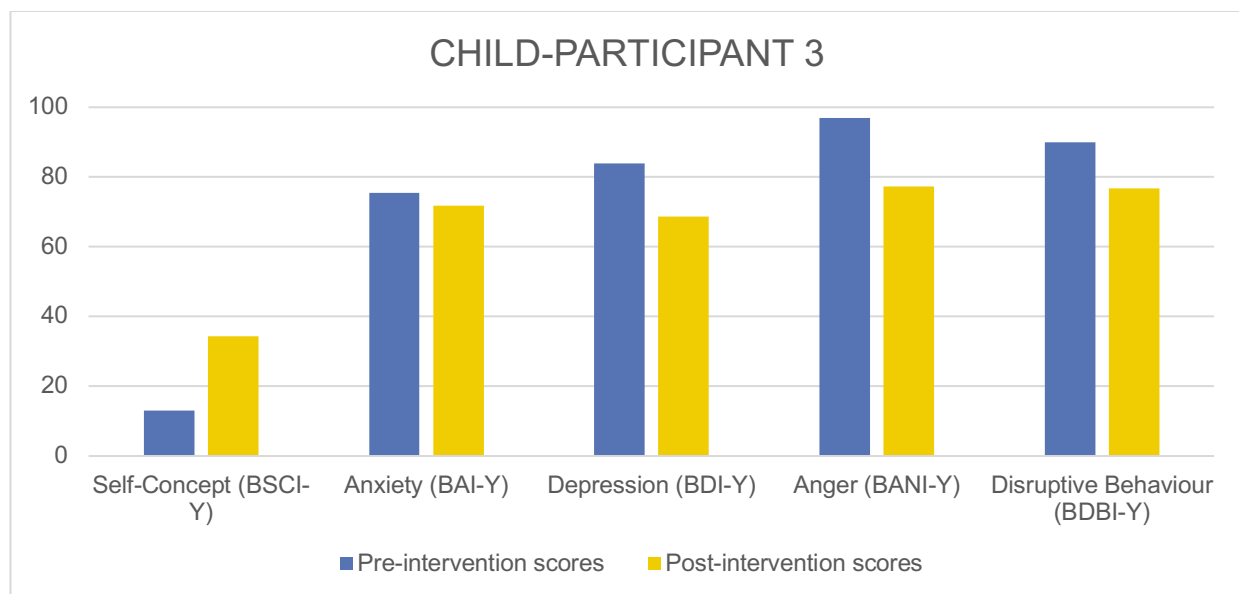
Pre- and post-intervention BYI-II scores and differences for child-participant 3

CHILD-PARTICIPANT 3 BYI-II SCORES					
Inventory	Pre-intervention/ Post-intervention	Percentile score	Interpretive Guidelines	Difference	
Self-Concept (BSCI-Y)	Pre	13.1%	Much lower than average	+21.2%	Increase by 21.2%
	Post	34.3%			
Anxiety (BAI-Y)	Pre	75.4%	Mildly elevated	-3.7%	Decrease by 3.7%
	Post	71.7%			

CHILD-PARTICIPANT 3 BYI-II SCORES					
Inventory	Pre-intervention/ Post-intervention	Percentile score	Interpretive Guidelines		Difference
Depression (BDI-Y)	Pre	83.9%	Mildly elevated		
	Post	68.7%	Average	-15.2%	Decrease by 15.2%
Anger (BANI-Y)	Pre	97%	Extremely elevated		
	Post	77.3%	Mildly elevated	-19.7%	Decrease by 19.7%
Disruptive Behaviour (BDBI-Y)	Pre	89.9%			
	Post	76.8%	Mildly elevated	-13.1%	Decrease by 13.1%

**Figure 4.9**

*Comparison of pre- and post-intervention BYI-II scores for child-participant 3*



As indicated in Table 4.7 and Figure 4.9, the results obtained pre- and post-intervention indicate a significant increase in the score for child-participant 3's self-concept inventory as well as a decrease in the scores of the depression, anger and disruptive behaviour scales. This indicates that child-participant 3 experienced a positive increase of 21.2% in terms of the symptoms associated with a healthy self-concept and a decrease of 15.2% for depressive symptoms, a decrease of 19.7% for anger symptoms and a decrease of 13.1% for disruptive behaviour symptoms. These results suggest that the resilience-enabling intervention had a significant positive effect on child-participant 3's overall emotional functioning, specifically in terms of his self-concept, the development of his self-esteem and his overall levels of anger, depressive symptoms and disruptive behaviour symptoms.

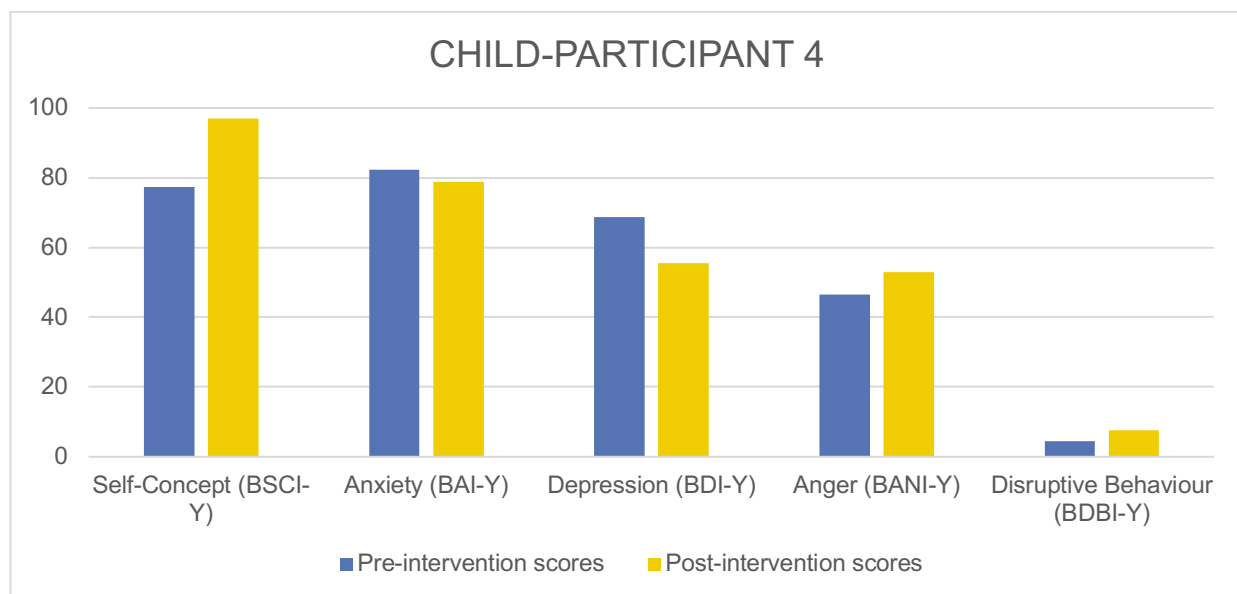
**Table 4.8**

*Pre- and post-intervention BYI-II scores and differences for child-participant 4*

CHILD-PARTICIPANT 4 BYI-II SCORES					
Inventory	Pre-intervention/ Post-intervention	Percentile score	Interpretive Guidelines		Difference
Self-Concept (BSCI-Y)	Pre	77.3%	Mildly elevated	+19.7%	Increase by 19.7%
	Post	97%	Moderately elevated		
Anxiety (BAI-Y)	Pre	82.3%	Mildly elevated	-3.5%	Decrease by 3.5%
	Post	78.8%			
Depression (BDI-Y)	Pre	68.7%	Average	-13.1%	Decrease by 13.1%
	Post	55.6%			
Anger (BANI-Y)	Pre	46.5%	Average	+6.5%	Increase by 6.5%
	Post	53%			
Disruptive Behaviour (BDBI-Y)	Pre	4.5%	Much lower than average	+3.1%	Increase by 3.1%
	Post	7.6%			

**Figure 4.10**

*Comparison of pre- and post-intervention BYI-II scores for child-participant 4*



As indicated in Table 4.8 and Figure 4.10, the results obtained pre- and post-intervention indicate a significant increase in the scores for child-participant 4's self-concept and a decrease in the score of the depression scale. This indicates that child-participant 4 experienced a positive increase of 19.7% in terms of the symptoms associated with a healthy self-concept and a decrease of 13.1% for depressive symptoms. These results suggest that the resilience-enabling intervention had a significant positive effect on child-participant 4's self-concept, the development of his self-esteem as well as his overall reduced level of depressive symptoms. A decrease of 3.5% in anxiety symptoms

occurred even though this is not considered to be significant. The post-intervention results obtained on the anger and disruptive behaviour scales fall within the Lower than average range, suggesting that these scores are age appropriate and not areas of concern.

An analysis of the pre- and post-intervention BYI-II results for the child-participants therefore indicates a significant positive effect of the intervention in terms of their self-concept. This positive increase in the scores of the various participants implies that the resilience-enabling intervention coupled with the parent guidance intervention positively affected their emotional and social functioning. Table 4.9 and Figure 4.11 provide a summary and visual representation of the four child-participants' pre- and post-intervention results for the self-concept scale.

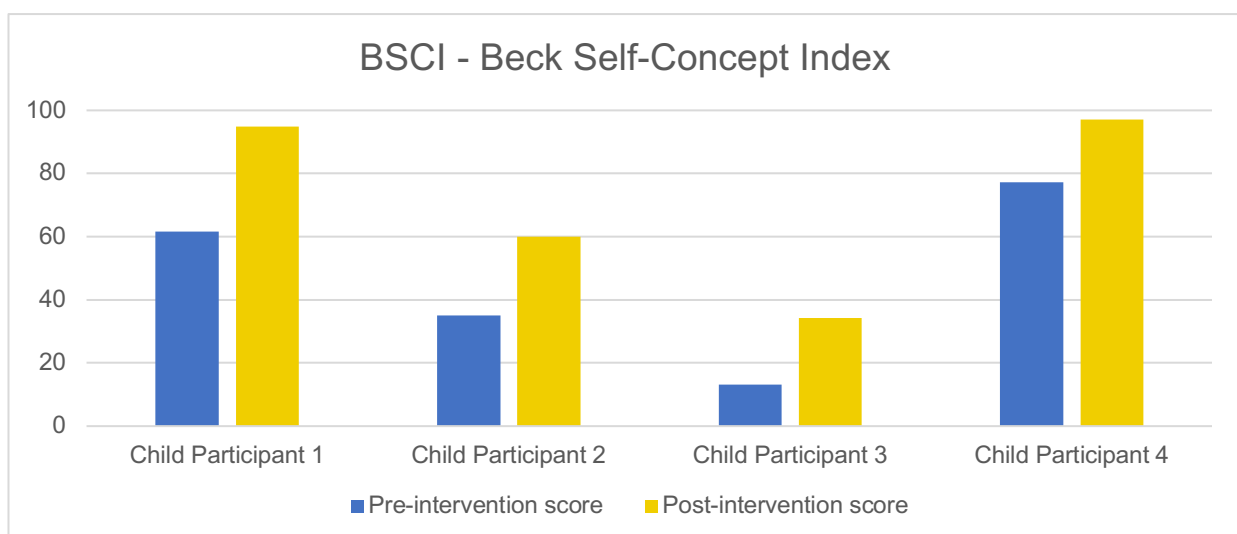
**Table 4.9**

*Pre- and post-intervention self-concept index scores and differences for the four child-participants*

BSCI - BECK SELF-CONCEPT INDEX SCORES					
Participant	Pre-intervention/ Post-intervention	Percentile score	Interpretive Guidelines		Difference
1	Pre	61.6%	Average		
	Post	94.9%	Moderately elevated	+33.3%	Increase by 33.3%
2	Pre	35%	Much lower than average		
	Post	60%	Mildly elevated	+25%	Increase by 25%
3	Pre	13.1%	Much lower than average		
	Post	34.3%		+21.2%	Increase by 21.2%
4	Pre	77.3%	Mildly elevated		
	Post	97%	Moderately elevated	+19.7%	Increase by 19.7%

**Figure 4.11**

*Pre- and post-intervention self-concept index scores for the four child-participants*



As captured, the scores obtained by the various participants indicate a positive increase in all four child-participants' scores, which suggests that the intervention positively influenced their emotional and social functioning, more specifically having a positive effect on their self-concepts, and by implication their levels of self-esteem for all four the child-participants. Next, the results obtained for the anxiety index are summarised for the four child-participants in Table 4.10 and Figure 4.12.

**Table 4.10**

*Pre- and post-intervention anxiety index scores and differences for the four child-participants*

BAI - BECK ANXIETY INDEX SCORES					
Participant	Pre-intervention/ Post-intervention	Percentile score	Interpretive Guidelines		Difference
1	Pre	67.7%	Average	-15.7%	Decrease by 15.7%
	Post	52%	Lower than average		
2	Pre	80%	Mildly elevated	-1%	Decrease by 1%
	Post	79%			
3	Pre	75.4%	Mildly elevated	-3.7%	Decrease by 3.7%
	Post	71.7%			
4	Pre	82.3%	Mildly elevated	-3.5%	Decrease by 3.5%
	Post	78.8%			

**Figure 4.12**

*Pre- and post-intervention anxiety index scores for the four child-participants*

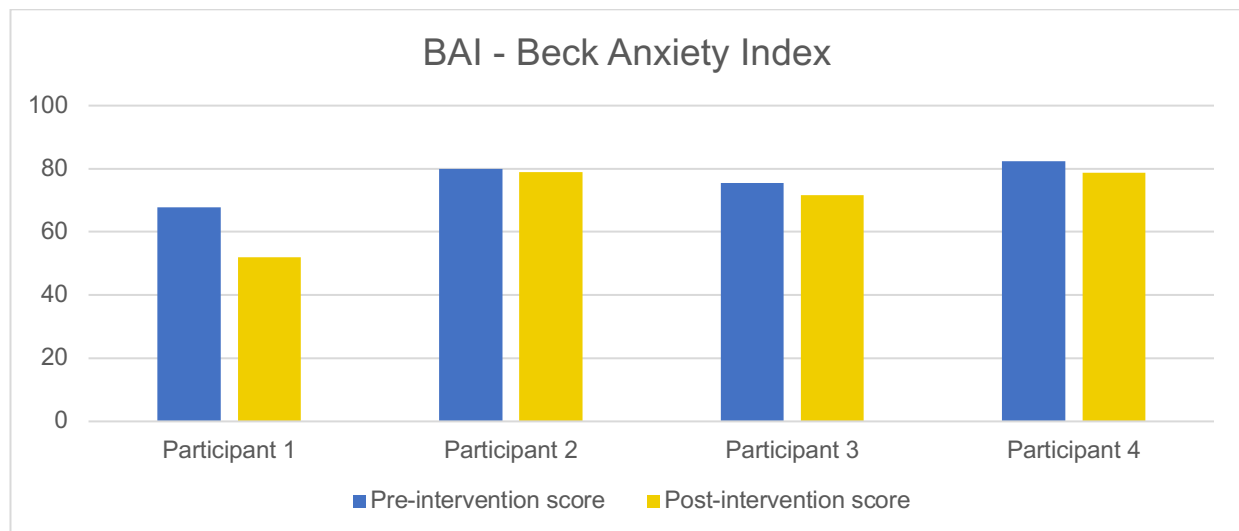


Table 4.10 captures the pre- and post-intervention percentile scores and interpretive guidelines for the Beck anxiety inventory while Figure 4.12 provides a visual representation of the various child-participants' scores. In all four cases, the scores indicate a decrease in the anxiety levels of the participants. Even though the differences in the scores are not significant for all four participants; due to all of them experiencing a decrease in anxiety symptoms, it may be deduced that the

intervention had an overall positive effect on the anxiety levels of the participants. Next, in Table 4.11 and Figure 4.13 I provide a summary of the scores obtained by the various participants on the Beck depression inventory.

**Table 4.11**

*Pre- and post-intervention depression index scores and differences for the four child-participants*

BDI - BECK DEPRESSION INDEX SCORES					
Participant	Pre-intervention/ Post-intervention	Percentile score	Interpretive Guidelines		Difference
1	Pre	18.2%	Much lower than average	+5%	Increase by 5%
	Post	23.2%			
2	Pre	85%	Mildly elevated	+3%	Increase by 3%
	Post	88%			
3	Pre	83.9%	Mildly elevated	-15.2%	Decrease by 15.2%
	Post	68.7%	Average		
4	Pre	68.7%	Average	-13.1%	Decrease by 13.1%
	Post	55.6%			

**Figure 4.13**

*Pre- and post-intervention depression index scores for the four child-participants*

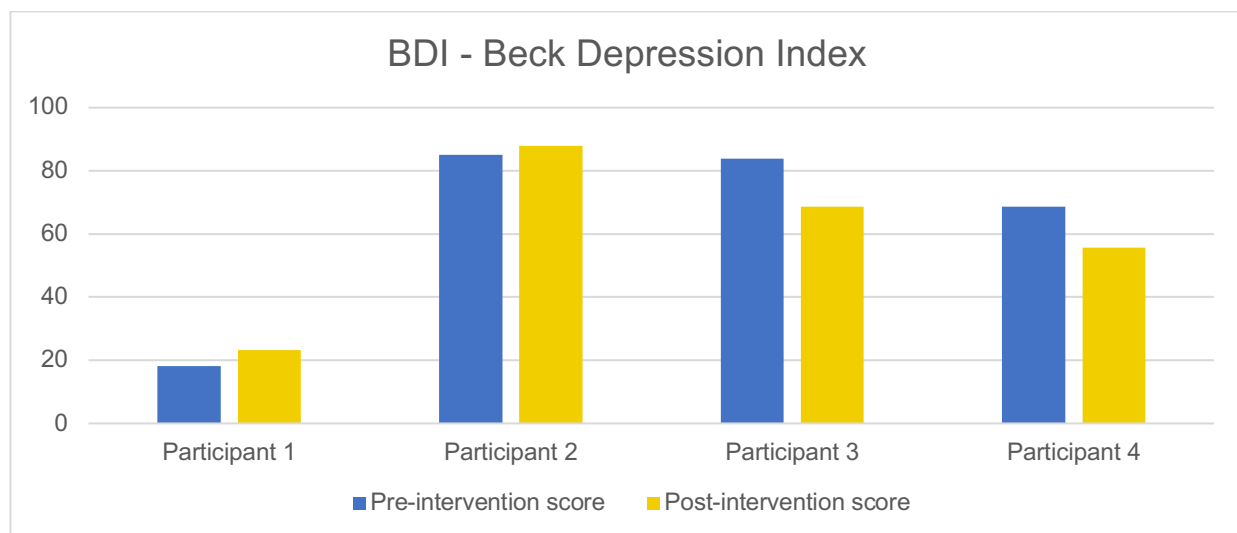


Table 4.11 captures the pre- and post-intervention percentile scores and interpretive guidelines for the Beck depression inventory while Figure 4.13 provides a visual representation of the various child-participants' scores. The scores indicate mixed results when comparing the four participants, with child-participants 3 and 4 experiencing a decrease in depressive symptoms that is significant, thereby indicating a positive effect of the resilience-enabling intervention in alleviating depressive symptoms for these specific participants. However, even though child-participants 1 and 2 experienced a slight increase in symptoms associated with depression, these results are not

significant and therefore not an area of concern. Next, the results of all four participants on the anger index are captured in Table 4.12 and Figure 4.14.

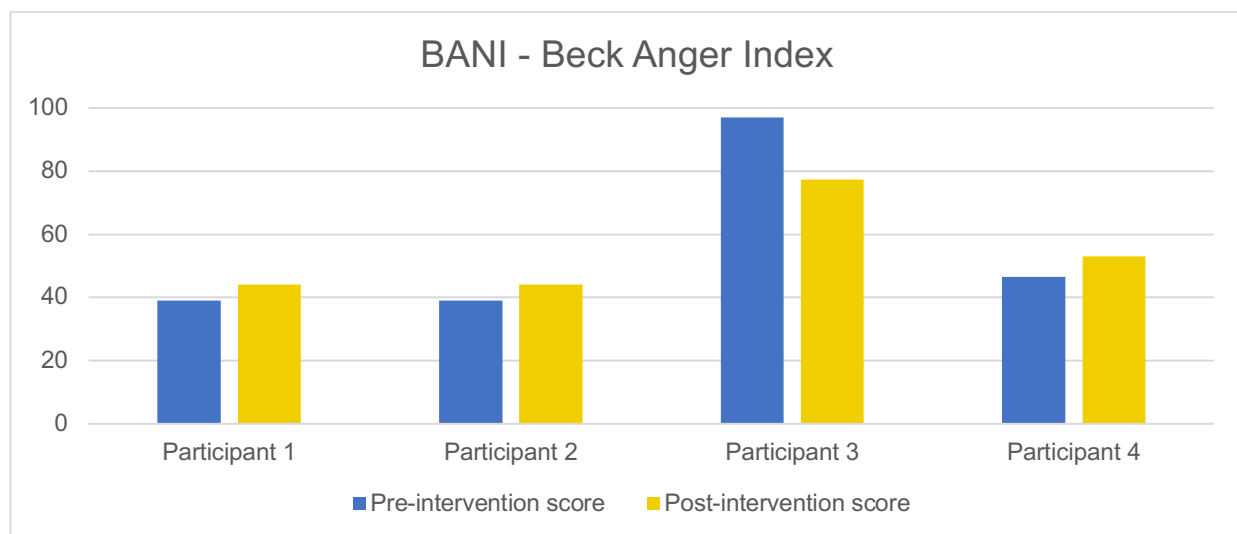
**Table 4.12**

*Pre- and post-intervention anger inventory scores and differences for the four child-participants*

BANI - BECK ANGER INDEX SCORES					
Participant	Pre-intervention/ Post-intervention	Percentile score	Interpretive Guidelines	Difference	
1	Pre	21.2%	Much lower than average	+6.6%	Increase by 6.6%
	Post	27.8%			
2	Pre	39%	Lower than average	+5%	Increase by 5%
	Post	44%	Average		
3	Pre	97%	Extremely elevated	-19.7%	Decrease by 19.7%
	Post	77.3%	Mildly elevated		
4	Pre	46.5%	Average	+6.5%	Increase by 6.5%
	Post	53%			

**Figure 4.14**

*Pre- and post-intervention anger inventory scores for the four child-participants*



In Table 4.12 the pre- and post-intervention percentile scores and interpretive guidelines for the anger inventory are provided for all four participants while Figure 4.14 provides a visual representation of these scores. Child-participant 3 experienced a significant decrease in anger symptoms, which suggests that the intervention could have positively supported the development of emotional regulation skills for this specific participant. However, child-participants 1, 2 and 4 experienced a slight increase in symptoms associated with anger even though these results are not significant and therefore not an area of concern. The scores for the final scale, the disruptive behaviour index, are summarised for the various participants in Table 4.13 and Figure 4.15.

**Table 4.13**

*Pre- and post-intervention disruptive behaviour inventory scores and differences for the four child-participants*

BDBI - BECK DISRUPTIVE BEHAVIOUR INDEX SCORES					
Participant	Pre-intervention/ Post-intervention	Percentile score	Interpretive Guidelines		Difference
1	Pre	23.7%	Much lower than average	-7.5%	Decrease by 7.5%
	Post	16.2%			
2	Pre	21%	Much lower than average	0%	No change
	Post	21%			
3	Pre	89.9%	Mildly elevated	-13.1%	Decrease by 13.1%
	Post	76.8%			
4	Pre	4.5%	Much lower than average	+3.1%	Increase by 3.1%
	Post	7.6%			

**Figure 4.15**

*Pre- and post-intervention disruptive behaviour inventory scores for the four child-participants*

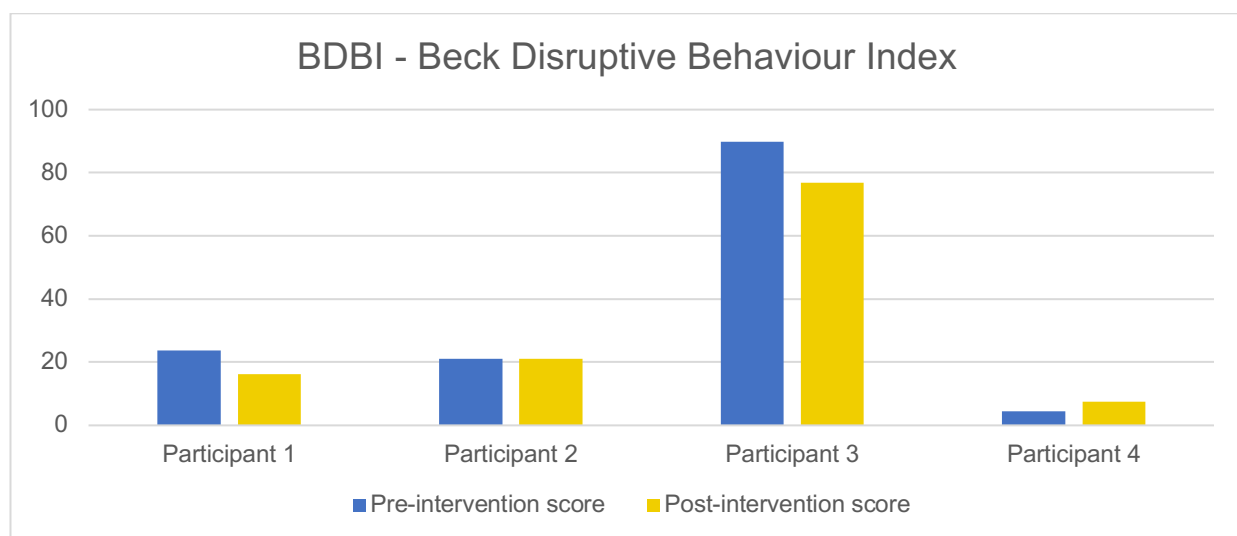


Table 4.13 captures the pre- and post-intervention percentile scores and interpretive guidelines for the Beck disruptive behaviour index while Figure 4.15 provides a visual representation of the various child-participants' scores. Child-participant 3 experienced a significant decrease in disruptive behaviour symptoms, suggesting that he may have become less inclined to externalise his frustrations or disrupt others to convey his inner emotions. This improvement indicates that he may have developed skills enabling him to communicate his experiences and needs more effectively, leading to more adaptive and healthy coping strategies. Even though child-participant 1 similarly experienced a decrease in disruptive behaviour symptoms, none of the results for the remaining two participants are significant and therefore are not considered to be an area of concern.

#### 4.4 ANALYSIS OF PROJECTIVE ASSESSMENT MEASURES

The Rotter Incomplete Sentences Blank (Rotter et al., 1992) and projective drawings were utilised to determine the child-participants' emotional and social profiles (Burns & Kaufman, 1970; Goodenough, 1926; Mitchell et al., 2011). These instruments were administered with all four child-participants involved in the resilience-enabling intervention both pre- and post-intervention with these datasets being compared in each case to gain insight into the effect of the holistic intervention. Tables 4.14 to 4.17 provide an overview of my analysis and the results obtained from the projective assessment measures. After the analysis of the projective measures I discuss the changes that occurred in terms of each child-participants' emotional and social functioning, with specific reference to their BYI-II scores.

**Table 4.14**

*Projective assessment results for child-participant 1*

CHILD-PARTICIPANT 1	
DRAWINGS	
PRE-INTERVENTION	POST-INTERVENTION
<ul style="list-style-type: none"> <li>• A need for control and to be in control of situations</li> <li>• Feelings of uncertainty and does not know how to cope with these</li> <li>• Fear of not being acknowledged by others</li> <li>• Wants to feel understood and valued by others, and for others to take an interest in his perspective</li> <li>• Healthy self-concept, yet feelings of insecurity and self-doubt</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in self-confidence</li> <li>• Self-assured and content with the self and his self-image</li> <li>• Positive change in perception of his abilities</li> <li>• Feeling less insecure and concerned about visual deficiency differences</li> <li>• At peace with the self and less of a need for others to validate him</li> <li>• Developing a sense of internal self-worth</li> <li>• Confident in the ability to speak out</li> </ul>
RISB	
PRE-INTERVENTION	POST-INTERVENTION
<ul style="list-style-type: none"> <li>• Hopeful and optimistic that the world can provide him with support for CVD-related challenges</li> <li>• Hardworking and driven</li> <li>• Regard CVD as difficult to overcome due to limited coping tools</li> <li>• Insecure and self-conscious</li> <li>• Love for his family – feels secure within the family environment</li> </ul>	<ul style="list-style-type: none"> <li>• Improved self-concept</li> <li>• Acknowledges uniqueness and being special</li> <li>• Optimistic and hopeful about the future</li> <li>• Focuses on solutions and overcoming challenges</li> <li>• Concerned about people who are not informed about CVD</li> <li>• Utilising skills acquired during the intervention to better support himself</li> <li>• Longs to encourage others to be more accepting of his difference</li> <li>• Values support from family and friends</li> <li>• Love for his family</li> </ul>
OVERALL IMPRESSION	
<ul style="list-style-type: none"> <li>• Improved self-concept, moving from feelings of insecurity to a sense of internal self-worth</li> <li>• A shift from the need for external validation to a state of being at peace with himself and more independent in his self-assessment</li> <li>• Greater optimism and hope for the future, showing a positive outlook</li> <li>• Acknowledgment of his uniqueness, embracing his individuality and difference</li> <li>• Focuses on solutions and overcoming challenges rather than being hindered by them</li> <li>• Enhanced coping mechanisms, utilising skills acquired during the intervention to support himself</li> </ul>	

### CHILD-PARTICIPANT 1

- Strong value placed on family support, highlighting a secure and loving family environment

The qualitative data confirms that child-participant 1 experienced an improvement in his emotional and social functioning post-intervention in comparison to his functioning before participating in the intervention. To elaborate, the results summarised in Table 4.14 indicate that child-participant 1 struggled with feelings of insecurity, uncertainty and a need for external validation at the start of my study. Post-intervention, however, an improvement in his self-confidence and self-concept could be noted, reflecting a positive shift towards a more assured and content self-image. He became more optimistic and hopeful about the future, acknowledging his uniqueness and focusing on solutions rather than challenges. Child-participant 1 also developed a greater sense of internal self-worth, showing less concern about his visual deficiency and placing more value on the support provided by family and friends. The qualitative data furthermore highlights the participant's enhanced ability to express and justify himself after participation in the intervention, with these results aligning with the observed reduced levels of anxiety and improved levels of socially acceptable behaviour as the study progressed. Therefore, the intervention seemingly empowered child-participant 1 to embrace his differences, enhanced his coping mechanisms and fostered a positive attitude to life.

**Table 4.15**

*Projective assessment results for child-participant 2*

CHILD-PARTICIPANT 2	
DRAWINGS	
PRE-INTERVENTION	POST-INTERVENTION
<ul style="list-style-type: none"> <li>• Insecure and unsure of himself</li> <li>• Self-conscious and a level of discomfort with himself</li> <li>• Sensitive to criticism</li> <li>• Feels loved and supported within the family environment</li> </ul>	<ul style="list-style-type: none"> <li>• Insecurity still present; however an improvement in self-confidence</li> <li>• Wanting to take control and to be seen by others</li> <li>• Happier and more self-assured</li> <li>• Less sensitive to criticism</li> <li>• Increased level of emotional awareness</li> <li>• More accepting of his differences and feeling at peace with himself</li> <li>• Feels loved within the family environment</li> </ul>
RISB	
PRE-INTERVENTION	POST-INTERVENTION
<ul style="list-style-type: none"> <li>• Very self-critical</li> <li>• Afraid of failure and not performing well</li> <li>• Questions his self-worth and value</li> <li>• Anxious</li> <li>• Desires to maintain control over situations</li> <li>• Protects himself to avoid disappointment</li> <li>• Kind and caring towards others</li> <li>• Confident in his academic abilities</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in self-confidence</li> <li>• Acknowledges his own value</li> <li>• A focus on strengths and mobilising strengths and resources to overcome difficulties</li> <li>• Hardworking</li> <li>• Increase in the confidence to voice his needs</li> <li>• Afraid of failure but more confident in his ability to achieve and perform well</li> <li>• Kind and caring towards others</li> </ul>
OVERALL IMPRESSION	
<ul style="list-style-type: none"> <li>• Increase in self-confidence, moving from insecurity and self-doubt to a more assured self-image</li> </ul>	

### CHILD-PARTICIPANT 2

- Development of emotional awareness, becoming less avoidant and more accepting of personal differences
- A shift from self-protection to a greater sense of agency, with the desire to take control and be recognised by others
- Continued drive and perseverance, showing a strong work ethic and belief in his own abilities despite lingering fears of failure
- Acknowledgement of his own value and capability, leading to a more positive outlook on his potential to achieve and perform well
- Persistent feelings of familial love and support, contributing to a secure and supportive environment for personal growth

As in the case of the first child-participant, child-participant 2 experienced a notable improvement in his emotional functioning, particularly in terms of his self-concept, following his participation in the intervention. He showed a significant shift from feeling insecure and doubting himself to demonstrating increased self-confidence and a more assured self-image post-intervention. Child-participant 2 experienced a positive change in emotional awareness, as he became less avoidant and more accepting of his differences as the intervention progressed. This change highlights the intervention's positive impact on fostering a healthy self-esteem and self-awareness in the case of this child-participant. To elaborate, as indicated in Table 4.15, child-participant 2 became more confident in his own abilities and self-worth, experiencing an increased level of self-confidence and a sense of peace and self-acceptance. Despite persistent concerns about failure, child-participant 2 demonstrated continued perseverance and resilience, demonstrating a strong work ethic and a belief in his own abilities. The continued love and support he experienced from his family provided him with a secure and nurturing environment for personal growth. In summary, his improved self-awareness, better self-perception and emotional engagement observed in the qualitative data underscore the intervention's success in enhancing his self-concept and emotional resilience.

**Table 4.16**

*Projective assessment results for child-participant 3*

CHILD-PARTICIPANT 3	
DRAWINGS	
PRE-INTERVENTION	POST-INTERVENTION
<ul style="list-style-type: none"> <li>• Need for independence</li> <li>• Need to control situations and dictate outcomes</li> <li>• Emotionally avoidant</li> <li>• Insecure and self-conscious</li> <li>• Masks insecurities to avoid appearing weak</li> <li>• Struggles to value himself</li> <li>• Angry that he is different and desires to be seen as <i>normal</i></li> <li>• Love for his family</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in self-confidence yet still a need to overcompensate and mask difficulties</li> <li>• Sensitive to criticism</li> <li>• Need to control situations; however, realises that he can speak up when feeling vulnerable</li> <li>• Understands that he can take up space in a non-aggressive way</li> <li>• Beginning to value his needs as being important</li> </ul>
RISB	
PRE-INTERVENTION	POST-INTERVENTION

### CHILD-PARTICIPANT 3

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Pessimistic outlook</li> <li>• Lack of hope that others will adequately support him</li> <li>• Fears that others will tease him for the CVD</li> <li>• Longs to be <i>normal</i> and see the world like others do</li> <li>• Masks feelings in the hope that other people will not see his true feelings</li> </ul> | <ul style="list-style-type: none"> <li>• Less focused on the negative aspects of CVD but still regards it as a hindrance</li> <li>• Increase in self-confidence to voice his needs to others</li> <li>• Confident in his own abilities</li> <li>• Internalising his strengths and acknowledging his value</li> </ul> |
|--|--|

### OVERALL IMPRESSION

- Growth in self-confidence, with a greater ability to voice his needs
- Developing recognition of his personal strengths
- Improved emotional expression and awareness, transitioning from masking his insecurities to internalising his strengths and acknowledging their value
- A shift in perspective, becoming less focused on the negative aspects of CVD and more aware of the importance of his own needs
- Developing healthy coping mechanisms, with a better understanding of how to manage situations and emotions in a non-aggressive way
- Increased self-awareness and self-worth, leading to a more positive self-concept and a greater recognition of his own needs and strengths

Child-participant 3 also showed an improvement in terms of his emotional and social functioning post-intervention. The qualitative data on this participant's level of functioning pre-intervention indicates a high level of insecurity and the need for control, along with signs of emotional turmoil. These feelings were, however, transformed into an improved level of self-worth and the tendency to display assertiveness without aggression post-intervention, as depicted in Table 4.16.

The qualitative results furthermore indicate a notable increase in child-participant 3's self-confidence, enabling him to voice his needs more effectively and to recognise his personal strengths. His emotional expression and awareness also improved post-intervention, as he moved from masking his insecurities to internalising his value and acknowledging his abilities. This shift in perspective was accompanied by a reduced focus on the negative aspects of his condition, with a growing awareness of the importance of his own needs. Child-participant 3 seemingly developed healthier coping mechanisms as the study progressed, where he learnt to manage situations and his emotions in a non-aggressive way. Overall, there was a marked increase in his self-awareness and self-worth, contributing to a more positive self-concept and a stronger understanding of his own needs and strengths, highlighting the intervention's impact on enhancing his self-acceptance and emotional resilience.

**Table 4.17**
*Projective assessment results for child-participant 4*

<b>CHILD-PARTICIPANT 4</b>	
<b>DRAWINGS</b>	
<b>PRE-INTERVENTION</b>	<b>POST-INTERVENTION</b>
<ul style="list-style-type: none"> <li>• Insecure and self-conscious</li> <li>• Unsure of the self</li> <li>• Feels as if he does not have the right to ask for support</li> <li>• Sensitive to criticism</li> <li>• Afraid to voice his needs and be heard</li> <li>• Feels loved and secure within his family environment</li> <li>• Feels accepted by his family and friends</li> </ul>	<ul style="list-style-type: none"> <li>• Feels capable and confident to take charge within his own environment</li> <li>• Healthy self-image</li> <li>• Hopeful and optimistic</li> <li>• Increased self-confidence</li> <li>• Feels stable and less insecure</li> <li>• Feels confident to voice his needs and occupy space</li> <li>• Developing a sense of internal self-worth</li> <li>• Feels loved and supported within the family</li> <li>• Wants to support his brother in overcoming CVD-related challenges</li> </ul>
<b>RISB</b>	
<b>PRE-INTERVENTION</b>	<b>POST-INTERVENTION</b>
<ul style="list-style-type: none"> <li>• Feels isolated and different due to being teased about CVD</li> <li>• Lack of control around CVD and people asking him questions about colour</li> <li>• Anxious and concerned about school yet perseveres and tries his best</li> <li>• Difficulty to verbalise his needs and express what he is uncomfortable with</li> <li>• Love for his family and friends</li> </ul>	<ul style="list-style-type: none"> <li>• Increased self-confidence</li> <li>• Feels at ease with himself</li> <li>• Confident to speak up for himself and ask for support</li> <li>• Afraid of failure and a lack of control</li> <li>• Emotional distress when peers tease him yet does not specify CVD any longer</li> <li>• Increased assertiveness</li> <li>• Worried about schoolwork yet believes in his own abilities</li> <li>• Ambitious</li> <li>• Love for his family</li> </ul>
<b>OVERALL IMPRESSION</b>	
<ul style="list-style-type: none"> <li>• Significant increase in self-confidence, leading to a stronger sense of capability and control within his environment</li> <li>• Improved emotional stability and self-worth, with a healthier self-image and a more hopeful, optimistic outlook</li> <li>• Enhanced level of assertiveness, allowing him confidently to voice his needs, ask for support and speak up for himself</li> <li>• Continued strong family connections, feeling loved and supported, with his expressing the desire to help others, such as his brother</li> <li>• A growing belief in his ability to overcome his anxiety and deal with the challenges he faces</li> </ul>	

As in the case of the other participants, child-participant 4 experienced an improvement in emotional and social functioning after participating in the intervention. The qualitative results captured in Table 4.17 suggest that, even though this participant felt secure within his family, he felt insecure about himself and was sensitive to criticism before participating in the intervention. Post-intervention he experienced considerable growth in his self-confidence that allowed him to feel more capable and in control within his environment. As a result of his increased self-confidence child-participant 4 felt confident to voice his needs, ask for support and speak up for himself, which marked a positive change from his previous fears of criticism and expressing his needs.

Additionally, the participant experienced an improvement in emotional stability and a healthier sense of self-worth, resulting in a more hopeful and optimistic outlook. Strong family connections continued to play a central role in his emotional wellbeing, with him expressing the desire to help others, including his brother with CVD as the study progressed. Despite this progress, some emotional challenges remained, such as experiencing distress when teased and feeling anxious about his schoolwork, although child-participant 4 demonstrated a growing belief in his ability to overcome these difficulties post-intervention. These changes confirm the positive effect of the intervention on child-participant 4's emotional resilience, self-regulation and overall self-perception.

#### **4.5 INTEGRATION OF QUALITATIVE AND QUANTITATIVE RESULTS**

The resilience-enabling intervention yielded positive changes in the emotional and social functioning of all four child-participants. By integrating the qualitative and quantitative results, a comprehensive understanding of how the intervention enhanced their self-concept, emotional regulation and overall behaviour can be seen.

As captured in Sub-theme 1.4 that describes the effect of CVD on the psycho-social functioning of the child-participants, the qualitative results suggest that CVD negatively influenced their self-concepts, resulting in them feeling different and struggling with a sense of unworthiness. As CVD was not always recognised as a difference requiring external support, the child-participants seemingly believed that their difficulties were not important or deserved the assistance of others. They felt inadequate and were concerned that others would reject them due to them being different. This resulted in a lack of the necessary self-confidence to voice their needs to others, as well as feelings of insecurity and frustration about seeing the world differently and having to cope with CVD-related challenges on their own, prior to participating in the resilience-enabling intervention.

Post-intervention, as summarised in Sub-theme 3.3, the qualitative results indicate an improvement in the child-participants' self-concept. In this regard, the child-participants reportedly experienced a sense of empowerment and an increased ability to voice their experiences as well as their CVD-related needs, as they became more informed and developed resilience-enabling coping skills. The intervention therefore seemingly boosted the child-participants' self-confidence, self-perception and self-worth, as also evidenced in the quantitative results, with the BYI-II results indicating substantial gains in self-concept in the case of all four child-participants. For example, child-participant 1's self-concept scale rose from the 61.6<sup>th</sup> to the 94.9<sup>th</sup> percentile, reflecting a 33.3% increase, child-participant 2's self-concept score improved with 25%, child-participant 3's score with 21.2%, and child-participant 4's with 19.7%. These quantitative improvements between the pre- and post-intervention scores are corroborated by the qualitative results that highlight all four of the child-participants' enhanced self-esteem, increased self-confidence, and a more positive self-image following their participation in the resilience-enabling intervention.

Next, the qualitative results of the study indicate that the intervention led to reductions in the levels of anxiety and depression for the child-participants. As the participants developed a better understanding of their condition of CVD and became aware of their strengths and available resources, they reported feelings of emotional upliftment, hopefulness and optimism. This positive change is reflected in the BYI-II scores, with child-participant 1's anxiety scale decreasing by 15.7%, child-participant 3's by 3.7% in addition to a significant 15.2% decrease on the depression scale, and child-participant 4's depression score decreasing by 13.1%. While individual changes in scores on the anxiety and depression scales were observed, examining the mean change across all participants provides a clearer picture of the intervention's overall effectiveness. The mean decrease in depression scores, for example, was notable, reflecting a shift toward more typical emotional functioning. Additionally, the shift toward average anxiety, anger, and disruptive behaviour scores across the four child-participants is meaningful, as it suggests that the intervention helped bring participants closer to typical emotional functioning, rather than leading to extremes that could indicate disengagement. These shifts in scores align with the qualitative results that suggest a decrease in feelings of emotional distress, as well as the child-participants' enhanced ability to manage emotions effectively. Although some of the participants showed a slight increase in their anger and disruptive behaviour scores, these remained within average or much lower than the average range, reflecting overall stability in behaviour.

The integrated results of the qualitative and quantitative components of my study therefore illustrate the effectiveness of the resilience-enabling intervention for the child-participants in fostering a healthy self-concept, reducing emotional distress and enhancing emotional regulation abilities, with these leading to an overall positive effect on their psycho-social functioning. The initial negative effects of CVD on their self-perception and psycho-social functioning, as detailed in Theme 1, were thus seemingly addressed through the holistic intervention they participated in. As stated, the child-participants showed improvements in self-confidence, self-worth, emotional stability, self-image and emotional resilience as well as reduced levels of anxiety and depression following their participation in the intervention. Overall, these results highlight the intervention's effect in supporting the child-participants to navigate the challenges they faced with greater self-assurance.

#### **4.6 CONCLUSION**

In this chapter, I presented the results of the study, detailing both the qualitative and quantitative results I obtained. In my discussion of the qualitative results, I focused on the pre-intervention experiences of the child-participants, their coping with CVD, the positive effect of the holistic intervention on their coping, and the role players positively affected by the intervention. Next, I presented the quantitative results obtained on the BYI-II and then discussed the results obtained from the projective measures. Finally, I integrated the qualitative and quantitative results of the study.

In the next chapter, I interpret the results I obtained against the background of the literature I presented in Chapter 2 as well as the conceptual framework that guided me in undertaking my study. I highlight differences and similarities, identify silences in the data and foreground new insight and knowledge that emerged from the study.



# CHAPTER 5

## FINDINGS OF THE STUDY

### 5.1 INTRODUCTION

In Chapter 4, I discussed the results of my study. I presented the qualitative results in terms of the identified themes and sub-themes. Next, I included and compared the quantitative results obtained pre- and post-intervention in terms of the child-participants' functioning. In the final section of the chapter, I integrated the qualitative and quantitative results.

In this chapter, I discuss the findings of my study by comparing the results I presented with the existing literature discussed in Chapter 2. I draw attention to similarities, differences and silences, and also indicate new insight stemming from the current study that may contribute to the existing body of knowledge on the experiences of children with CVD, and a potential way in which to support them. In discussing the findings of my study relating to the effect of the holistic intervention on the child-participants, I situate the findings for each participant within the conceptual framework of the study, thereby indicating the changes that occurred within the child-participants' nested systems.

### 5.2 FINDINGS ON THE EXPERIENCES OF CHILDREN LIVING WITH CVD

I found that prior to the implementation of the holistic intervention, many of the child-participants experienced challenges on various levels of their functioning, as a result of their own and others' limited understanding or lack of awareness of CVD, as discussed in the sub-sections below.

#### 5.2.1 Limited understanding or lack of awareness of CVD and the challenges it implies

As an introduction to my discussion of the findings relating to the participants' experiences of their own and others' limited understanding or lack of awareness of CVD, I provide an overview in Table 5.1 of my comparison of the results of the current study with those captured in the existing literature.

**Table 5.1**

*Findings on the challenges associated with a general limited understanding of CVD*

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
Teachers in general hold a limited understanding or lack a basic understanding and awareness of CVD and what the condition implies.	Barry et al. (2017) Berisso (2018) Colour Blind Awareness (2018) Espinda (1973) Kvitile (2018) Mashige (2019) Sullivan (2011b)	Supporting existing literature

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
Child-participants held a limited understanding of CVD, and were uncertain how to explain it to others or which kinds of support they required.	Chan et al. (2014) Dohvoma et al. (2018) Colour Blind Awareness (2018) Webster (2020)	Supporting existing literature
The difficulties faced by children with CVD are often misunderstood with their possibly being misidentified as slow or experiencing barriers to learning.	Chan et al. (2014) Chaparro and Chaparro (2017) Eze et al. (2020) Male et al. (2024) Mashige and Van Staden (2019) Preito et al. (2021) Torrents et al. (2011) Zorn and McMurtrie (2019)	Supporting existing literature
Child-participants did not feel that they had the right to be accommodated or supported by others.	Department of Education (2001; 2016) Lansdown et al. (2014)	Contradicting existing literature
	None found	New insight
Child-participants' lack of awareness resulted in their receiving limited support from others, with this also negatively affecting their emotional and social functioning.	Colour Blind Awareness (2018) Male et al. (2024) Mashige and Van Staden (2019) Mpu and Adu (2021) Nithiyaanathan et al. (2020) Sullivan (2011a; 2011b)	Supporting existing literature
Teachers may benefit from further training on CVD.	Karunanayake et al. (2021) Mashige (2019) Shrestha et al (2010) Valero et al. (2022)	Supporting existing literature

The findings of the current study indicate that teachers often hold a limited understanding and may even be unaware of CVD, how the condition affects children and which challenges such children may experience, as well as how to effectively support them. This finding aligns with the work of Colour Blind Awareness (2018) that indicates that teachers are in general not trained to identify colour vision defects and are typically unaware of the specific learning needs associated with such conditions. In further support, studies by Barry et al. (2017), Kvitle (2018) and Mashige (2019) indicate that teachers often hold a limited understanding of CVD and are typically unaware of the fact that the condition may pose a barrier to learning. These contributions are confirmed by the findings of my study, according to which both the child- and parent-participants experienced teachers as not possessing sufficient awareness of CVD nor the necessary knowledge to provide appropriate accommodation and support to these learners.

In addition to teachers' apparent unawareness of CVD, the findings of my study suggest that children living with CVD themselves as well as their parents typically also hold a limited understanding and knowledge about CVD, specifically with regard to the causes of the condition, the potential challenges it implies, and the support needs of those affected by CVD. Due to this lack of sufficient awareness and their limited understanding of CVD, the child-participants and their parents did not

view themselves as entitled to accommodation and external support. They were not sure which support and accommodations they could ask for. This finding aligns with the work of Chan et al. (2014), Dohvoma et al. (2018) as well as Colour Blind Awareness (2018), similarly indicating that children with CVD are often unaware of their condition, resulting in them not understanding their unique support needs, or the support they may obtain from others and at school (Webster, 2020).

As suggested by the findings of my study, the lack of sufficient awareness and/or a limited understanding of CVD can result in children being misdiagnosed and misunderstood, which may, in turn, lead to the incorrect labelling of a child as someone who experiences other learning impairments, such as deficits in cognition, attention, behaviour or emotional functioning. This can subsequently result in children with CVD developing feelings of uncertainty, insecurity and frustration, with them feeling misunderstood and alone due to their unique difficulties not being addressed and not receiving appropriate support to overcome the difficulties they experience as a result of CVD. They may even receive inappropriate support that will not assist them but rather confirm their label of, for example, being difficult and problematic, further exacerbating the emotional and social distress they may experience. This finding aligns with the work of Chan et al. (2014), Mashige and Van Staden (2019), Torrents et al. (2011) as well as Zorn and McMurtrie (2019) who all state that children with CVD are often misidentified and labelled as experiencing other barriers to learning that can result in them developing sensitivities and insecurities that can cause further distress and may even result in school refusal and social withdrawal. Additionally, Chaparro and Chaparro (2017), Eze et al. (2020), Male et al. (2024) as well as Prieto et al. (2021) indicate that when children with CVD are misidentified as experiencing some sort of learning barrier, they will find it hard to cope and meet expectations that may further contribute to a negative self-concept and overall feelings of distress.

Closely related, the findings of my study highlight the fact that, due to the child-participants' limited understanding of CVD and of their rights to inclusive education and the fact that they deserve accommodation and support within the school setting, they tended to simply adapt on their own. This finding provides new insight into the way in which children cope with CVD and points to some contradictions with existing literature. To elaborate, according to the Department of Education (2001; 2016) and Lansdown et al. (2014), children have the right to inclusive education, with their unique barriers to learning being accommodated in class. Despite this stipulation, the child-participants in the current study did generally not experience such support within their school environments. This contradiction between policy and practice can perhaps be ascribed to a lack of sufficient awareness and understanding of CVD among teachers as already discussed, leading to the insufficient support and accommodation of children with the condition. This is, however, a mere hypothesis that requires further investigation before reaching final conclusions. This finding further highlights the need for a greater awareness of CVD in schools and the importance of accommodating and supporting children with this visual condition. The finding also offers new insight into the specific experiences of children

with CVD, revealing that CVD is not commonly recognised by children affected by the condition as a condition that implies the need for support by teachers at school.

The findings of my study thus suggest that children with CVD may not receive the necessary support to overcome the CVD-related difficulties they face in school, and that this can prevent them from performing optimally. This finding aligns with the work of Colour Blind Awareness (2018), Male et al. (2024), Mashige and Van Staden (2019), Mpu and Adu (2021), Nithiyaanathan et al. (2020) as well as Sullivan (2011a; 2011b) who all indicate that children with CVD typically do not receive the necessary support due to teachers and other role players within the school and home systems not understanding their needs and appropriate support measures that can be provided to assist them in overcoming the unique difficulties they face.

With regard to teachers being trained to provide such support in the school context, the findings of my study indicate that teachers generally require training and guidance on CVD, the potential barriers it may pose to learning, and how teachers can accommodate and support learners with the condition. This finding aligns with the work of Karunanayake et al. (2021), Mashige (2019), Shrestha et al. (2010) as well as Valero et al. (2022) who similarly emphasise that current teachers require further training and development to raise their awareness of CVD and equip them to be able to support these children to be able to actualise their full potential within the school setting.

### 5.2.2 Negative effect of CVD on daily living

As an introduction to my discussion of the findings on the effect of CVD on the daily living of children, I provide an overview of the findings I obtained, in relation to existing literature, in Table 5.2.

**Table 5.2**

*Findings on the challenges children with CVD may face in terms of daily living*

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
Children with CVD may experience several CVD-related challenges that can influence their ability to perform daily activities.	Barbur and Rodriguez-Carmona (2017) Barry et al. (2017) Cole (2016) Costedoat and McHughes Palmer (2018) Mashige and Van Staden (2019) Osman at al. (2021) Stoianov et al. (2019) Sullivan (2011a; 2011b) Wu et al. (2019)	Supporting existing literature
	Colour Blind Awareness (n.d.-d) Barry et al. (2017) Raynor et al. (2019) Sports Grounds Safety Authority (2018) Colour Blind Awareness (n.d.)	Silences in the data when compared to existing literature
	Melo et al. (2014)	Supporting existing literature

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
Children with CVD may experience many challenges that typically sighted people are unaware of.	Stoianov et al. (2019) Sullivan (2011b)	
	None found	New insight

I found that the child-participants in my study experienced several challenges related to CVD that affected their ability to perform daily living activities. The participants, for example, experienced CVD as having an influence on their choices of clothes, as well as their driving and ability to distinguish between different road signs based on colour. In support of this finding, Costedoat and McHughes Palmer (2018) confirm that individuals with CVD may find it difficult to identify road signs, with this affecting their driving and adherence to road rules. The finding furthermore aligns with the work of Barry et al. (2017), Cole (2016), Mashige and Van Staden (2019), Osman et al. (2021), Stoianov et al. (2019), Sullivan (2011a; 2011b) as well as Wu et al. (2019) who all emphasise that colour vision defects can negatively impact a person's ability to engage in general daily living activities, such as dressing, cooking and driving.

The findings of my study additionally suggest that children living with CVD experience a range of challenges and difficulties that typically sighted people may not be aware of. To elaborate, I found that children with CVD may experience the world that is full of colour as challenging and at times even as frustrating as they have to work harder and smarter than typically sighted peers when navigating and engaging with their environment. As these children cannot utilise colour in the same way as typically sighted peers, they may have to rely on other visual cues and information in their environment when undertaking tasks. This finding aligns with the work of Stoianov et al. (2019), Sullivan (2011b) as well as Melo et al. (2014) who state that colour may not be considered as a useful tool by a child who perceives colour differently but may, instead, be considered as a potential hindrance that can cause emotional distress and inhibit the confidence of the individual.

Even though the Sports Grounds Safety Authority (2018) and Colour Blind Awareness (n.d.-d) suggest that children with CVD may experience difficulty with safety signs and when interpreting colourful information related to emergencies, and Barry et al. (2017) as well as Raynor et al. (2019) indicate that people with CVD may struggle to notice changes in the colour of stools, vomit or urine when blood is present, or when trying to identify sunburn, rashes and colour variations in moles, I did not obtain any such results. This silence in my data may perhaps be ascribed to factors such as the child-participants' ages or exposure to emergency situations, thereby pointing to a possible unawareness of these potential challenges that may be experienced by people with CVD. Follow-up research in this field may add further insight in terms of the possibility. It is, however, also possible that the child-participants in my study had developed coping strategies or received support that could help them mitigate such challenging situations. This is a mere hypothesis, with this silence in the

data emphasising the need for further research to explore these aspects more thoroughly and understand why these difficulties were not referred to in the current study.

### 5.2.3 Negative effect of CVD on the academic functioning of children

The findings of my study indicate that CVD can negatively affect the academic functioning of children, due to, for example, limited support experienced from teachers who may be unaware of the challenges implied by CVD. Such a lack of understanding by teachers can make it difficult for children to navigate classrooms that heavily rely on colour. In Table 5.3, I provide an overview of the findings that relate to the possible effect of CVD on the academic functioning of children with CVD.

**Table 5.3**

*Findings on the potential negative effect of CVD on the academic functioning of children*

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
CVD can negatively affect children's school performance.	Albany-Ward (2011) Barry et al. (2017) Chan et al. (2014) Colour Blind Awareness (2018) Cole (2015) Grassivaro Gallo et al. (1998; 2002) Mashige (2019) Spalding (1997) Suero et al. (2005) Sullivan (2011a; 2011b) Zorn and McMurtrie (2019)	Supporting existing literature
	Grassivaro Gallo et al. (1998; 2002) Suero et al. (2005) Moudgil et al. (2021)	Silences in the data when compared to existing literature

As indicated, the findings of my study confirm that CVD can negatively affect a child's ability to perform within the school setting, and to optimally engage with the learning content and related tasks. The child-participants in my study experienced CVD as a barrier to learning when appropriate accommodations and support were not provided to them, as CVD made it harder to engage with colourful learning content. Such challenges experienced within the academic context may result in feelings of distress, thereby impacting the academic, emotional and social functioning of the child. To elaborate, the children with CVD who participated in the current study encountered difficulties when engaging with colourful school materials, resulting in a lack of self-confidence and feelings of fear and anxiety about their ability to perform well within the school setting. CVD required of the child-participants to exert increased efforts to compensate for the challenges they faced. These findings support previous research by Barry et al. (2017), Grassivaro Gallo et al. (1998; 2002) Mashige (2019), Suero et al. (2005) as well as Zorn and McMurtrie (2019) that similarly highlights the negative impact of CVD on children's academic performance. These findings furthermore

emphasise the importance of teachers recognising and addressing the educational challenges associated with CVD to support the affected children.

Despite the challenges they experienced with school-related tasks, the child-participants in the current study performed well academically. In this regard I found that they worked hard to overcome the challenges they faced, primarily relying on self-help strategies to be able to perform within their academic environment. As such, CVD does not necessarily predict lower academic achievement, yet it causes challenges with school-related tasks. This finding contradicts the findings of Grassivaro Gallo et al. (1998; 2002), Moudgil et al. (2021) as well as Suero et al. (2005) who indicate that children with CVD will generally perform poorer academically than their peers with normal colour vision. My finding that the participants in my study did not refer to poor academic performance may perhaps be ascribed to factors such as strongly developed individual coping strategies or unreported support mechanisms that the children had received. However, these possibilities require further investigation before coming to final conclusions.

In addition to their current functioning at school, the child-participants in my study predicted that CVD would also influence their career choices, believing that they would be limited in choice as a result of the CVD condition. This finding supports the work of Mashige and Van Staden (2019), Osman et al. (2021) as well as Barbur and Rodriguez-Carmona (2017) who similarly indicate that colour vision is often needed in visually demanding occupations and that CVD can cause challenges in career contexts, thereby affecting a person's career path.

#### 5.2.4 Negative effect of CVD on the emotional functioning of children

The findings of the current study indicate that CVD may negatively influence the emotional functioning of children with the condition, affecting their self-concept and leading to feelings of insecurity, frustration and anxiety. In Table 5.4, I provide an overview of the related findings.

**Table 5.4**

*Findings on the challenges that children with CVD may face on an emotional level*

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
CVD can negatively influence the emotional functioning of children with the condition.	Chakrabarti (2018) Cumberland et al. (2004) Espinda (1973) Mashige and Van Staden (2019) Stoianov et al. (2019) Thomas et al. (2018) Thompson (1962) Waddington (1965)	Supporting existing literature
Children with CVD may be challenged in terms of their self-concept, feelings of	Barry et al. (2017) Chaparro and Chaparro (2017) Demmin and Silverstein (2020) Gabielli et al. (2022)	Supporting existing literature

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
insecurity, feeling different or fearing rejection.	Kvitle (2018) Mashige (2019) Moudgil et al. (2021) Thomas et al. (2018) Sullivan (2011a) Thurston et al. (2010)	
Children with CVD may find it difficult to share their experiences and needs with others due to a lack of sufficient self-confidence.	Banks et al. (2022)	Supporting existing literature
	None found	New insight
Children with CVD may long to view the world as typically sighted people do.	None found	New insight

As stated, the findings of my study indicate that CVD may negatively affect children’s emotional functioning and self-concept. To elaborate, I found that the child-participants in my study experienced conflicts in terms of their self-concept, feeling different and isolated, and experiencing feelings of anxiety and a fear of being rejected and teased by their peers. This finding supports the work of Chakrabarti (2018), Cumberland et al. (2004), Espinda (1973), Mashige and Van Staden (2019), Stoianov et al. (2019), Thomas et al. (2018), Thompson (1962) as well as Waddington (1965) who all found that CVD can significantly impact the emotional functioning of children, especially when they are not accommodated or supported appropriately. These studies report that children with CVD tend to experience themselves as being different from their peers. They may subsequently present with increased levels of anxiety and social isolation tendencies when their condition is not understood or catered for in educational settings.

I furthermore found that the child-participants in my study experienced feelings of frustration and shame, which negatively influenced their self-confidence and self-esteem, due to them not being able to correctly complete colour-related tasks or accurately use colour as expected of children at their developmental phase. This finding aligns with research by Barry et al. (2017), Chaparro and Chaparro (2017), Demmin and Silverstein (2020), Gabrielli et al. (2022), Kvitle (2018), Mashige (2019), Moudgil et al. (2021), Snyder (1973), Sullivan (2011a), Thomas et al. (2018) as well as Thurston et al. (2010) who similarly report that children with CVD may likely experience feelings of disappointment and anxiety when not able to achieve or accurately identify and use colour as expected. These scholars highlight the finding that a lack of sufficient support and understanding will exacerbate the negative emotions often experienced by these learners, with this negatively impacting their self-esteem and confidence.

Closely aligned, the findings of my study suggest that the child-participants experienced difficulty to voice their experiences and needs to others due to a lack of the necessary self-confidence. Additionally, the findings of my study indicate that, without knowledge or understanding, children with

CVD may feel disempowered to share their experiences, believing that their experiences are not valuable. This finding can be related to the work of Banks et al. (2022) who conducted research with children with physical disabilities and found that a lack of confidence will diminish a child's willingness and ability to engage in situations where they are vulnerable. The finding also adds new insights into the specific experiences and behaviour of children with CVD, as it emphasises the lack of confidence often experienced by these children when having to express their needs and ask for support. Such hesitancy may stem from a fear of experiencing further discrimination and marginalisation. Further research is required to explore this possibility more comprehensively, focusing on strategies that may empower children with CVD by enhancing their self-confidence in communicating their experiences and needs to others.

Finally, I found that children with CVD may long to see what typically sighted people see and as a result feel sad and frustrated for not being able to see colour as others do. They may feel that they are not experiencing the world as it should be experienced and that they, as a result, are being disadvantaged in terms of what they perceive. This finding does not relate to any existing literature, thereby adding new insight in terms of the possible experiences of children with CVD. Further research is required to elaborate on and confirm this finding.

### 5.2.5 Negative effect of CVD on the social functioning of children

The findings of the current study indicate that CVD can negatively affect the social functioning of children, as they may experience incidents of discrimination due to the difficulty of identifying colours. At times, these children may even feel ostracised. In Table 5.5, I summarise the findings that relate to the effect of CVD on the social functioning of children in comparison to existing literature.

**Table 5.5**

*Findings on the potential negative effect of CVD on the social functioning of children*

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
Children may experience social difficulties as a result of CVD.	Chan et al. (2014) Cole (2015) Thomas et al. (2018) Thurston et al. (2010) UNICEF (2013b) Banks et al. (2022)	Supporting existing literature

The findings of the current study indicate that the child-participants experienced some social challenges as a result of CVD, such as being teased, bullied and discriminated against, primarily because of their inability to identify certain colours. These children's peers and friends often taunted and teased them, thereby revealing a lack of sufficient awareness and understanding of CVD and how it may affect a child. To elaborate, peers may mock the inability of children with CVD to distinguish between colours, leaving them with feelings of embarrassment and frustration. In addition

to such social torment highlighting these children’s differences, it may exacerbate their emotional distress. In terms of the discrimination experienced by the child-participants in my study, it was specifically experienced in social situations where colour identification was important, with the inability to do so being met with disdain or exclusion. Such discriminatory behaviour may result in children feeling isolated and undervalued, which, in turn, can negatively affect their self-esteem and confidence. The discrimination that these children may experience can cause a barrier to them being socially included, resulting in them feeling unwelcome and misunderstood in various social settings.

The potential emotional impact of such negative social interactions is highlighted by the findings of the current study. To elaborate, the child-participants experienced feelings of isolation, frustration, annoyance, anger, anxiety and general emotional distress when involved in social situations where colour is important. A constant fear of being teased or discriminated against intensified their feelings of anxiety and emotional vulnerability, resulting in some of the participants withdrawing from social situations and experiences where they could potentially encounter negative experiences. In this way, withdrawal served as a protective strategy to avoid further emotional distress.

These findings align with the work of Chan et al. (2014), Cole (2015), Thomas et al. (2018) and Thurston et al. (2010) who all found that children with CVD will often experience bullying and ridiculing targeted at their differences. These studies report that such negative social experiences can result in feelings of insecurity, the fear of rejection, and a reluctance to ask for help, as found in my study. In this regard, confirming research conducted by UNICEF (2013b) as well as Banks et al. (2022) indicates that children with disabilities are at a higher risk of experiencing discrimination and being bullied by peers, family members and teachers. These negative experiences highlight the need for an increased awareness and understanding of CVD amongst peers, teachers and the broader community to be able to foster a more inclusive and supportive environment for children with CVD.

### 5.3 FINDINGS ON CHILDREN’S WAY OF COPING WITH CVD

In this section, I discuss the findings of the current study that relate to the child-participants’ experiences of coping with CVD. I provide an overview of these findings in Table 5.6.

**Table 5.6**

*Findings on children’s way of coping with CVD*

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
Child-participants relied on self-developed coping strategies to overcome CVD-related challenges.	Torrents et al. (2011) Melo et al. (2014)	Supporting existing literature
	None found	New insight
Child-participants were supported by their family systems.	Bronfenbrenner and Morris (2006) Giordano et al. (2021)	Supporting existing literature

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
Child-participants shared mixed experiences about the support they received from teachers.	Colour Blind Awareness (2018) Kvitile (2018) Shi et al. (2014) Taneja-Johansson et al. (2023) Wang et al. (2023) Zorn and McMurtrie (2019)	Supporting existing literature  Contradicting existing literature
Child-participants shared mixed experiences about accommodations and holistic support offered in the school environment.	Department of Basic Education (2016) UNICEF (2004) Colour Blind Awareness (2018)	Supporting existing literature  Contradicting existing literature
Child-participants experienced support from their peers.	Berisso (2018) Eze et al. (2020)	Supporting existing literature
Child-participants indicated limited use of supportive devices and resources.	Gómez-Robledo et al. (2018) Almagambetov et al. (2015) Mancuso et al. (2009) Rubin et al. (2009) Stoianov et al. (2019) Wong (2011) Varikuti et al. (2020) Webster (2020)	Supporting existing literature

In my study, I found that children with CVD often cope with the challenges they face by relying on self-developed coping skills and strategies that can assist them to function in a world of colour and adapt within the home and school environments. This finding supports the work of Melo et al. (2014) who state that children with CVD will spontaneously develop self-help strategies to overcome the challenges they face as a result of their condition as they progress through life. In my study, these self-developed strategies often involved that the child-participants adopted a positive outlook regarding their deficiency, seeing the challenges they faced in a positive light and focusing on a shift in mindset, thereby reframing their perceptions of them being different from others. Although this finding does not directly align with any existing literature on CVD, it relates to the work of Banks et al. (2022) who conducted research with children with disabilities. Banks et al. (2019) namely found that a shift in mindset and the adoption of a positive attitude can enable children with disabilities to experience life more positively and focus less on the difficulties and challenges they face. The findings I obtained build on this knowledge base and contribute new insight to the existing literature on the experiences of specifically children with CVD in terms of possible strategies that can assist them in coping with their condition.

Closely related, the findings of my study suggest that children with CVD will develop internal adaptive coping strategies to overcome the CVD-related challenges they face within the classroom environment, due to teachers not always offering appropriate support or adapting resources for these children to be CVD-friendly. Teachers tend to offer reactive support rather than proactive support by adjusting teaching and learning materials and resources to support children with CVD before they are exposed to learning activities that involve colour. This finding aligns with the work of Torrents et

al. (2011) and Melo et al. (2014) who also indicate that teachers will seldom create CVD-friendly resources, expecting of the children to make adaptations and accommodate the content as presented.

The findings of my study furthermore indicate that the children with CVD who participated experienced positive support from people within their family systems. To elaborate, the child-participants experienced their family systems as secure environments where they received positive support that assisted them in overcoming CVD-related difficulties, and where they felt accepted and loved despite them being different from others. The child-participants were specifically supported by their parents, siblings and grandparents. This finding correlates with the work of Bronfenbrenner and Morris (2006) who stress the importance of parental support for the positive development of children. The finding furthermore aligns with the conceptual framework of my study that emphasises the importance of children receiving support within their supportive social ecologies, with such support potentially positively influencing their holistic development.

The findings of my study specifically indicate that a dedicated, supportive mother implies the benefit of children with CVD feeling appropriately supported, with their rights being advocated within the classroom context. This finding confirms the work of Giordano et al. (2021) who emphasise the importance of protective relationships and supportive social ecologies for the functioning and positive outcomes for children with differences. Furthermore, the findings of my study reveal that when children with CVD are supported by a family member who also has CVD, they will experience a greater sense of belonging. Such support can enable them to share their experiences with someone who understands their world and the challenges they face. This finding provides new insight into the experiences of children with CVD and underscores not only the impact of familial support but also specifically the benefit of support by someone who understands the unique challenges they face.

The level of support received from teachers within the classroom context varied across the different child-participants in the current study. While some participants received support once their teachers were made aware of their condition, others received little to no support from teachers and consistently had to remind their teachers of their learning barrier. This disparity highlights an inconsistency in teacher awareness and suitable responses to children with CVD. My findings resonate with research conducted by Kvitle (2018), Shi et al. (2014), Taneja-Johansson et al. (2023), Wang et al. (2023) as well as Zorn and McMurtrie (2019) who all highlight that teachers often lack the necessary training to identify CVD and to appropriately support children with the condition in terms of their unique learning needs. As a result, teachers may tend to overlook the needs of these children and not prioritise support in such cases.

According to the Department of Basic Education (2016), all children with disabilities or who experience differences and have unique learning needs should be accommodated within the school environment, based on their right to quality education (UNICEF, 2004). Despite this indication in

policy documents and existing literature, the findings of my study indicate that only one of the child-participants was granted accommodations at school for his CVD. Suitable support was provided to this child-participant by teachers without him having to request support on an ongoing basis. This finding points to an inconsistency between existing literature and inclusive education policies on the one hand, and the practices implemented in South African schools on the other. To be more specific, even though individual support is provided to children with CVD in some instances, this is seemingly limited and not in line with what literature and policy suggest. This contradiction between what literature proposes and what I found may perhaps be linked to the limited or lack of awareness of CVD by teachers. This hypothesis requires further investigation before reaching conclusions.

The supportive role that peers and friends can fulfil in the lives of children with CVD emerged as another finding in my study. To elaborate, most of the child-participants received positive emotional and social support from their peers that contributed to their feelings of empowerment and upliftment. In particular, friends were found to be instrumental in assisting the children with CVD by helping them identify colours, advocating for their support needs, and reminding teachers of the condition when necessary. This collective support by peers encompassed academic, emotional and social dimensions, contributing to a positive and inclusive classroom environment for the children with CVD. The finding resonates with the work of Berisso (2018) and Eze et al. (2020) who emphasise the importance of peer support in shaping the learning experiences and views of children with CVD.

With regard to the use of assistive technologies in support of children with CVD, the findings I obtained differ from those captured in existing literature, in addition to certain silences that are prevalent in the data. While Wright (2022) as well as Tillem and Gün (2023) suggest the availability and value of assistive technologies such as applications and colour vision filter options in games, the findings of my study indicate a limited awareness and utilisation of such resources among the child-participants. Even though one of the child-participants was found to use a colour vision filter in games, the absence of similar experiences reported by the other child-participants may perhaps suggest limited awareness of such assistive technologies among children with CVD and their parents. This is, however, a mere hypothesis that requires further research before coming to final conclusions on the utilisation of assistive technologies and devices by children with CVD.

#### **5.4 FINDINGS ON THE EFFECT OF THE HOLISTIC INTERVENTION**

In this section, I discuss the findings I obtained on the effect and potential value of the holistic intervention, entailing a resilience-enabling intervention with children and a parent guidance intervention with their parents.

### 5.4.1 The value of understanding CVD as condition

As a result of their participation in the holistic intervention, the child-participants developed a better awareness of CVD and what the condition entails, thereby becoming empowered with knowledge. As an introduction to my discussion of these findings, I summarise the findings in relation to the existing literature in Table 5.7.

**Table 5.7**

*Findings on the value of being better informed*

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
It is important for children with CVD as well as the role players within their social ecologies to be informed of CVD, its associated challenges and the related support needs of these children.	Cole (2015) Long et al. (2015)	Supporting existing literature
Being informed of CVD can result in a sense of fulfilment and empowerment for children with the condition.	Masten et al. (2019)	Supporting existing literature
A parent guidance intervention can assist parents to better support their children with CVD.	Birch et al. (1998) Chakrabarti et al. (2018) Kvitile (2018) Male et al. (2024) Prieto et al. (2021) Shi et al. (2014) Wang et al. (2023)	Supporting existing literature
	None found	New insight
Increased awareness of CVD by parents, teachers and peers can result in positive changes in children's microsystems.	Berisso (2018)	Supporting existing literature
The majority of teachers who become informed of CVD will positively adapt their classroom practices once informed.	Kvitile (2018) Taneja-Johansson et al. (2023)	Supporting existing literature Contradicting existing literature

The findings of my study suggest that the resilience-enabling intervention was valuable to the child-participants as it equipped them with essential knowledge of CVD that led to an increased awareness and their better understanding of this visual condition, how it can affect their functioning, which support they can benefit from, how they can support themselves and how they can request and access accommodation arrangements at school. This finding highlights the importance of children with CVD being informed about what their condition entails to be able to experience positive changes within their supportive social ecologies. Their increased awareness and understanding of CVD and the development of self-advocacy skills boosted the child-participants' self-confidence and self-awareness, enhancing their ability to deal with adversity. This finding aligns with the insights offered by Cole (2015) who advocates for a raised awareness of the condition among children with CVD, and the value of educating them about their condition, indicating that informed awareness can empower children with CVD to navigate their experiences more effectively and advocate for their

needs within their different environments. Similarly, Long et al. (2015) highlight the negative consequences of delayed information about a CVD diagnosis, stating that this can exacerbate emotional and psychological distress among affected children.

As indicated earlier, the participants in my study experienced a sense of fulfilment and empowerment through the application of their newfound knowledge and skills to help others within their social systems. By sharing their experiences with others and offering support to peers and caregivers, the child-participants could not only reinforce their own understanding and mastery of the CVD-related challenges they faced but could also contribute to the lives of others. This finding resonates with the work of Masten (2019) who emphasises the impact of resilience-promoting interventions in building individuals' capacity to respond to adversity. By participating in interventions that foster resilience and empowerment, individuals with CVD can thus develop the necessary skills and mindset to cope with the challenges related to their condition, thereby enhancing their overall wellbeing and adaptive functioning. The findings of my study add new insight to the existing body of knowledge into the transformative potential of resilience-promoting interventions, indicating that individuals can be equipped with the necessary tools and mindset to demonstrate resilience and determination by fostering a sense of control, agency and contribution through such interventions.

In addition to the findings of my study highlighting the positive effect of the holistic intervention for children with CVD, their parents also benefitted from the parent guidance intervention. To elaborate, prior to the intervention, the parents reported a limited understanding of CVD and were uncertain of the way in which to effectively support their children. However, post-intervention, the parents indicated a well-developed understanding and knowledge base of CVD, accompanied by increased confidence in their role in advocating for their children's unique needs as well as understanding the specific support and guidance role that they as parents can fulfil within their children's lives.

This finding correlates with the work of Birch et al. (1998), Chakrabarti (2018), Male et al. (2024), Prieto et al. (2021) as well as Shi et al. (2014) who all emphasise the importance of an increased awareness of CVD amongst people affected by the condition as well as the various role players within their systems to foster inclusion and support. The finding furthermore resonates with the work of Chan et al. (2014), Kvitle (2018) as well as Wang et al (2023) who emphasise the transformative impact of an awareness of CVD on the positive development of children with CVD. In this regard, I found that the parents' newfound awareness and knowledge enabled them to better understand their children's difficulties and provide tailored support that empowered the children to navigate challenges with resilience and determination while feeling supported and secure within their social ecologies. Based on the uniqueness of the holistic intervention that was developed as part of my study, the findings I obtained also add new insight into the effect of the parent guidance intervention that was implemented and how this positively influenced the parents of children with CVD and indirectly the lives of their children.

Besides feeling better equipped to support their own children with CVD, I found that the parents in my study experienced greater empathy and understanding of other children experiencing differences. By sharing their knowledge and experiences with others, the parents positively contributed to the broader community, fostering a culture of acceptance and support for individuals with diverse needs. This finding relates to the work of Banks et al. (2022) and Taneja-Johansson et al. (2023) who assert that parental awareness and advocacy play a crucial role in ensuring that children with disabilities receive the necessary support and accommodations to facilitate optimal learning and development. The finding furthermore offers new insight into how an intervention focused on imparting knowledge and skills to parents of children with CVD will not only guide these parents to support their own children by creating a more supportive and inclusive environment for them but will also encourage better support provision to other children with unique needs. Closely related, the findings of my study indicate that parents who are well-informed can develop and implement specific support strategies within the home environment to meet their children's needs, as is also emphasised by Kvitle (2018) who asserts that parental awareness and understanding are essential prerequisites for effective support provision to children with diverse needs.

As a result of the increased awareness and understanding of their parents, as well as their teachers and peers, I found that the child-participants in my study received better support within their various microsystems. This finding aligns with the work of Berisso (2018) who states that once peers and teachers understand how a person with CVD experiences the world, they will feel enabled and empowered to provide these children with the appropriate support, which can lead to positive changes within the children's supportive social ecologies. As such, the findings of my study indicate how teachers indirectly benefitted from the holistic intervention by being made aware of and informed of children with CVD's condition as well as their support needs. I further found that once teachers become aware of how to support a child with CVD, they may become proactive in implementing support strategies that are tailored to the specific learning needs of the child. This finding is consistent with the work of Kvitle (2018) and Taneja-Johansson et al. (2023) who similarly emphasise the important role of teacher awareness and understanding in effectively supporting children with diverse and unique support needs. Moreover, by being informed, the teachers were better able to provide the necessary support and accommodations to children with CVD, thereby fostering a more inclusive and understanding school environment. Even though one child-participant in my study reportedly received inconsistent levels of support from his teachers, this seemingly contradictory finding may perhaps be ascribed to the teachers not fully understanding CVD and the challenges it may cause. This possibility requires further research to gain more clarity.

#### **5.4.2 The value of adopting a mindset of acceptance and hope**

In Table 5.8, I provide an overview of the findings I obtained that relate to the power of adopting a mindset of acceptance and hope when viewing CVD.

**Table 5.8**
*Findings on the value of a positive mindset*

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
The child-participants shifted their perception of CVD from viewing it as a deficiency to embracing it as a unique condition that holds intrinsic value.	UNICEF (2013b)	Supporting existing literature
	None found	New insight
The participants experienced a positive shift in mindset from being negative and pessimistic to being hopeful and optimistic.	Singal (2008) UNICEF (2013b)	Supporting existing literature
	None found	New insight
The child-participants experienced a positive change, acknowledging that they deserved accommodation and support.	UNICEF (2013b)	Supporting existing literature
	None found	New insight
A positive shift in mindset by other role players positively affected the child-participants.	Banks et al. (2022)	Supporting existing literature
	None found	New insight
Child-participants experienced a healthier self-concept and self-esteem as a result of their changed mindset in viewing their condition of CVD in a positive light.	McLeroy et al. (1988)	Supporting existing literature
	None found	New insight

The findings of my study indicate a shift in the participants' perceptions of their visual condition, highlighting a transformation from viewing CVD as a deficiency or limitation to embracing their condition as unique and as something that holds intrinsic value. The participants accordingly moved from seeing the world as wrong or less than, to recognising the beauty and validity of their unique perception of the world. They transitioned from a state of feeling isolated and different from others to embracing their uniqueness and valuing their diverse perspectives. Rather than maintaining a deficit view, the participants started viewing their CVD as a source of richness and diversity that contributes to their sense of identity and self-worth. This finding is consistent with the work of UNICEF (2013b), according to which the development of children with disabilities can be supported by promoting their self-belief that they as well as their perspectives and experiences are important and valuable. The finding also adds new insight into the way in which the reframing of restricting thoughts and preconceived beliefs can positively support children with CVD and enable them to find value and worth in their perception of the world. Furthermore, this finding can be interpreted against the background of my conceptual framework, specifically in terms of the mechanism of resilience: *dream* (Theron, 2018) as the child-participants developed the skill of seeing things differently or reinterpreting their reality and fostering hope for the future. This adds new insight into how the mechanisms of resilience can support children with CVD to cope with the challenges they face as a result of their condition.

The findings of my study furthermore confirm that the resilience-enabling intervention supported the transformation of the child-participants' perceptions of themselves, from experiencing high levels of

pessimism, frustration and anger towards themselves that negatively impacted their overall self-esteem and self-image to demonstrating a notable shift in their mindset, characterised by messages of optimism, understanding and acceptance of diversity. Whereas they felt defeated and incapable of completing certain activities or tasks, leading to feelings of disempowerment and hopelessness before implementation of the intervention, they developed a newfound sense of acceptance and hope during and after their participation, embracing their unique experiences and perspectives. This finding relates to the work of UNICEF (2013b), indicating that a potential factor that can support the healthy development and wellbeing of children with disabilities relates to a positive self-belief that such children are valuable and deserve to be accommodated. The finding furthermore supports the insights offered by Singal (2008) who emphasises the power of knowledge and an understanding of challenges in reshaping the beliefs of children who experience barriers to learning. This finding also adds new insight into the way in which knowledge and information can lead to a positive paradigm shift amongst children with CVD, thereby supporting them to develop a healthier self-concept.

In addition to the value of the children with CVD adapting a positive mindset about their condition, the findings of my study indicate that when parents, teachers and peers adopt a mindset of acceptance and respect for others with CVD, the latter can be supported more effectively, resulting in them feeling more secure and accepted. This finding correlates with the work of Banks et al. (2022) who note that positive peer attitudes can be an important support mechanism in empowering children with disabilities to engage with their environment and build competence and capacity. The implication of this finding is profound, emphasising the critical role of social attitudes and perceptions in shaping the experiences of children with disabilities, thereby adding new insight into the value of inclusive attitudes and the behaviours of peers, teachers and parents for children with CVD.

The findings of my study furthermore confirm the positive effect of the holistic intervention that was developed and implemented on the self-concept and self-esteem of the child-participants. To elaborate, prior to the intervention, the child-participants held critical views of themselves; yet following the intervention, they demonstrated a significant shift towards a healthier self-concept, characterised by an increased awareness of their personal strengths and abilities as well as a greater willingness to seek support when needed. This finding aligns with the work of McLeroy et al. (1988) and the conceptual framework of my study that proposes that interventions targeting the intrapersonal level can facilitate change and enhance an individual's self-concept while empowering them with knowledge, subsequently leading to the development of resilience-enabling skills. This finding also adds new insight into the way in which an intervention facilitated with children with CVD can positively influence their emotional functioning by specifically supporting self-awareness and the development of a positive self-concept.

### 5.4.3 The value of feeling confident to voice personal needs and request outside support

The findings of the current study suggest that the holistic intervention supported the child-participants in developing the necessary confidence to voice their needs, and supported both the child-participants and their parents to advocate for the children's rights to inclusive education and accommodation within the school setting. In Table 5.9 I provide an overview of these findings.

**Table 5.9**

*Findings on the value of being confident to voice needs and request support*

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
The child-participants developed confidence to voice their experiences and needs that led to positive changes and support within their systems.	Fergus and Zimmerman (2005)	Supporting existing literature
Parent involvement and support provision are important for children coping with CVD.	Bronfenbrenner and Morris (2006)	Supporting existing literature
The resilience-enabling intervention enhanced the child-participants' ability to cope and overcome adversity.	Cameranesi et al. (2023) Crisan et al. (2021) Fergus and Zimmerman (2005) Frounfelker et al. (2020) Gabrielli et al. (2022) Giordano et al. (2021) Sander et al. (2022)	Supporting existing literature
	None found	New insight

The findings of my study confirm that the holistic intervention empowered the child-participants with the necessary skills and confidence to articulate their experiences and advocate for their need for support when they experienced difficulty with tasks involving colour. To elaborate, the child-participants demonstrated an increased ability to voice their needs, leading to positive changes within their systems and in them gaining better support and being accommodated more effectively. Importantly, the participants were able to express their experiences and needs without displaying feelings of embarrassment or shame, with this pointing to a sense of empowerment and self-assurance. This finding aligns with the work of Fergus and Zimmerman (2005) who underscore the importance of resilience-enabling coping strategies in empowering children to navigate adversity within their ecological systems. To be more specific, by developing the ability to share their needs with others, children can enhance their resilience and agency, thereby being able to effectively respond to challenges and advocate for their own wellbeing. As such, this finding adds new insight into the potential value of interventions in empowering children with CVD to navigate the unique difficulties they face by voicing their needs to others to access focused support.

The findings of my study also emphasise the differing and distinct roles assumed by children and their parents in advocating for support and the accommodation of children with CVD in school. While

the child-participants were empowered to voice their direct experiences and perceptions with others and explain which support and accommodations they require, the parent-participants fulfilled a complementary role by providing guidance and support to their children and overseeing their children's efforts to access support while sometimes, in cases where required, approaching teachers and explaining the support and accommodation required by their children. Based on the conceptual framework that guided me, parents can thus be regarded as a resource that can bring about positive change within the systems where the child functions. This finding also aligns with the mechanism of resilience: *connect* (Theron, 2018) of the conceptual framework as the participants connected with others and relied on the resources around them to access support. The finding adds new insight into the roles of both parents and children when having to cope with a disability or difference.

The findings of my study furthermore indicate that the resilience-enabling coping skills and strategies developed by the child-participants during the holistic intervention were not limited to addressing CVD-related challenges but could also be transferred to other situations such as navigating academic pressures, managing peer relationships, and coping with general stress or anxiety. This finding suggests that the knowledge and skills gained during the resilience-enabling intervention could be used to help the child-participants overcome other forms of adversity, thereby pointing to the broad applicability of the content included in the intervention beyond its initial scope. The finding closely aligns with the conceptual framework of the study, particularly with the perspective proposed by Khenti et al. (2016) who advocate for health initiatives that will promote capacity building and have long-term positive influences on participants. The findings of my study, as a result, suggest that the holistic intervention developed as part of the study may serve as an example and model for other resilience-enabling interventions targeting diverse populations that face a form of adversity.

This perspective can be related to the work of Cameranesi et al. (2023) as well as Crisan et al. (2021) who underscore the value of resilience-focused interventions in providing individuals with versatile coping mechanisms applicable across various contexts. Similarly, Frounfelker et al. (2020) and Gabrielli et al. (2022) underscore the importance of equipping participants with adaptable skills that can extend beyond the primary focus of an intervention, thereby facilitating broader applications in different adversity scenarios. Giordano et al. (2021) and Sander et al. (2022) confirm that interventions designed to enhance resilience hold the potential to improve individuals' overall capacity to manage a range of challenges, thereby affirming the broad relevance of the skills and strategies included in the holistic intervention I implemented. Moreover, this finding adds new insight into the field of resilience-focused interventions, highlighting the potential of interventions targeting specific challenges to serve as frameworks for addressing broader issues of adversity.

#### 5.4.4 Positive effect of the intervention on the functioning of the children

In this section, I discuss the findings of the study related to the positive effect of the holistic intervention on the functioning of the child-participants. In Table 5.10, I summarise the findings by comparing the results I obtained to existing literature.

**Table 5.10**

*Findings on the positive effect of the intervention on the functioning of the child-participants*

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
The holistic intervention positively affected the child-participants' psycho-social functioning.	Khenti et al. (2016) Masten et al. (2019)	Supporting existing literature
	None found	New insight
The resilience-enabling intervention enhanced the child-participants' ability to overcome the adversity they faced.	Frounfelker et al. (2020) Dray et al. (2015) Morina et al. (2017)	Supporting existing literature
	None found	New insight
The holistic intervention resulted in positive change in the child-participants' holistic systems that enabled multi-level support.	Dadczynski et al. (2020) McLeroy et al. (1988) Stodden et al. (2020)	Supporting existing literature
As a result of being involved in the holistic intervention the child-participants were able to mobilise their resources and better understood their support needs.	Brymer and Davids (2016) Fergus and Zimmerman (2005) Theron (2018)	Supporting existing literature
Participants developed positive communication skills that supported them in overcoming adversity.	Lansdown et al. (2014) Theron (2018)	Supporting existing literature
Participants experienced positive growth in their self-awareness as a result of their involvement in the resilience-enabling intervention.	Blessin et al. (2019) Masten (2019)	Supporting existing literature
Children involved in resilience-promoting interventions may develop skills that can empower them effectively to navigate and overcome adversity.	Cameranesi et al. (2023) Crisan et al. (2021) Fergus and Zimmerman (2005) Frounfelker et al. (2020) Gabielli et al. (2022) Giordano et al. (2021)	Supporting existing literature
	None found	New insight
Child-participants indicated mixed experiences of wearing the EnChroma glasses.	EnChroma (n.d.-c) Gómez-Robledo et al. (2018) Varikuti et al. (2020) Werner et al. (2020) Webster (2020)	Supporting existing literature

The findings of my study indicate that the holistic intervention positively influenced the psycho-social functioning of the child-participants. More specifically, the child-participants reported improvements in their self-concept, self-confidence and self-awareness, following their participation in the holistic

intervention. To elaborate, through targeted activities and support, the child-participants were able to explore their strengths, talents and capabilities, leading to greater self-awareness and confidence. This enhanced their self-concept and not only empowered them to navigate the challenges they faced more effectively but also fostered a sense of belonging and acceptance within their peer groups. This finding aligns with the work of Khenti et al. (2016) who state that effectively developed health initiatives can lead to meaningful change amongst participants as they develop skills to deal with unique difficulties that can imply positive long-term effects. The finding aligns with the research of Masten (2019) who highlights the importance of capacity building as part of health promotion interventions as well as the development of protective factors associated with resilience.

The findings of my study furthermore suggest that the resilience-enabling intervention did not only strengthen the child-participants' ability to overcome adversity related to their CVD but also helped them manage other challenges unrelated to this condition. The finding correlates with the work of Dray et al. (2015), Frounfelker et al. (2020) and Morina et al. (2017) who state that participation in resilience-promoting interventions can enhance individuals' capacity to cope with adversity, resulting in the development of resilience-enhancing skills and protective factors. By fostering resilience and adaptive coping strategies, interventions can contribute to the overall wellbeing and flourishing of participants, enabling them to navigate life's challenges with greater confidence and efficacy. This finding adds new insight into the positive effect of a resilience-enabling intervention for the specific demographic profile of children with CVD.

As such, the findings of my study illustrate how the holistic intervention addressed multiple aspects of the child-participants' functioning and provided them with multi-level support, having a positive effect on their overall functionality and development. The resilience-enabling intervention specifically supported the child-participants, while the parent guidance intervention aimed to support their parents. This combined approach, focusing on support within the microsystems of the child-participants, led to positive changes within their supportive social ecologies. This finding correlates with the work of Dadczynski et al. (2020) as well as McLeroy et al. (1988) who state that a holistic approach to interventions will rely on the interaction between individuals' various systems that can foster positive change within the participants' supportive environments. In confirmation, Stodden et al. (2020) emphasise the importance of collaboration between parents, teachers and other support systems to ensure that participants receive consistent and comprehensive support, thereby fostering resilience and aiding in their overall functioning and development.

Moreover, the findings of my study indicate that involvement in the holistic intervention resulted in the child-participants being able to mobilise the resources in their supportive social ecological systems, resulting in them being able to better overcome the challenges they faced. By drawing upon the strengths and resources available within their family, school and community systems, the child-participants were thus empowered and enabled to demonstrate resilience. Whether through

them seeking the guidance of their parents or teachers, or through utilising friendships for emotional support, or mobilising community resources for practical assistance, the child-participants were able to thrive and better cope with the CVD-related challenges they faced. This finding aligns with the work of Fergus and Zimmerman (2005) who emphasise the importance of identifying assets and resources within individuals' nested systems when wanting to cope with adversity. The finding furthermore correlates with the work of Brymer and Davids (2016) who similarly highlight the importance of assets and resources in enhancing resilience and facilitating positive outcomes among individuals facing challenges within their supportive social settings.

Furthermore, the finding relates to the conceptual framework of my study, specifically with the mechanism of resilience: *do* (Theron, 2018). To explain, the child-participants in my study developed the skill of identifying and mobilising their resources, thereby enhancing their resilience and adaptive functioning. By recognising their assets, the participants were better equipped to confront challenges and thrive in the face of adversity. This finding adds new insight into how the mechanisms of resilience can be utilised for interventions to support children facing unique differences such as CVD. Additionally, the child-participants developed the skill of connecting with others and forming meaningful relationships that can also support them when faced with adversity.

The findings of my study also suggest that the child-participants experienced better self-awareness after participating in the intervention, specifically in terms of their ability to understand their own feelings and identify their strengths and weaknesses. Through the intervention, they developed better insight into their emotional experiences, gaining the capacity to recognise and process their feelings more effectively. Additionally, they became more capable of identifying their strengths and weaknesses, which enabled them to approach challenges with a clearer understanding of their capabilities, where they required support and where they could access such support (resources). Their heightened self-awareness served as a foundation for personal growth and development, empowering the participants to make informed decisions and pursue strategies for self-improvement. By nurturing this aspect of their emotional intelligence, the intervention supported not only their psychological wellbeing but also their ability to navigate various aspects of their lives with confidence and resilience. This finding aligns with the work of Blessin et al. (2019) and Masten (2019) who postulate that the involvement in resilience-enabling interventions may culminate in the development of emotional regulation, a positive self-esteem, and improved active coping strategies.

With regard to the ability to openly communicate and express themselves, the intervention positively influenced the development of the participants' communication skills and their ability to express their needs and experiences with others. Through the structured activities and supportive guidance provided within the intervention, the participants gained confidence in articulating their thoughts and feelings more effectively. This newfound ability to communicate openly fostered deeper connections with others, enhancing their relationships and support networks. Overall, the intervention did not only

enhance their communication abilities but also empowered them to advocate for themselves and engage more meaningfully during social interactions. This finding aligns with the work of Lansdown et al. (2014) who emphasise the importance of adopting a mindset of championing children with differences, emphasising the pivotal role of a positive mindset in fostering the development of communication skills and the ability to express oneself. Additionally, the finding resonates with the conceptual framework of my study, specifically the mechanisms of resilience: *connect* and *do* (Theron, 2018) as, by enhancing their communication skills, the participants were better equipped to navigate interpersonal challenges and collaborate with others towards common goals.

As suggested in existing literature, children involved in resilience-promoting interventions typically develop skills that can empower them to cope with adversity (Cameranesi et al., 2023; Crisan et al., 2021; Fergus & Zimmerman, 2005; Frounfelker et al., 2020; Gabrielli et al., 2022; Giordano et al., 2021). In terms of this finding, my study indicates that the child-participants developed skills associated with resilience that empowered them to better cope with their condition. This finding adds new insight into the unique value and skills that these children with CVD developed and found meaningful and important to face specific challenges. The finding may also inform the future development of interventions for children with visual impairments or related conditions, potentially changing the way they experience and perceive the world around them.

Finally, the findings of my study indicate that the child-participants generally experienced the wearing of the EnChroma glasses as something positive that added value to their lives. This finding aligns with the work of Gómez-Robledo et al. (2018), Varikuti et al. (2020), Webster (2020) as well as Werner et al. (2020) who found that EnChroma lenses increase the wearer's ability to identify contrast between colours, resulting in noticeable differences in colour vision. One of the participants in my study similarly indicated that the glasses improved his ability to differentiate between colours, thereby positively altering his colour vision. On the contrary, another participant experienced headaches when wearing the glasses for long periods of time and felt that this overshadowed the benefit of wearing the glasses. This finding aligns with EnChroma (n.d.-c) indicating the potential side effects of wearing the glasses as being headaches or eyestrain. These mixed experiences highlight the importance of individual differences and considerations in implementing holistic interventions, as well as the need for further research to understand the diverse effects, benefits and potential limitations of assistive technologies such as EnChroma glasses.

#### **5.4.5 Positive effect of the holistic intervention on role players in the supportive social ecologies**

In this section I discuss the findings related to the positive effect of the holistic intervention on role players in the child-participants' supportive social ecologies. I summarise the findings of my study in comparison to existing literature in Table 5.11.

**Table 5.11**
*Findings on the positive effect of the holistic intervention for various role players*

FINDINGS	RELATED LITERATURE	RELATION WITH EXISTING LITERATURE
A holistic support intervention can positively influence the emotional and social functioning of children living with CVD.	Frounfelker et al. (2020) Giordano et al. (2021) Luthar and Cicchetti (2000) Morina et al. (2017)	Supporting existing literature
	None	New insight
A resilience-enabling intervention can positively influence the development of resilience-enabling coping skills.	Cameranesi et al. (2023) Dray et al (2015) Gabielli et al. (2022) Masten (2019)	Supporting existing literature
	None	New insight
The holistic intervention provided multi-level support within the child-participants' systems.	Dadaczynski et al. (2020) Dray et al. (2015) Khenti et al. (2016) McLeroy et al. (1988) Morina et al. (2017)	Supporting existing literature
A parent guidance intervention can positively influence parents' ability to support their children with CVD.	None found	New insight
A resilience-enabling intervention can empower those involved to support others.	Khenti et al. (2016)	Supporting existing literature
A holistic intervention can be of specific value to parents of young children with CVD.	Eze et al. (2020) Mashige and Van Staden (2019) Melo et al. (2014) Torrents et al. (2011)	Supporting existing literature
A holistic intervention can positively influence child-parent relationships.	Bronfenbrenner and Morris (2006)	Supporting existing literature
	None found	New insight
A holistic intervention can indirectly positively influence other children.	None found	New insight

The findings of my study suggest that the holistic intervention positively affected the emotional and social functioning of the child-participants living with CVD. The findings indicate that children with CVD can benefit from being involved in an intervention that focuses on empowering the participants with knowledge of CVD and with resilience-enabling skills that can support them in overcoming the challenges they face. This finding aligns with the work of Frounfelker et al. (2020), Giordano et al. (2021), Luthar and Cicchetti (2000) as well as Morina et al. (2017) who all emphasise the effectiveness of resilience-enabling interventions and psycho-educational approaches in supporting the emotional and social functioning of children facing challenges. In this regard, Frounfelker et al. (2020) emphasise that resilience-building strategies can empower children to manage stress and adversity more effectively, while Giordano et al. (2021) foreground the importance of psycho-education in providing children with the necessary skills and knowledge to navigate their social environments and the challenges they face. Luthar and Cicchetti (2000) similarly highlight the

importance of resilience in mitigating the impact of adversities on emotional development, suggesting that supportive interventions can significantly enhance adaptive functioning.

The findings of my study furthermore suggest that in addition to the child-participants, their parents, siblings, teachers and friends within their supportive social ecologies benefitted either directly or indirectly from the children's and parents' involvement in the holistic intervention. This potential ripple effect of such interventions highlights the value of not only supporting the individual child but also fostering an understanding and support within the child's broader supportive social ecologies. This finding aligns with the ecological model of McLeroy et al. (1988) that posits that effective health promotion will consider multiple levels of influence. By recognising the interconnectedness of these levels, the holistic intervention that I facilitated illustrates how addressing individual needs can simultaneously impact and improve a broader social ecology. McLeroy et al. (1988) explain that interventions will be more effective when they are multi-layered and contextually sensitive, with this view aligning with my findings that the holistic approach of the intervention contributed to positive changes not only for the children with CVD but also for others within their supportive networks.

The findings of my study, for example, indicate that the parent-participants significantly benefitted from participating in the parent guidance intervention, being enabled to better support and understand their children with CVD. Parents benefitted by developing a greater awareness and understanding of their children's condition as well as an understanding of their role in supporting and advocating for the rights of their children with CVD, especially within the school environment. This finding adds new insight into the importance of involving parents in interventions designed to support children with CVD. By actively participating, the parents did not only gain a better understanding of CVD but also became better equipped to advocate for their children's needs. This finding contributes new insight by emphasising the pivotal role of parental support in the holistic care of children with CVD. It highlights how targeted interventions can empower parents to fulfil a more informed and proactive role in their children's development and functioning, particularly in navigating the complexities associated with CVD.

In the current study, the participants were empowered to work collaboratively with others by sharing their own experiences, knowledge and perceptions. The findings therefore indicate that as a result of them participating in the resilience-enabling intervention, the child- and parent-participants were empowered to support others. This finding is consistent with the conceptual framework of my study that predicts that holistic approaches can foster collaborative support networks and amplify the impact of interventions by extending benefits to a wider community, as highlighted by Khenti et al. (2016). This finding also provides new insight into the effect of resilience-enabling interventions on participants' ability to support others and how such collaborative support can extend the benefits of an intervention to the broader community.

The findings I obtained on the experiences of the child-participants and the effect of the holistic intervention add new knowledge to the fields related to the experiences of children with CVD, resilience-promoting interventions and support interventions specifically aimed at supporting children with CVD and their parents. Furthermore, the findings of my study were used to compile supportive guidelines on CVD and provide support strategies to teachers, parents and children with CVD. By synthesising my insights from the study into practical guidelines (consult Appendix C and Appendix D), this research fills some gaps in the knowledge base available on CVD and also provides valuable tools that can be implemented by people involved in supporting children with CVD.

Existing literature highlights the importance of an early diagnosis and intervention for CVD to prevent long-lasting negative effects and ensure appropriate support provision from early childhood onwards. In this regard, existing literature states that early detection can minimise potential stigmatisation and discrimination experienced by children with CVD (Eze et al., 2020; Mashige & Van Staden, 2019; Melo et al., 2014; Torrents et al., 2011). The findings of my study confirm this view, as the parent-participants noted that the holistic intervention would have been more valuable if accessed earlier in their children's lives. The child-participants similarly felt that earlier introduction to the knowledge could have provided them with better strategies to cope with the CVD-related challenges they had been experiencing.

Finally, the findings of my study indicate that the participants' relationships were positively influenced as the child-participants and their parents were able to more openly communicate as the intervention progressed. To elaborate, the intervention resulted in better awareness and empathy within child-parent relationships, as parents were better able to understand the experiences and challenges their children faced. As such, the intervention facilitated stronger connections and strengthened the bonds between the children and their parents. As a result, the parents became more attuned to their children's needs and experiences, leading to greater empathy and support provision, benefiting the family's overall wellbeing and providing a foundation for managing CVD-related challenges. This finding aligns with the work of Bronfenbrenner and Morris (2006) who emphasise the importance of parental support for the development of a child. The finding also adds new insight into the experiences of children with CVD and their parents after participating in a holistic intervention.

## **5.5 SITUATING THE FINDINGS OF THE CURRENT STUDY WITHIN THE CONCEPTUAL FRAMEWORK**

In this section, I situate the findings of the current study within the conceptual framework that guided me to highlight the effect of the holistic intervention on each child-participant. I provide a detailed account of how the intervention impacted each of the child-participants. To depict the effect of the holistic intervention on the child-participants and the changes within their systems, I present my

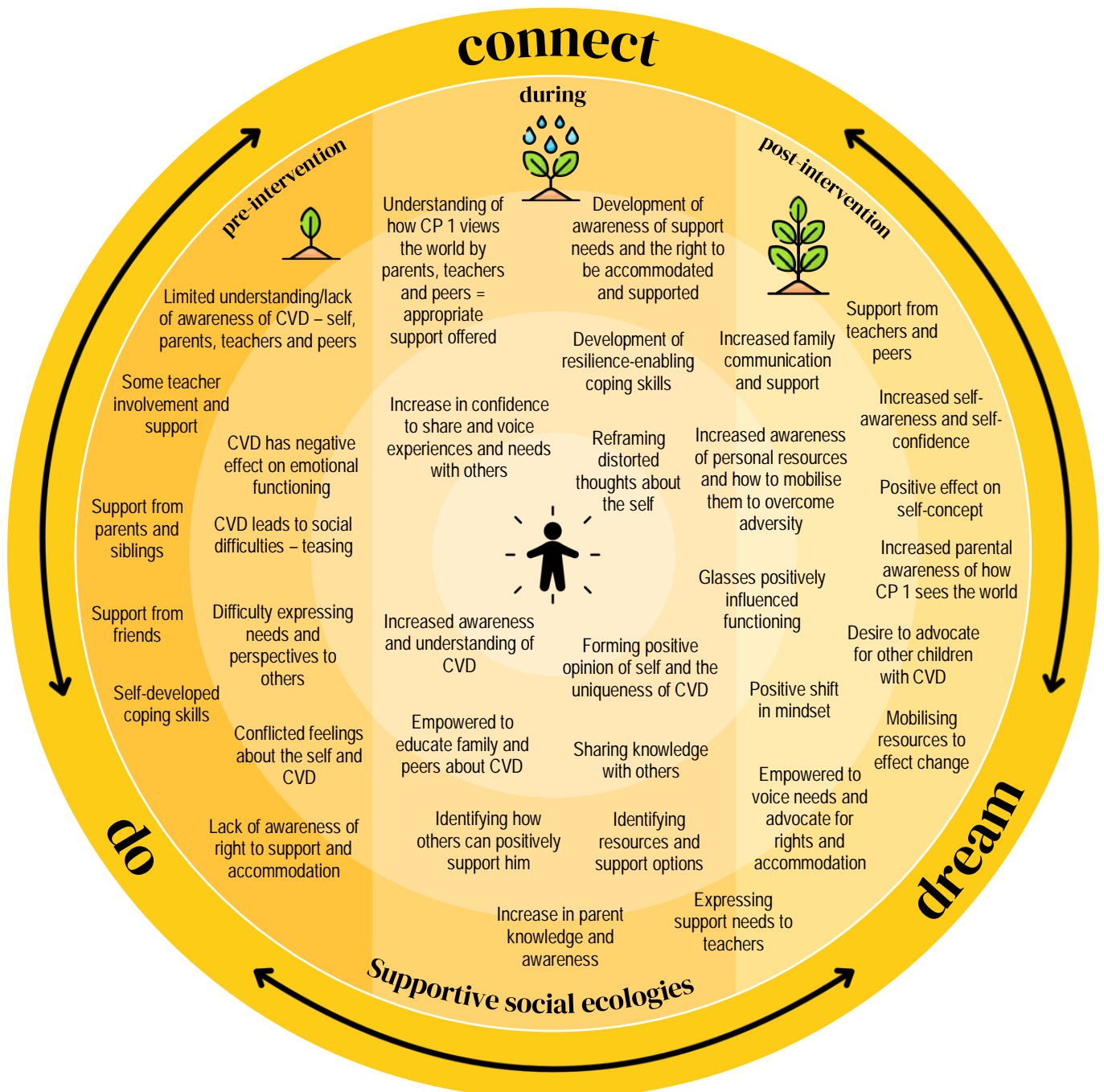
findings in the form of visual diagrams (Figures 5.1, 5.2, 5.3 and 5.4) that align with the conceptual framework that guided me.

### 5.5.1 Effect of the holistic intervention for child-participant 1

The findings of my study indicate that child-participant 1's academic, emotional and social functioning was positively influenced after his participation in the resilience-enabling intervention and his parents' participation in the parent guidance intervention. Figure 5.1 provides an overview of the findings for the various phases of my study for child-participant 1.

**Figure 5.1**

Overview of the effect of the holistic intervention in the case of child-participant 1



As captured in Figure 5.1, the findings of my study suggest that child-participant 1 experienced a limited understanding of his condition prior to his participation in the intervention, resulting in him experiencing difficulty to express his needs and perception of the world to others. He also struggled with conflicted feelings regarding his self-image and felt frustrated about being different from others and not being able to see what others see. Child-participant 1 reported a lack of awareness of CVD amongst his parents, teachers and peers that resulted in him having negative experiences within the school context, taking the form of, for example, being teased by peers and experiencing a lack of teacher involvement and support. At this stage, child-participant 1 primarily relied on self-developed coping strategies to navigate the world and deal with the CVD-related difficulties he faced, even though these strategies did not always positively support him in the school setting.

During the resilience-enabling intervention, the participant gained knowledge of CVD and resilience-enabling coping skills, enabling him to enact positive changes within his nested systems. This finding relates to the conceptual framework of the study as it highlights the importance of ecological models of health promotion and the role of social contexts in individual development. More specifically, the ecological model of McLeroy et al. (1988) emphasises the interplay between the individual and their environment that is reflected in child-participant 1's improved ability to navigate and influence his social ecologies as the intervention progressed. He also obtained a better awareness of his available resources and how to mobilise these to overcome the challenges he faced. This development of resilience-enabling skills aligns with Theron's (2018) *connect&dream&do* framework that highlights the importance of forming meaningful connections, having positive expectations, and taking wellness-promoting actions when facing any form of adversity.

The skills acquired by child-participant 1 during the intervention fostered resilience within his nested systems, thereby empowering him to make constructive choices that could elicit positive changes within himself and his supportive social ecologies. This finding aligns with the HPIF (Khenti et al., 2016) that emphasises holistic health, cultural relevance and sustainability through strong partnerships and capacity building. The positive effect of the intervention on the self-concept and coping strategies of child-participant 1 resonates with the framework's emphasis on understanding individuals within their specific contexts and fostering long-term positive effects.

In addition to the notable changes in terms of his self-concept and the cultivation of a more positive self-image, child-participant 1 demonstrated reduced levels of anxiety after the intervention (consult Table 4.5 and Figure 4.7), respectively reflecting a shift towards more positive and healthy beliefs about himself and improved coping strategies to manage anxiety. Child-participant 1's reflection after his participation in the intervention highlights the positive effect he experienced from developing an awareness of CVD, learning to utilise resources and seek support from others, with this resulting in a sense of empowerment and reduced feelings of isolation. This indicates that the intervention not

only addressed his immediate needs but also equipped him with valuable skills and strategies to navigate the challenges he faced more effectively in the future, thereby demonstrating resilience.

The findings of my study furthermore indicate that child-participant 1 experienced a transformed mindset, moving away from frustration and anxiety about his CVD to feeling proud about him being different and eager to share his experiences and knowledge with others. Subsequent to his participation in the intervention, he developed coping strategies to manage others' teasing about his condition and cultivated positive intrapersonal and interpersonal skills associated with resilience. This resulted in him feeling empowered, more self-assured, self-aware and more self-confident. The skills he acquired included an increased ability to voice his needs and experiences, the ability to mobilise internal resources for support, optimism, hopefulness, confidence to advocate for his rights and accommodations, and acceptance of him requiring support to deal with the challenges he faced. He also displayed a strengthened ability to communicate openly with his family, peers and teachers as the intervention progressed, to express himself, explain his condition, and identify resources within his social networks through which he could mobilise support. These enhanced intrapersonal and interpersonal skills positively influenced his academic, emotional and social functioning, which reflects the conceptual framework's inclusion of the transactional pathways to resilience, highlighting how the *connect&dream&do* mechanisms may foster a sense of agency and self-efficacy.

Next, the findings of my study indicate that child-participant 1 facilitated positive changes within his social ecologies by utilising resources from the intervention to educate his peers and teachers, enabling them to better support him and to better support other children with CVD. He also communicated his needs to teachers to receive appropriate accommodations and support in the classroom, leading to improvement in his academic functioning, with him feeling heard and supported in the school environment. Furthermore, the increased awareness and understanding of CVD and its related challenges by his parents and teachers resulted in positive change in his supportive social ecologies. To elaborate, his parents' involvement in the parent guidance and support intervention contributed to their increased awareness and advocacy for his needs, while accommodations made within the school context and parental communication with the school supported his academic and social functioning. Overall, these positive changes within child-participant 1's social ecologies positively influenced and supported his development and wellbeing, thereby aligning with the ecological model's focus on the importance of supportive environments and the HPIF's emphasis on collaborative efforts and systemic change.

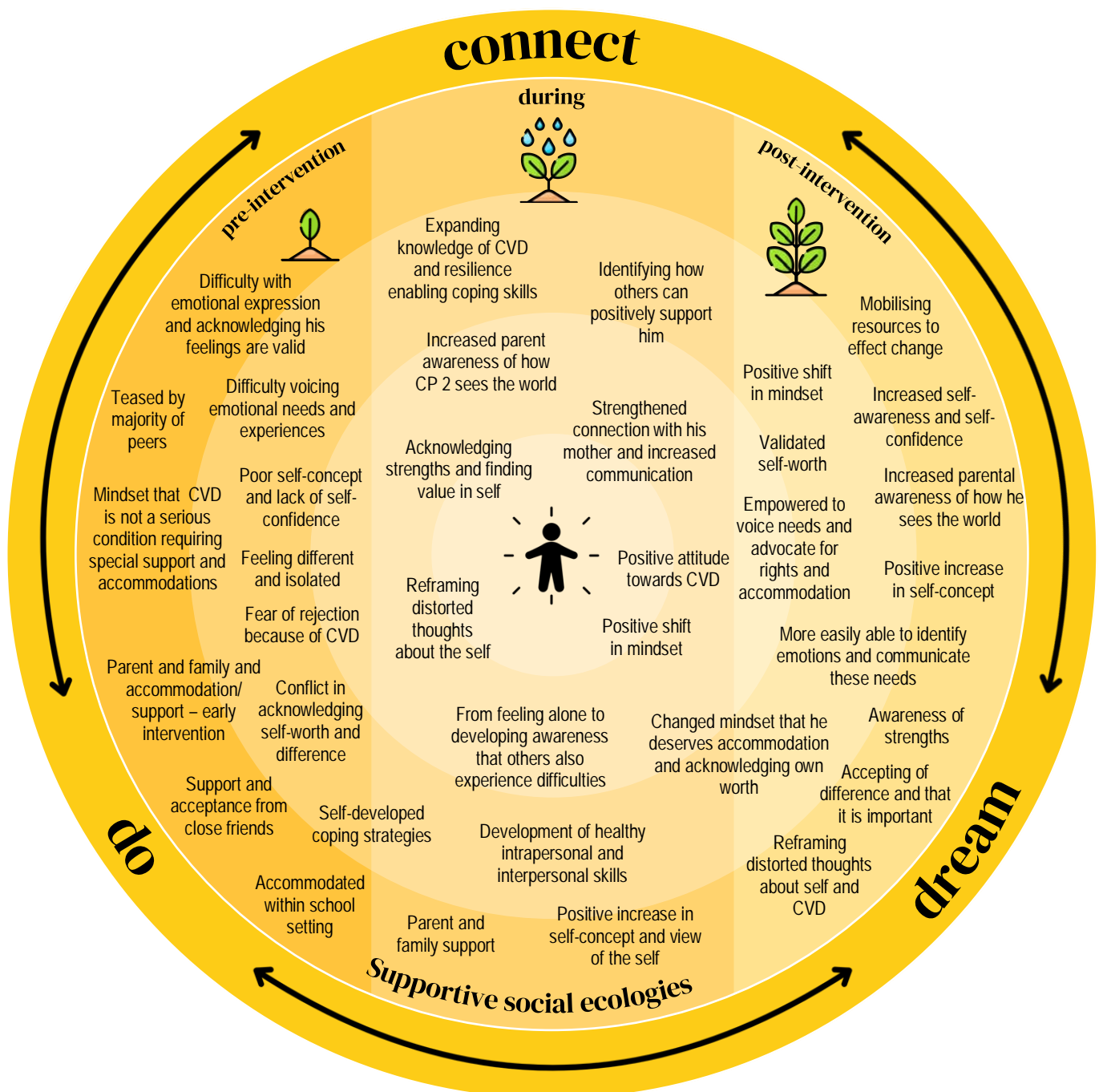
In conclusion, child-participant 1 experienced significant positive changes within his microsystem and supportive social ecologies that supported and promoted the development of individual and systemic resilience. The holistic intervention, in the form of the resilience-enabling intervention and parent guidance intervention, supported the facilitation of these positive changes over time. This reflects the interconnectedness highlighted in the conceptual framework of my study, demonstrating

how the combined elements of the ecological model, the HPIF, and the *connect&dream&do* mechanisms fostered resilience and wellbeing in child-participant 1 as the intervention progressed.

### 5.5.2 Effect of the holistic intervention for child-participant 2

The findings of my study indicate that child-participant 2 experienced positive changes within his emotional and social domains of functioning as a result of his participation in the resilience-enabling intervention and his mother's participation in the parent guidance intervention. Figure 5.2 provides an overview of the findings for the various study phases.

**Figure 5.2**  
*Overview of the effect of the holistic intervention in the case of child-participant 2*



The findings of the study suggest that child-participant 2 experienced positive changes within his microsystem as well as within his family and school systems. These changes within his nested systems were evident throughout the course of the intervention, suggesting that the holistic intervention positively influenced his functioning. He developed positive intrapersonal skills that supported his individual resilience, and demonstrated positive changes in terms of emotional and social functioning.

Prior to the intervention, child-participant 2 struggled with a poor self-concept, difficulty acknowledging his strengths and self-worth, and feared rejection due to his CVD. He found it hard to believe that his differences deserved the same level of accommodation and support as other, more serious challenges. Although he held a good understanding of CVD and its causes, he found it hard to verbally express his emotional needs when CVD caused him distress. While he could articulate his practical support needs in the classroom, he struggled to express his emotions related to CVD and the challenges he experienced as a result. Within his social ecologies, his mother and grandparents held a well-developed understanding of CVD, and he received support from his family, close friends and teachers. The school made adaptations based on efforts by the child-participant and his mother who informed the school about his need for support with colour perception. However, child-participant 2 was teased by some peers due to his struggles with colour perception that at times negatively impacted his school experience.

The findings furthermore indicate that child-participant 2 was relying on several self-developed coping strategies to manage the challenges he faced when becoming involved in my research, such as asking his friends for help with practical matters in the classroom and labelling his pencils. These strategies developed in response to his experiences during his early childhood, when he struggled with colour perception and navigating social interactions with others. Asking for help allowed him to seek assistance when needed, while labelling his pencils assisted him to organise materials and distinguish between different colours more effectively. These coping strategies demonstrate the participant's resourcefulness and resilience in finding practical solutions to the problems he faced as a result of his condition. However, despite these efforts, it was evident that additional support and accommodations were needed to fully address child-participant 2's needs and promote his overall wellbeing.

As the holistic intervention progressed, the resilience-promoting skills of child-participant 2 were strengthened within his nested systems, empowering him to make positive choices and experience positive change. Significant improvements were observed in his emotional functioning in terms of an improved self-concept and a positive shift in his mindset regarding his self-worth, with him gradually acknowledging that he deserves to be accommodated and supported by others academically, emotionally and socially. In addition to the positive effect of the intervention on his self-concept (consult Table 4.6 and Figure 4.8) an improvement in self-confidence and a decrease in sensitivity

to criticism could be observed after his involvement in the holistic intervention. In terms of the conceptual framework, these findings demonstrate how individual and systemic resilience can be fostered through targeted interventions within a child's ecological systems, reflecting the ecological model of McLeroy et al. (1988) as well as Theron's (2018) *connect&dream&do* mechanisms.

Following the intervention, child-participant 2 demonstrated better interpersonal skills linked to resilience that fostered a sense of acceptance, self-confidence and the ability to express his emotional needs and experiences of CVD. His enhanced self-awareness resulted in him realising that his CVD was a learning barrier, deserving of accommodation and support within the school environment. This realisation enabled him to better identify and acknowledge his emotions and needs. As a result, he gained a better understanding of his condition, strengthened his relationship with his mother, and experienced better communication with family, peers and teachers. These improvements in intrapersonal and interpersonal skills enabled him to cope more effectively with challenges, with this positively influencing his emotional and social functioning. These findings reflect the study's conceptual framework, which emphasises transactional pathways to resilience and the importance of supportive social ecologies.

The findings of my study furthermore confirm certain positive changes within child-participant 2's supportive social ecologies, such as an increased awareness and understanding amongst his family and peers of how CVD influenced child-participant 2's experiences and how he perceived the world; they also underscore increased parental support and an even stronger connection and attachment with his mother. These positive changes supported better emotional and social functioning for this participant. As such, my findings attest to the fact that the intervention did not merely facilitate changes by addressing the individual needs of child-participant 2 but also by encouraging a supportive and accommodating environment, as captured in the conceptual framework where ecological and holistic health promotion models are integrated.

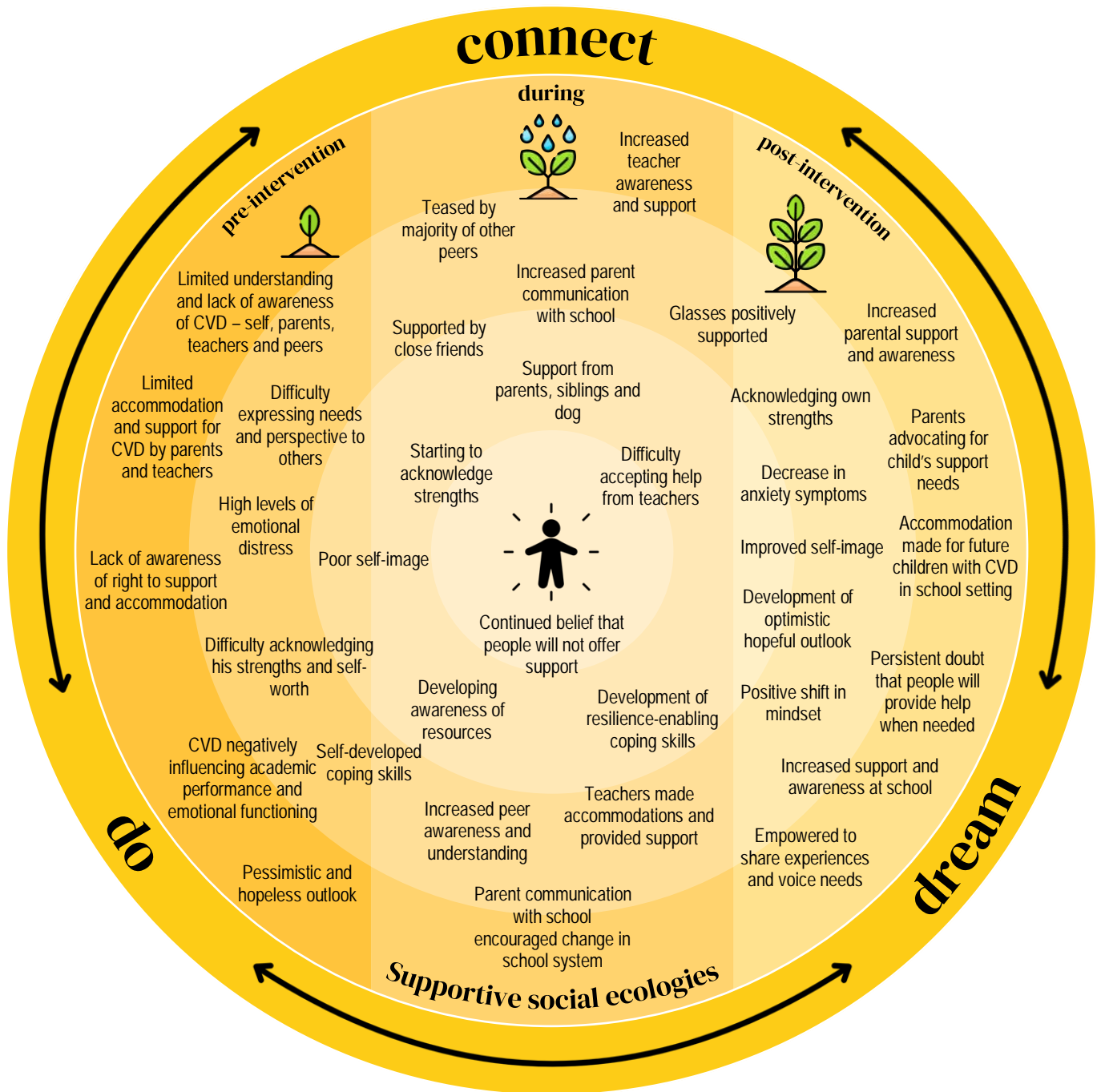
In conclusion, child-participant 2 experienced significant changes within his microsystem and supportive social ecologies that positively supported and promoted the development of individual and systemic resilience. The holistic intervention supported the facilitation of these positive changes over time. This reflects the interconnectedness that is highlighted in the conceptual framework, thereby demonstrating how the combined elements of the ecological model, the HPIF, and the *connect&dream&do* mechanisms fostered resilience and wellbeing in the case of child-participant 2.

### **5.5.3 Effect of the holistic intervention for child-participant 3**

The findings of my study suggest that child-participant 3 experienced positive changes within the academic, emotional and social domains of functioning as a result of his participation in the resilience-enabling intervention and his parents' participation in the parent guidance intervention, as summarised in Figure 5.3.

**Figure 5.3**

*Overview of the effect of the holistic intervention in the case of child-participant 3*



The findings of my study indicate that, before the intervention, child-participant 3 experienced several CVD-related challenges that adversely affected his academic, emotional and social functioning. These challenges included a lack of understanding and knowledge of CVD among his parents, teachers and friends, leading to the child-participant experiencing emotional distress and frustration. Additionally, he faced a lack of accommodation and appropriate support within his school environment, resulting in him feeling unheard and unsupported. Being teased by his peers and experiencing a general lack of understanding by others of his condition and how he perceived the world and the challenges associated with his condition, further exacerbated the difficulties he faced.

As a result, child-participant 3 presented with a poor self-concept, low self-esteem, and a sense of hopelessness and pessimism in terms of him receiving the necessary support within the school environment. He found it hard to acknowledge his strengths and self-worth, or the idea that his differences deserved to be accommodated and supported by others. He struggled to voice his needs and experiences, as well as to advocate for himself and the challenges he faced.

Despite these challenges, child-participant 3 demonstrated a form of resilience at the start of the intervention by making numerous adaptations within both his home and school environments. These adaptations were, however, not always accepted, more specifically by his teachers. Therefore, despite his efforts to cope with the condition of CVD, a lack of the necessary understanding and willingness to accommodate his needs within the school setting remained.

Throughout the intervention, child-participant 3 further strengthened the resilience-promoting skills within his nested systems, empowering him to make positive choices and facilitate positive changes in his environment. Within his microsystem, notable improvements were observed in terms of his emotional functioning, self-concept, levels of optimism and a positive self-belief. More specifically, this participant developed the ability to identify and better acknowledge his strengths and self-worth. In addition to the improvement in his self-concept, symptoms of depression, anger, and disruptive behaviour reduced (consult Table 4.7 and Figure 4.9), thereby confirming the positive effect of the intervention on his emotional functioning. These findings align with the conceptual framework of the study by demonstrating how individual and systemic resilience can lead to positive developments in the domains of emotional and social functioning (McLeroy et al., 1988; Theron, 2018).

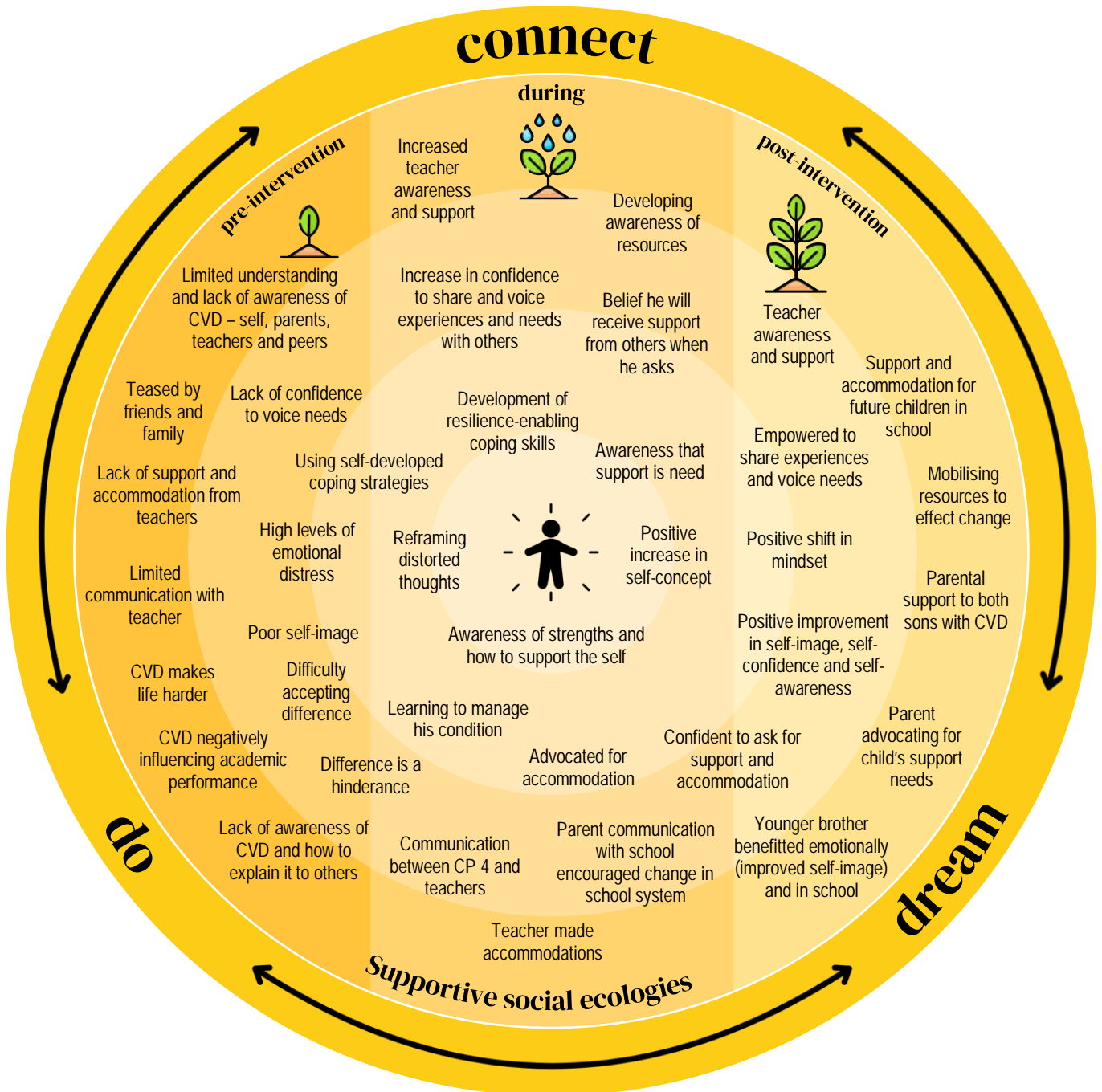
The findings of my study furthermore suggest that positive changes occurred within child-participant 3's supportive social ecologies, such as an increased awareness and understanding of CVD by his parents and teachers, additional support provided by his teachers, accommodations made within the school context, parental advocacy and increased parental support. These positive developments contributed to child-participant 3's academic, emotional and social functioning. As such, the holistic intervention facilitated changes by addressing not only the individual needs of child-participant 3 but also by fostering a supportive and accommodating environment, which is a key aspect of the conceptual framework that integrates ecological and holistic health promotion models.

In conclusion, child-participant 3 experienced significant changes within his microsystem and supportive social ecologies that positively supported and promoted the development of individual and systemic resilience. The holistic intervention supported the facilitation of these changes over time. This reflects the interconnectedness that is highlighted in the conceptual framework, demonstrating how the combined elements of the ecological model, the HPIF, and the *connect&dream&do* mechanisms fostered resilience and wellbeing in child-participant 3.

### 5.5.4 Effect of the holistic intervention for child-participant 4

The findings of my study indicate that child-participant 4 experienced positive changes within his academic, emotional and social domains of functioning as a result of his participation in the holistic intervention and his mother’s participation in the parent guidance intervention. Figure 5.4 provides an overview of the findings for the various phases of my study.

**Figure 5.4**  
*Overview of the effect of the holistic intervention in the case of child-participant 4*



The findings of my study indicate that, prior to the intervention, child-participant 4 experienced distinct challenges related to his CVD within his nested systems that had adverse effects on his

academic, emotional and social functioning. To elaborate, in his supportive social ecologies, child-participant 4 experienced a lack of the necessary understanding and knowledge among teachers, peers and friends regarding his condition. Teachers allegedly responded negatively when he made mistakes, failed to provide accommodations or support him for his CVD, and demonstrated a limited involvement in addressing his needs. His peers teased him and often failed to support him, thereby further exacerbating the challenges he experienced. Additionally, a lack of communication between child-participant 4 and his teachers about his condition and his support needs was evident.

These proximal processes within his individual microsystems contributed to a conflicted self-image where child-participant 4 felt competent and worthy at times, yet at other times questioning his worth and value as a result of his CVD. He lacked the necessary self-confidence to voice his needs to others, experienced elevated levels of emotional distress including feelings of anxiety and depressive symptoms, felt isolated and different from others, had little understanding of CVD, struggled to verbally express his condition and the associated needs, and faced difficulties in seeking help due to his fear of rejection. These challenges highlight the impact of CVD on child-participant 4's overall functioning, as evident prior to his participation in the intervention.

Over the course of the intervention, child-participant 4 developed resilience-enabling skills that he applied within his nested systems, thereby being empowered to make positive choices that resulted in positive changes. Within his microsystem, notable improvements could be observed in terms of his emotional functioning, including positive changes in his self-concept, self-confidence and self-esteem. Child-participant 4 demonstrated increased levels of self-awareness, specifically in terms of his ability to identify his strengths and acknowledge his self-worth and the right to be accommodated and supported by others. He gained a better understanding of how to manage his condition and accepted that he needed help, demonstrating an increased willingness and ability to ask for support. Additionally, he started embracing his diversity and expressing his needs effectively.

Following the intervention, the findings of my study indicate significant improvements in child-participant 4's self-concept, a healthier and more positive belief about himself, as well as reduced levels of anxiety and depressive symptoms (consult Table 4.8 and Figure 4.10) that all confirm the positive effect of the holistic intervention on the emotional functioning of this participant. As a result of his development of resilience, the participant was empowered to navigate the challenges he faced more effectively and foster a more positive self-image and outlook on life. These findings relate to the conceptual framework of my study by illustrating how the intervention facilitated positive changes within the child-participant's microsystem, with this being consistent with the ecological model of McLeroy et al. (1988) and Theron's (2018) *connect&dream&do* mechanisms.

The findings of my study furthermore suggest that within child-participant 4's supportive social ecologies, several positive changes occurred that not only supported him but also had positive

consequences for the microsystems of his younger brother who also suffered from CVD and his supportive social ecologies, thereby positively influencing his holistic functioning. The findings therefore suggest that the holistic intervention that I facilitated as part of my study holds the potential to positively influence other children with CVD and provide them with support. In addition to the changes already mentioned, child-participant 4 experienced an increased awareness and understanding of CVD and its related challenges; accommodation and support at school; a willingness by teachers to address his needs once he had voiced these and advocated for his right to be accommodated within the school setting; better communication between the mother and teachers at child-participant 4 and his brother's school that resulted in advocacy for support and the child's needs; as well as better parental support and understanding of how child-participant 4 perceived the world. These positive changes within his supportive social ecologies positively influenced child-participant 4's holistic functioning. Overall, he experienced positive changes within his microsystem and supportive social ecologies that promoted the development of individual and systemic resilience. Therefore, the holistic intervention, taking the form of a resilience-enabling intervention and parent guidance intervention, effectively supported positive changes over time, contributing to child-participant 4's overall functioning and wellbeing.

#### **5.5.5 Synthesis of the findings on the effect of the holistic intervention**

The findings of the current study indicate that the holistic intervention forming part of my research had a positive effect on the academic, emotional and social functioning of all four child-participants. The intervention successfully addressed various aspects of the participants' experiences of CVD, thereby contributing to their overall functioning and wellbeing. As a result of the intervention, both the child- and parent-participants gained the capacity to respond to the challenges related to CVD, with the child-participants' social ecologies being strengthened to provide them with the necessary support to mobilise resources within their various supportive social systems. These findings align with research conducted by Masten (2019) and Cameranesi et al. (2023) who suggest that resilience-promoting interventions hold the potential to facilitate positive changes within individuals' nested systems. Such changes will not only support individuals in responding to the challenges and adversity they face but also equip them with valuable skills and resources that can assist them in navigating life's difficulties more effectively.

The effect of the holistic intervention on the academic functioning of the child-participants was marked by increased engagement and support offered to them within their educational environment as the intervention progressed. In terms of the conceptual framework of the study, the ecological model's intrapersonal and interpersonal levels were thus targeted by addressing individual needs and providing support through tailored educational resources. Participants, as a result, had a more supportive educational experience and demonstrated improved academic performance, reflecting the intervention's value for integrating academic support with emotional and social growth.

As indicated, the holistic intervention resulted in positive changes in terms of the emotional functioning of all four of the child-participants, with them demonstrating improved levels of self-confidence and reduced levels of anxiety, following their participation in the intervention. The integration of the *connect&dream&do* mechanisms included in the conceptual framework of the study added to this change, particularly through the *dream* component that assisted participants to envision a hopeful future and strengthen their resilience. Next, in terms of their social functioning, the child-participants all experienced positive changes relating to their interpersonal relationships and support networks. This finding aligns with the ecological model's emphasis on interpersonal processes and the HPIF's focus on partnerships, as depicted in the conceptual framework of the study. Improved communication and collaboration among peers, teachers and family members facilitated better social support and interaction, contributing to the child-participants' overall healthy functioning. The *connect* and *do* mechanisms of resilience that emphasise building meaningful relationships and engaging in wellness-promoting actions, played an important role in enhancing the child-participants' social wellbeing.

Overall, the findings of my study highlight the value of the holistic intervention in promoting resilience and fostering positive development among children who face challenges as a result of CVD. By addressing multiple domains in the participants' lives and environments, the intervention proved to hold the potential of facilitating a positive impact on the child-participants' wellbeing and quality of life. The findings of my study can be explained in terms of the conceptual framework, integrating the ecological model, holistic health promotion principles, and existing theory on transactional pathways to resilience. The intervention addressed the individual needs of the child-participants while simultaneously focusing on their supportive social systems, demonstrating the interconnectedness of individual and systemic resilience. As a result, the resilience-enabling strategies and parent guidance intervention were found to have effectively fostered positive changes across academic, emotional and social domains, supporting the child-participants' overall functioning.

## 5.6 CONCLUSION

In Chapter 5, I discussed the findings of the current study by interpreting the results I presented in Chapter 4 against the background of the existing literature I presented and discussed in Chapter 2. I highlighted similarities and contradictions, identified silences in the data and foregrounded new insight that stems from my study. I then situated the findings in terms of the positive changes experienced by each child-participant as a result of being involved in the holistic intervention before providing a synthesis of the findings on the overall effect of the holistic intervention for participants.

In Chapter 6, I address the research questions and draw conclusions grounded in the findings of this study. I reflect on the strengths of my study and its potential contributions, and identify the challenges I encountered. I conclude with recommendations for training and practice, policy and future research.

# CHAPTER 6

## FINAL CONCLUSIONS AND RECOMMENDATIONS

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### 6.1 INTRODUCTION AND OVERVIEW OF THE PRECEDING CHAPTERS

In **Chapter 1** I introduced the focus of my study, stated the purpose and formulated research questions that guided me in undertaking this research. I clarified the key concepts, provided an overview of the selected paradigmatic perspectives, and introduced the research design and methodological strategies I employed. I presented the conceptual framework, and briefly introduced the ethics considerations and quality criteria I aimed to adhere to in undertaking the study.

**Chapter 2** focused on an exploration of the existing literature on CVD. To this end, I described the effect of CVD on development and daily living as well as on the academic, emotional and social functioning of children with CVD. I also discussed inclusive education policies as well as current efforts to address CVD-related difficulties, contemplating the potential benefits of resilience-focused holistic interventions in support of children with CVD. I concluded the chapter with an explanation of the conceptual framework that guided me in undertaking my research.

In **Chapter 3** I focused on the research methodology and strategies I utilised in conducting the current study. I explained social constructivism as metatheory and described the mixed methods qualitatively-driven research approach I followed whilst applying PRA principles. I described the research design, as well as the data generation/collection, documentation, analysis and interpretation methods. I concluded Chapter 3 by discussing ethics and quality criteria.

**Chapter 4** focused on the results of the study. I first presented the four central themes, with the related sub-themes, that I identified during reflexive thematic analysis of the generated qualitative data. Next, in reporting on the quantitative results, I compared the quantitative data obtained on the BYI-II pre- and post-intervention for each of the four child-participants. Finally, I integrated the qualitative and quantitative results of the study.

In **Chapter 5** I discussed the findings of my study by relating the results I obtained to the existing literature presented in Chapter 2. I highlighted correlations, contradictions, silences and new insight, and synthesised the effect of the holistic intervention as experienced by the child- and parent-participants.

In this final chapter of the thesis, I address the formulated research questions, thereby drawing conclusions based on the findings I obtained. I present the potential contributions and then reflect on the challenges and limitations I encountered during my study. Finally, I formulate recommendations for training and practice, policy as well as future research.

## 6.2 CONCLUSIONS IN TERMS OF THE RESEARCH QUESTIONS

In this section, I draw conclusions by first addressing the secondary research questions, and thereafter the primary research question that guided my research.

### 6.2.1 Secondary research question 1: How does CVD and its associated challenges affect the holistic functioning of children with CVD?

The findings of my study confirm that children with CVD often experience challenges on various levels. Firstly, due to the way that CVD alters the manner in which an individual perceives the world, daily living activities may pose distinct challenges. For instance, CVD can affect one's ability to drive, as the ability to differentiate between traffic lights and road signs based on colour is crucial for safety. Existing literature suggests that children with CVD can similarly experience challenges to interpret safety signs, colourful information during emergencies, changes in body fluids and skin conditions as well as to differentiate between food items that are ready and safe to consume, potentially being confused between, for example, raw and cooked meat, and ripe and unripe fruits. Children with CVD may furthermore struggle to identify the colours of clothing or other household objects where colour is an important indicator, as foregrounded by the findings of my study.

Academically, children with CVD typically find themselves in a disadvantaged position in school when compared to their sighted peers, specifically in terms of their ability to engage with school material containing colour and to perform optimally in educational settings, as classroom teaching and resources are often filled with colour as differentiating indicator. In this regard, I posit that these challenges, combined with a limited awareness of CVD by teachers will increase the cognitive workload placed on children with CVD, as they are often expected to demonstrate competency with colourful learning material and are not being catered for by means of specific accommodations.

An inability to perform optimally on an academic level can, in turn, affect the emotional and social functioning of children with CVD. For example, these children may experience anxiety and emotional distress that can go unnoticed by parents, teachers and peers. In terms of emotional functioning, CVD may negatively affect children's self-concept due to them perceiving themselves as flawed, finding it hard to validate their need for support and recognise their own self-worth. Additionally, their longing to see the world as others do can intensify feelings of emotional distress. These children often find it hard to express their emotional needs and accept themselves which may, in turn, result in feelings of isolation and frustration when expected to interact with the environment as typically sighted individuals would. As a result of such potential negative effects on an emotional level, I argue that understanding, empathy and accommodation by all role players within children's supportive social ecologies is required, as these can alter their negative assumptions, perceptions and the way in which these children behave as a result.

Socially, children with CVD often experience teasing, discrimination and a lack of understanding by their peers, specifically relating to their condition and the difficulties they experience in perceiving colour. Children with CVD may accordingly feel isolated and different from others, prompting some of them to overcompensate in social situations. These experiences may contribute to these children internalising feelings of insecurity, uncertainty, inadequacy and shame, with this once again negatively affecting their emotional functioning. The inability to fully participate in colour-based recreational activities, such as sport and games, may further exacerbate the challenges they experience, leading to social exclusion. Against this background, I argue that the social challenges typically faced by children with CVD require an increased awareness and understanding of CVD by peers and teachers to create a more inclusive and supportive social environment for these children.

A major factor contributing to the lack of sufficient support for children with CVD relates to the general unawareness of the condition among individuals but also particularly among teachers. While inclusive education policies exist, the limited knowledge of CVD can prevent children from receiving the accommodations they have the right to. This gap between policy and practice may result in CVD being misinterpreted as behavioural or learning difficulties, thereby potentially labelling and marginalising these children and jeopardising their confidence. I therefore argue that teachers' unawareness may maintain and even strengthen the gap between inclusive policy and practice.

Despite the challenges typically faced by children with CVD, the findings of my study indicate that these children are still able to perform well academically and often do so, largely due to their effective reliance on self-help strategies. The apparent lack of consensus in terms of CVD predicting lower academic performance or not highlights the need for ongoing research. In this regard, I argue that the satisfactory academic performance of the child-participants in my study may be attributed to strongly-developed self-driven coping strategies whereas the indication of poorer performance of such children as indicated in other studies may point to these skills not yet having developed. Such self-reliant strategies may enable children with CVD to mask the difficulties they experience, pretending that colour does not pose a significant obstacle in their lives, driven by shame or a desire to fit in. As a result, I posit that children with CVD may not necessarily access the support they deserve within the school context, as their efforts to conceal their learning barrier may make it difficult for others to recognise the true extent of the challenges they face.

As a result of their difference in perspective, children with CVD often do not make the same inferences or assumptions as typically sighted children when interacting with the world, due to their visual communication relying less on colour signals. They may, instead, prioritise other visual cues that can aid them in navigating the world and overcoming the challenges they face. This shift in perspective highlights the unique ways in which children with CVD are required to adapt to their environment as well as the need for tailored support and an understanding by others to address their

specific needs and experiences. Doing this is essential to help children with CVD reach their full potential and improve their overall quality of life.

In terms of other challenges experienced by individuals with CVD, their career aspirations and understanding of available options may also be affected. To elaborate, individuals with CVD may experience that their condition limits their career choices and they may believe that they are excluded from certain professions, such as that of a pilot due to their deficiency. This perception highlights a limited understanding of CVD, as many career fields have seen positive developments and currently offer accommodations for individuals with CVD. As a result, restrictions are no longer as rigid as they used to be despite children with CVD potentially still believing this to be the case.

In summary, based on the findings of my study, I can conclude that CVD impacts the holistic functioning of children as the condition influences the way in which a person perceives the world, with this potentially resulting in challenges on academic, emotional and social levels of functioning. The potential negative impact of CVD can present a significant barrier for children with CVD to navigate and overcome the challenges they face to be able to thrive. Due to CVD not being a condition where physical indicators can be observed by others, the condition is often not recognised or may go unnoticed, with the lack of awareness or limited knowledge of society and the individuals with CVD resulting in them not accessing the necessary support. This may prevent children with CVD from experiencing emotional safety and security within their social ecologies as they may be left to take it upon themselves to adapt and cope with the difficulties they face due to CVD.

### **6.2.2 Secondary research question 2: How do parents of children with CVD understand the condition and support their children to cope with the associated challenges?**

The findings of my study indicate that the parents of children with CVD often lack a comprehensive understanding of the condition and how it influences their children's experiences of the world, which associated challenges may be experienced by their children and how these influence their children's functioning. Even though the parents who participated recognised some of the practical implications of CVD for their children's ability to interact with the world, they seemingly underestimated the impact and extent to which it can influence academic, emotional and social functioning. This apparent limited understanding of CVD by parents may be attributed to the general lack of emphasis on CVD as a barrier to learning that warrants support and accommodation within educational and healthcare settings, for example, by teachers or diagnosing healthcare professionals. As a result, I argue that without the necessary recognition and validation of the challenges posed by CVD, parents will not advocate for their children's rights to obtain support, resulting in the children not being sufficiently accommodated and supported by others. Even though parents may not intentionally downplay the significance of their children's struggles, the possibility of them not fully grasping the depth of support required by their children to be able to thrive may add to the challenges these children face.

Based on the findings of my study, I can further conclude that the possibility exists that parents' perceptions of the support provided to their children at school may differ from the actual support received. To elaborate, the parents who participated in my study believed that their children were receiving adequate support and accommodation from teachers, yet the experiences of the child-participants suggested otherwise. In this regard I argue that such discrepancies may once again perhaps stem from parents' limited understanding of the specific needs of their children with CVD and the type of support required to address these needs effectively in terms of the support strategies and accommodations that teachers may be expected to implement.

In terms of family-based support, the findings of my study highlight the value of positive support to children with CVD within the family system. The child-participants experienced their family environments as secure and nurturing where they felt accepted and loved despite their differences. They were primarily supported by their parents (particularly their mothers), siblings and grandparents. In addition to supporting children to cope with challenges, supportive parents, specifically mothers, can play an important role in advocating for children's needs within the school context, thereby ensuring that their rights are addressed through suitable accommodations. Additionally, when a family member with CVD offers support, a child with CVD can experience a better sense of belonging and understanding, being able to share experiences with someone who truly understands. As a result of these findings, I posit that family-based support of children with CVD will not only reinforce a child's emotional wellbeing but can also contribute to the overall ability to navigate and manage the difficulties experienced as a result of CVD.

With regard to the way in which parents can support their children with CVD, the findings of my study reveal that parents, particularly mothers, can play a central role in providing practical and emotional support. Practical support can take the form of, for example, labelling coloured objects such as pencils with corresponding colours to help children with CVD perform tasks that rely on colour differentiation, purchasing household items in colours that are easily identifiable by these children, as well as helping them identify colours when they are uncertain. Additionally, parents can communicate with teachers, informing the school of their children's condition to ensure the necessary accommodations in the school setting. Emotional support may take the form of parents offering comfort and guidance when their children with CVD experience distress related to the challenges associated with CVD. By supporting these children, they may, as a result, be better able to cope with the academic, emotional and social challenges they face as a result of the condition.

### **6.2.3 Secondary research question 3: What does a holistic intervention for children with CVD entail?**

As part of my study, I developed and implemented a holistic intervention for children with CVD to provide tailored support to help them cope with the challenges posed by their condition. The

intervention was designed to offer multi-level support across the various domains of functioning while addressing the children's needs within their different social ecologies. The intervention comprises two primary components, a resilience-enabling intervention for the child-participants and a parent guidance intervention for their parents. The child-participants were provided with EnChroma glasses (forming part of the intervention) to address the physical challenge of not being able to differentiate between all colours.

The development of the holistic intervention was guided by the conceptual framework of my study that provided a structured approach to meeting the unique needs of children with CVD. The development process and content of the intervention were informed by research on CVD, holistic and resilience-focused interventions as well as the data generated/collected prior to the intervention's implementation. In terms of the generated/collected data, I was primarily guided by the information I obtained on the challenges faced by children with CVD, their existing support systems, the child-participants current levels of emotional and social functioning as well as the specific needs that the holistic intervention could potentially address.

The resilience-enabling intervention aimed to address the physical, emotional, social and by implication academic needs of the children with CVD. As stated, the children were provided with EnChroma glasses to address their physical needs while many of the intervention sessions focused on fostering resilience-enabling skills that could support emotional and social functioning. The intervention targeted the improvement of the children's self-concept by fostering self-awareness, self-confidence and self-appreciation. The children were encouraged to gain insight into their strengths and weaknesses, promoting a positive view of CVD and replacing negative perspectives with realistic, empowering understanding. The intervention sought to build self-knowledge by helping children understand CVD and how their unique abilities could be applied to overcome the challenges they faced. It also aimed to foster self-appreciation, encouraging children to recognise and value their achievements and unique perspectives. Furthermore, the intervention focused on building self-confidence, instilling a belief in the child-participants' own capabilities and potential. In addition, it explored the children's views of CVD to dispel distorted, negative perspectives and replace them with empowering, realistic understandings. This involved a process of challenging misconceptions of CVD and promoting a positive, proactive approach to managing the condition in a positive way.

To address the social needs of the child-participants, the intervention included strategies that can enhance social interactions and communication skills. It aimed to build the children's confidence in expressing their needs and advocating for appropriate support in various settings. In this manner, the intervention provided them with tools for effectively communicating their condition to peers and teachers, thereby fostering an understanding and support from others. It also focused on developing social skills, such as negotiating and problem-solving skills to help children navigate social

challenges related to CVD. By creating opportunities for role play and practising these skills in a safe environment, the intervention furthermore helped children to feel more confident in their interactions.

To address the academic needs of the child-participants, the intervention provided strategies for both the children and their parents to manage the challenges associated with CVD in the school setting. While teachers were not directly involved, the intervention empowered children and parents to make meaningful changes in the academic environment. Furthermore, by improving the children's emotional and social skills, the intervention indirectly enhanced their academic experience. The children became more confident in advocating for their needs and communicating with teachers, while parents supported them in seeking the necessary accommodations and support. Overall, the intervention equipped the children with resilience, improved self-concept and the knowledge needed to effectively navigate their academic and social environments, thereby ensuring that they received the support they required to thrive.

The parent guidance intervention was facilitated concurrently with the children's intervention, equipping parents with strategies to understand CVD better, advocate for their children's rights, and provide both emotional and practical support. Initially, the participating parents received a comprehensive overview of CVD and the associated support that may be provided to children with CVD. Next, resilience concepts were discussed, guiding the parents on how to foster a resilience mindset and encourage their children to develop coping skills and a positive attitude. Parents were also guided on how to help their children build confidence in communicating their condition and experiences, thereby ensuring that they felt empowered to advocate for themselves.

The intervention provided the parents with practical guidelines for supporting their children's academic needs, such as guidelines on managing coloured learning material and collaborating with teachers to ensure the necessary accommodations. It furthermore offered strategies to assist children to cope with the academic challenges stemming from CVD. For emotional functioning, the intervention guided the parents on how to support their children in developing a positive self-concept and emotional resilience to address the psychological impact of CVD. For social functioning, the intervention included advice on fostering positive interactions and building communication skills as well as helping children set and achieve future goals, including goals associated with career aspirations. As the parent guidance intervention was delivered through a WhatsApp group, the parents could access the information at their convenience and apply newly gained strategies to enhance their children's overall wellbeing and success as they saw fit.

As a result of the holistic intervention that I developed and implemented, I compiled two resource booklets, one for children with CVD (consult Appendix C) and one for parents and teachers (consult Appendix D). These booklets include information on CVD and offer practical guidance on how to understand and support children with CVD.

#### **6.2.4 Secondary research question 4: How does the functioning of children with CVD prior to their participation in the holistic intervention compare to that post the intervention?**

Based on the findings of my study, I can conclude that the holistic intervention led to improvements in the holistic functioning of the children with CVD. On a physical level, the EnChroma glasses positively influenced the colour perception of two of the three participants who wore the glasses, with the third participant opting not to wear the glasses regularly due to the negative side effects experienced by him. The glasses enhanced the participants' visual ability to engage with their surroundings, with improved colour perception, alleviating some of the frustrations and limitations associated with their CVD, thereby positively affecting their self-esteem and confidence. Consequently, the participants felt more included and capable of performing as can be expected that, in turn, contributed to a heightened sense of emotional resilience and belonging.

Prior to the intervention, the child-participants felt unsupported and pressured to adapt to the school environment rather than being accommodated for their condition in school, partly due to the lack of other children with CVD in the classroom or a limited understanding by teachers. Post-intervention, there was a significant shift in mindset, with the children starting to view their condition not as an insurmountable barrier but as something that is manageable, implying the right to accommodations and support. The parents also played a central role by becoming more informed of CVD and their children's specific learning needs. They used this knowledge to advocate for their children, engage with teachers and ensure that the necessary support was provided. This collaboration between parents and teachers contributed to positive changes in the children's academic performance.

Prior to the intervention, the emotional functioning of the child-participants was characterised by frustration, reduced self-concept and feelings of inadequacy due to their CVD. Additionally, the children's self-confidence and self-belief were also negatively affected, whereby they often felt that their condition was a barrier to them achieving success, leading to low self-esteem and a negative outlook on their abilities. A general lack of understanding and support further exacerbated their feelings of anxiety, contributing to a sense of isolation and insecurity. These insecurities were often linked to a limited self-awareness of their condition and how it impacted their daily lives, resulting in increased feelings of inadequacy.

Post-intervention, a notable improvement in the emotional functioning of the child-participants was evident, with all four of the child-participants experiencing a better self-concept and reduced levels of anxiety. As they gained a better understanding of their condition and their strengths, they started viewing CVD as a manageable part of their identity rather than an obstacle. In this regard I can conclude that the child-participants' functioning improved after participating in the holistic intervention. They experienced a notable shift in perspective that led to a significant reduction in

feelings of insecurity and anxiety. This shift fostered a more optimistic outlook, a positive self-concept, and increased levels of self-confidence. It furthermore resulted in improved academic functioning as the child-participants were able to express their needs and experiences more confidently, resulting in positive changes within the school setting.

The intervention fostered the development of resilience-enabling skills, empowering the child-participants to approach challenges with a resilience mindset. They learnt to recognise their strengths, understand their weaknesses and rely on self-awareness to navigate the condition of CVD more effectively. This boosted their confidence and emotional outlook, positively affecting their emotional functioning. In this regard I argue that holistic interventions can support children with CVD in developing essential coping mechanisms, resilience and stress management skills, resulting in better emotional and psychological health.

On a social level, prior to the intervention, the child-participants faced bullying and discrimination due to a lack of awareness by others about their condition and their own hesitation to express their needs. The findings of my study indicate that post-intervention, the children with CVD experienced improved levels of social functioning. Enhanced interactions and relationships with others enabled them to voice their needs and perspectives better, fostering a greater sense of belonging and acceptance. By sharing their knowledge gained from the intervention with others, empathy and inclusivity could be promoted among their peers, reducing teasing, discrimination and social isolation. Consequently, the children experienced greater social integration and participation that significantly improved their social functioning and overall wellbeing.

#### **6.2.5 Primary research question: How can a holistic intervention facilitate positive change in the lives of children with CVD?**

Based on the findings of my study, I can conclude that the holistic intervention I implemented facilitated positive change in the lives of the participating children with CVD. In this regard, I argue that the holistic intervention provided the child-participants with the provision of support and resources that they had not previously accessed or received within their various nested systems. In this way, the holistic intervention facilitated actions that could effectively fill gaps in support and resources, addressing the specific needs of each child within their physical, academic, emotional and social contexts. By offering EnChroma glasses, the intervention addressed the visual challenges the child-participants faced, enhancing their ability to differentiate colours. Additionally, the holistic intervention offered the children a safe space where they could openly discuss their condition, learn about it in-depth and receive specific support tailored to their needs. As a result, they experienced that their unique perspectives and experiences were valued that resulted in their understanding that their unique challenges deserved accommodation and support. The intervention thus instilled a

sense of hope and acceptance in the children and their parents of their unique differences and of the fact that, while their unique perspective on the world may be different, it still hold value.

The holistic intervention empowered the participants through knowledge that led to an informed understanding of CVD and increased self-knowledge. To elaborate, the children with CVD experienced a sense of empowerment as a result of their participation in the holistic intervention by acquiring knowledge and skills to better cope with CVD. Their better understanding of CVD and of their right to accommodation resulted in the children with CVD developing the necessary confidence to voice and express their needs within their various social systems, thereby asserting their rights and needs more effectively. These findings highlight the transformative power of interventions that foster resilience and positive self-belief among children with special needs, such as those with CVD.

Additionally, the increased awareness of CVD amongst parents and other key role players such as teachers and peers facilitated more effective advocacy for inclusive education and tailored support, contributing to a more understanding and supportive environment surrounding such children. Furthermore, by raising awareness and understanding of CVD among teachers, such interventions can promote tailored support and accommodations to meet the unique needs of these children. In this regard I therefore argue that empowerment through knowledge was a key cornerstone of the intervention. By informing children and key role players of CVD and its effects, the intervention provided valuable insights that extended across various aspects of the children's lives. This knowledge not only enhanced the role players' understanding of CVD but also equipped the children, their parents, teachers and peers with the tools necessary to support children with CVD effectively.

As a result of their participation in the holistic intervention, the children with CVD were thus able to better support themselves and utilise their external and internal resources to cope with the challenges they faced. Based on the findings of my study, I can conclude that the children with CVD developed several resilience-enabling skills, such as the ability to connect with others, express their needs and experiences, reframe their thoughts and perceptions towards more hopeful and positive outlooks, seek solutions, as well as validate their self-worth and place value on their own unique experiences. The children with CVD subsequently adopted a more positive outlook in life, feeling less alone and accepting that their unique life experiences were important and valid.

These positive developments led to positive change in terms of the emotional and social functioning of the children with CVD. Based on the findings of my study, I can conclude that the children with CVD experienced improvements in terms of their self-concept, self-esteem, self-confidence, self-awareness, self-appreciation and self-knowledge. Armed with a better understanding of their condition, the children with CVD felt equipped to express their needs and engage in proactive self-care practices, resulting in their view of CVD being an integral and valuable part of their identity, and recognising it as a potential strength. By becoming more self-aware, they were able to identify areas

for growth, develop resilience-enabling coping strategies and implement positive changes conducive to their overall wellbeing. These findings highlight the positive impact of the holistic intervention in fostering emotional resilience amongst children with CVD, pointing to its potential value in facilitating an internal shift towards self-acceptance and empowerment.

The findings of my study furthermore indicate that the holistic intervention facilitated positive change in the supportive social ecologies of the children with CVD, leading to positive changes across their holistic systems of functioning. In addition to the changes experienced in their internal microsystem as discussed in the previous paragraphs, their home microsystems were characterised by positive change. To elaborate, the intervention resulted in improved communication and support from the children's families, contributing to a more understanding and supportive home environment. Within the school microsystem, an increased awareness among teachers resulted in better accommodation and support for these children, fostering a more inclusive school setting. Overall, the intervention created a ripple effect that positively affected the academic, emotional and social functioning of children with CVD across their internal, home and school systems.

To elaborate, the findings of my study indicate that when parents, teachers and peers adopt a mindset of acceptance and respect for children with CVD, they may feel accepted and supported, and may be more likely to engage in interactions where colour is involved. The implication of this finding emphasises the critical role of the social attitudes and perceptions of others in shaping the experiences of children with CVD. By fostering an environment of acceptance and respect, parents, teachers and peers can create a supportive system that can encourage the active participation and healthy functioning of children with CVD.

In addition to the child-participants benefitting from the intervention, the parents benefitted from their involvement in the parent guidance intervention, with this, in turn, positively affecting their children with CVD. Parents developed a deeper awareness and understanding of their children's condition and gained practical insight into possible effective support strategies. They felt better equipped to advocate for their children's needs and rights, particularly within the school setting, thereby supporting positive change in their children's academic and emotional functioning. Through tailored guidance, the parents also experienced higher levels of empathy and understanding, leading to a positive shift in their mindset towards their children and the challenges they faced. In addition to sharing their knowledge and skills with their children's teachers who subsequently implemented positive change practices in school, both the child- and parent-participants shared their newly gained knowledge with others, thereby indirectly benefitting other children, such as siblings facing adversity.

Based on the findings of my study, I argue that the holistic intervention represented a comprehensive support system for the child-participants, providing essential resources and strategies to manage their condition while fostering a sense of empowerment and self-efficacy, thereby leading to positive

developments in their physical, academic, emotional and social domains of functioning. By integrating emotional and practical support, the intervention facilitated meaningful and sustainable improvements in the children's overall wellbeing and functioning. Consequently, the holistic intervention led to a positive shift in the children's mindset, equipping them with the knowledge, skills and support needed to manage their condition more effectively. This newfound empowerment allowed them to advocate for themselves, embrace their unique experiences and effect meaningful positive change in their lives, resulting in a stronger sense of self-acceptance and resilience.

In conclusion, the holistic intervention that I developed and implemented facilitated positive change across the various domains of functioning and within the broader supportive social ecologies of the child-participants. By imparting knowledge and encouraging the development of resilience-enabling skills, the intervention did not only empower the participants to address immediate challenges but also laid the foundation for a long-term focus on resilience. The findings highlight the importance of raising awareness and fostering understanding of the conditions of CVD amongst role players functioning within the social ecologies of such individuals to establish support networks and contribute to the overall wellbeing of individuals with the condition within their broader social systems.

### **6.3 CONTRIBUTIONS OF THE STUDY**

In this section, I foreground the theoretical and practical contributions of my study.

#### **6.3.1 Theoretical contribution of the study**

This study offers new insight into the challenges typically faced by children with CVD and how these challenges may influence their holistic development, particularly within the academic, emotional and social domains of functioning. To elaborate, the findings shed light on the implications of CVD on a child's daily life, revealing how the condition can shape children's experiences and functioning in various areas, as well as which types of support can be offered. In this way, the findings of my study contribute to the relatively scarce body of existing literature in the field of CVD, providing valuable knowledge on how children with CVD experience the world and how they can be better supported.

The holistic intervention that I developed adds significant theoretical value by offering a comprehensive framework that integrates aspects of resilience-building, awareness of CVD, communication skills and self-concept development. The integrated approach I followed addresses the unique challenges of CVD and demonstrates how interventions can be developed to cater for not only the condition but also the broader emotional and social contexts surrounding children with CVD. By actively involving parents, the overall family dynamics can be enhanced, creating a ripple effect that can strengthen the support system surrounding a child. The intervention's theoretical contribution extends beyond CVD, as it offers a replicable model for future research and intervention design for children facing other forms of adversity.

Furthermore, the study highlights the impact that children with CVD can experience as a result of participating in a holistic intervention. The findings demonstrate how the intervention positively affected the academic, emotional and social functioning of children with CVD, underscoring its value as a supportive tool for an underrepresented demographic group in society whose needs are often not prioritised. The skills and knowledge the children developed through the intervention supported the children's overall functioning, particularly in navigating the challenges they faced. In this way, the intervention contributed to the existing body of knowledge on effective support strategies for children with CVD as well as their parents and potentially also other key role players in their support networks when new knowledge and skills were shared by children and parents with others, such as teachers.

Moreover, the findings of my study thus add new insight into the potential value of a targeted holistic intervention, taking the form of a resilience-focused intervention for children, combined with a parent guidance intervention. The child intervention included aspects of support on the various levels of child functioning, being the physical (using EnChroma glasses), emotional and social (resilience-enabling skills) and academic (culmination of the effect in the other areas of functioning) levels.

In relation to the focus and content of the intervention, the findings of my study also contribute to the current understanding of resilience-enabling interventions, specifically when implemented with children with CVD. To elaborate, the current study contributes to existing literature on how such interventions can strengthen the resilience-enabling skills of participants, thereby supporting growth and healthy functioning. As this thesis includes a detailed overview of the intervention, it offers a framework or a blueprint that can be adapted and implemented in future by other scholars and practitioners in different contexts with children facing various forms of adversity.

Based on the methodology and mode of implementation of the intervention, my study further contributes to the body of knowledge on interventions that adopt alternative and technology-driven formats of implementation. By primarily relying on digital elements for implementation of the intervention, the current understanding of how technology can be utilised to support children's wellbeing and development through focused interventions is strengthened. This contribution is particularly relevant in the modern digital age, where the use of technology during interventions has become increasingly prevalent. In this way, the findings of my study offer implications for the design and implementation of digitally-based interventions targeting aspects of child health and wellbeing.

### **6.3.2 Contribution to practice**

Following their participation, the children and parents whom I facilitated the intervention with acquired knowledge and skills that they could implement, thereby supporting their coping with CVD-related challenges. The resilience-enabling skills they gained can be implemented on a day-to-day basis to overcome other challenges. In addition, the holistic intervention that I developed as part of my study can be implemented with children with CVD in future and potentially also with children experiencing

other challenges, after adapting certain sections of the content. To clarify, as the resilience-enabling intervention was specifically designed to support children with CVD in developing awareness of their condition and strengthening their resilience-enabling as well as other coping skills, the possibility of application in other challenging circumstances exists.

Closely related, the parent guidance intervention can be implemented in future to equip parents of children with CVD for supporting their children (and others) more effectively. In this way, the support that is available to children with CVD may better meet their unique needs and ensure that their rights are advocated for. As both the child- and parent-participants in my study gained knowledge and an understanding of CVD they may inform others who may potentially also apply and utilise this knowledge, such as the teachers of these children with CVD in the future. In this case, my study may indirectly contribute to better implementation of inclusive practices by teachers in the profession.

In this way, the holistic intervention that I developed can offer a comprehensive and potentially impactful avenue to support children with CVD as well as their families. By focusing on resilience and including a parent guidance component, the holistic intervention can support children to address the challenges they face while equipping them and their parents with long-term strategies for better managing CVD and advocating for their needs. This intervention can serve as an example for other scholars working in this field, potentially leading to broader applications and adaptations of the intervention for children experiencing other differences or challenges.

The two resource booklets that I developed similarly hold value for practical implementation and have the potential to reach wider audiences, enabling others to support individuals with CVD and assist them to cope with the challenges they face. These resource booklets can raise awareness of CVD and can thus benefit other children with CVD as well as those functioning within their supportive social ecologies. To elaborate, the *Support Guide for Children with CVD* and *Supporting Children with CVD: A Guide for Parents and Teachers* (consult Appendices C and D respectively) were specifically developed to incorporate the knowledge and experiences gained from the research process, thereby creating resources that can be implemented by various role players to contribute positively to the support provided to learners with CVD. The booklets can be distributed in schools and other social settings not only to increase an awareness of CVD but also to empower readers with practical guidelines on how to support children with CVD.

Based on the intervention emphasising the importance of clear communication between parents, teachers and children with CVD to ensure efficient support and accommodation of the needs of each child with CVD, the participants may pursue open communication channels between the various systems in which the children function in future. Effective collaboration between the key role players can ensure that supportive strategies are relevant, personalised and responsive to each child's specific needs. Through regular open communication, parents and teachers may create a more

inclusive and supportive environment for children with CVD, fostering healthy holistic functioning and wellbeing. By fostering agency and practising resilience, children with CVD, their parents and teachers may thus collaborate in addressing the challenges faced by these children. At the centre of this possibility lies the confidence to make one's needs known to others, as was acquired by the children and parents who participated in my study.

#### **6.4 REFLECTING ON CHALLENGES AND POTENTIAL LIMITATIONS OF THE STUDY**

Due to the data generation/collection commencing during the onset of the COVID-19 pandemic that resulted in strict social distancing regulations, I had to adapt the format and delivery of the intervention. Even though it was initially designed for group sessions with all four child-participants, the intervention format changed to be implemented through primarily online platforms such as Zoom and Google Meet, with only a few in-person sessions conducted individually. This shift presented challenges in building trust and rapport virtually, as non-verbal cues were harder to interpret. In order to overcome this challenge, I implemented strategies such as rapport-building activities at the start of each session, regularly checking in on participants' lives, showing genuine interest in their daily experiences, hobbies and feelings as well as following up on previous conversations to foster meaningful connections. In addition, I employed interactive and creative activities during the virtual sessions to sustain the children's interest. Consistency in the session structure also contributed to a sense of security, helping to strengthen rapport over time.

The use of online platforms provided me with an unexpected advantage as it offered the child-participants the comfort of participating from their own home environments, with this potentially reducing the possibility of anxieties often associated with in-person meetings. It furthermore required of me to develop new skills in virtual facilitation and finding creative ways to keep sessions interactive and supportive, despite the physical distance between the participants and me. In reflecting on this, I regard the challenge I faced as something that eventually became an opportunity during which I could explore new methods of engagement, experiencing that with thoughtful adaptation, meaningful support can still be provided, even in unpredictable circumstances.

Another challenge I encountered during the study relates to participant availability, resulting in the need to regularly reschedule sessions due to unexpected circumstances. Inconsistency in the time-lapse between sessions made it challenging to deliver sessions consistently on a regularly or weekly basis, resulting in the intervention being prolonged for some participants while not in the case of others. As I followed a specific structure for the various sessions I was able to actualise all sessions with all four child-participants, even though at a different pace.

Next, two of the initially selected child-participants encountered unexpected difficulties and withdrew from my study before the holistic intervention commenced. This posed the challenge of recruiting additional participants to replace them. Despite the fairly high prevalence of CVD, I found it

challenging to recruit suitable candidates. In response to this challenge, I accessed my networks in the teaching profession and field of optometry to assist me in identifying potential participants.

Given the qualitative nature of my study and the selected research design, the generalisability of the findings may be limited. However, the primary goal of my research was not to achieve generalisability but rather to gain a deep understanding of the experiences of a group of children with CVD, particularly in terms of how the holistic intervention I developed affected their overall functioning and wellbeing. By recognising this potential limitation from the outset of the study, I aimed to enhance the transferability of the findings by including an audit trail and detailed descriptions of the research process. While the findings may thus not be directly applicable to all contexts, they may offer valuable insight for similar settings and for parents, teachers and other caregivers of children with CVD on how to support these children. It remains the discretion of the reader and future scholars to determine the relevance and applicability of the findings to their own research contexts.

Finally, even though the question can be raised whether or not the positive changes experienced by the child-participants can be directly ascribed to the intervention, as other factors may also have had an influence, I aimed to ensure that the intervention content focused on aspects related to coping with CVD, equipping them with strategies to address CVD-related challenges. I was guided by the results I obtained pre-intervention to plan the content of the intervention, thereby addressing the needs of, for example, not being sufficiently aware of or understanding CVD, or how to deal with this with self-confidence. As a result, the intervention led to a significant shift in the children's self-perception, self-image and the confidence with which they voiced their needs to others. Similarly, as parents became more confident in their own ability to support their children, they could better respond to the challenges their children faced by embedding suitable coping skills into their children's daily lives and advocating for their children's needs to be met in, for example, the school context.

## **6.5 RECOMMENDATIONS**

Based on the findings and conclusions of my study, I formulate recommendations for training and practice, potential policy implementation and future research in this section.

### **6.5.1 Recommendations for training and practice**

The findings highlight the critical need for comprehensive teacher training programmes that can foster an awareness of CVD and empower teachers with suitable strategies to effectively support children with the condition. By equipping teachers with the necessary knowledge and skills, they may feel empowered to identify and accommodate the needs of children with CVD, thereby creating more inclusive learning environments that can promote their academic success and wellbeing.

To this end, the findings of my study can inform teacher training programmes in an attempt to raise awareness of CVD and equip future teachers with the necessary knowledge on the challenges that children may experience as a result of CVD, specifically in the school context. If teachers are more knowledgeable, they may be able to better support and accommodate children with CVD within the school environment, thereby better implementing inclusive education policy. In the same way, the findings of my study can inform workshops and professional development opportunities for in-service teachers, thereby empowering them to better support learners with CVD in practice.

Additionally, healthcare workers in the field of vision and visual impairment may benefit from knowledge of the potential experiences of children with CVD, the challenges they often face and the potential positive impact of the intervention that was developed and implemented as part of this study. Such knowledge has the potential to inform the responses to a CVD diagnosis in the healthcare profession. Closely related, teachers and others who are informed of CVD and what this implies may share the knowledge with others, thereby promoting better accommodation and support for these children in the various systems they function in.

Next, based on the findings of my study, early detection and intervention can be recommended, though, for example, the reintroduction of routine screening programmes for CVD in schools that may ensure that these children are not misidentified and misdiagnosed. Healthcare workers in the field of vision and visual impairment are accordingly encouraged to prioritise the early detection of CVD and to provide appropriate support and resources that can reduce the impact of CVD on a child's academic, emotional and social functioning.

I further recommend that the resource booklets that I developed for parents and teachers as well as for children with CVD be disseminated to people who may interact or work with children with CVD. These booklets can, for example, be made available to all schools to promote CVD awareness and enhance the support offered to children with CVD in the school context. Additionally, I propose that the content of the parent guidance intervention be shared with other parents of children with CVD. It may similarly be used by healthcare workers and others who can diagnose CVD. Closely related, the content of the intervention can be used as a basis for the development of future support interventions aiming to support resilience in contexts similar to that of my study.

Lastly, as the findings of my study emphasise the importance of a joint effort between the various role players functioning in the nested systems of a child with CVD, effective communication and collaboration between teachers, parents and others are encouraged when wanting to support a child with CVD. In practice, the focus should fall on building partnerships between stakeholders and fostering open dialogue to ensure that children with CVD, or for that matter, any child facing specific challenges, receive the support they deserve and have a right to, both at school and at home.

### **6.5.2 Recommendations for policy implementation**

Based on the findings and conclusions of my study, I recommend the revision of current policies on inclusive education to include specific mention of CVD as a barrier to learning that merits accommodation and support. This can enable schools to promote equality and accessibility for children with CVD in educational settings by ensuring that schools plan for resources that can enable the accommodation of children with CVD, thereby ensuring that inclusive education policies are upheld. Given the prevalence of CVD and the possibility of all teachers teaching a child with CVD one time or another during the course of their careers, it seems important to equip and encourage teachers to practise inclusive education in such cases.

To elaborate, the findings of my study indicate the importance of schools catering for the diverse needs of children with CVD. This implies implementation of accommodations such as providing accessible learning material, incorporating alternative assessment methods, and creating supportive learning environments that cater for the specific needs of children with CVD by attending to the use of colour in teaching material and classroom practice. In this regard, policy can be changed, specifically to identify and clarify CVD as a barrier to learning that, as the findings of this study suggest, can impede a child's ability to learn and actualise the full potential if not accommodated sufficiently. In support of this drive, policy initiatives at both national and international levels, such as those outlined by the Department of Education (2001) and UNESCO (1994), should advocate for the integration of CVD awareness and support strategies into the relevant educational frameworks.

### **6.5.3 Recommendations for future research**

The following recommendations can be made for future research:

- Continued research on the challenges experienced by children with CVD across the various school phases and how interventions can support them.
- Follow-up longitudinal research on the long-term consequences of CVD for children.
- Exploratory research on areas for improvement in policy and practice concerning the accommodation of learners with CVD in school.
- Follow-up research on the perceptions of teachers relating to CVD and their role in supporting children experiencing this barrier to learning in the classroom.
- Explanatory research into how children with CVD navigate and interpret a world of colour.
- Descriptive research on the experiences of children with CVD in terms of the support they receive within the school setting.
- Follow-up descriptive research on the supportive actions that teachers can take within the academic setting, the nature of possible accommodation for CVD, and supportive changes that can be made in the school environment for children with CVD.

- Case study research on the extent to which resilience interventions can support children with other medical conditions or impairments that pose unique challenges.
- Exploratory research on the impact of healthcare workers' approach to CVD and how this may affect the perceptions of parents of children with CVD.
- Comparative research on the effect of the holistic intervention on younger children with CVD shortly after being diagnosed.
- Intervention research on the design and implementation of a teacher guidance intervention in support of learners with CVD.

## 6.6 CONCLUDING REMARKS

Children with CVD are embedded within and are products of interactions with others in their various supportive social ecologies. As a result of this, their unique perspectives and interactions with others determine how they navigate and engage with the surrounding world. Children with CVD can subsequently benefit from support provision that has been tailored to meet their unique and specific needs. To this end, I developed and implemented a holistic intervention to support four children with CVD as well as their parents, promoting resilience-enabling practices that allowed them to thrive across the various phases of their lives. I focused on determining the potential effect of the holistic intervention on the academic, emotional and social functioning of children with CVD.

The findings of my study highlight the challenges that children with CVD often experience as well as the support they may receive at home and at school to accommodate the challenges they face. The findings furthermore foreground the value of fostering resilience-enabling skills amongst children with CVD as well as their parents for the children to overcome the challenges they face. The importance and value of parental support and advocacy for children with CVD is confirmed, as well as the value of other supportive relationships and adopting a mindset of acceptance and positivity towards CVD by the people engaging with these children in their social ecologies. Based on the findings of my study, I conclude that the holistic intervention I developed that focused on CVD awareness, promoting resilience, communication skills, self-belief and a positive self-concept positively affected the academic, emotional and social wellbeing and functioning of the children with CVD as well as their parents. In any such initiatives, it remains important to embrace the unique perspectives of the child with CVD and foster a mindset of acceptance and hope, as effectively captured in the following contribution by one of the child-participants:

*To see the world in my way isn't wrong, it's just different.*

(PRA-S, 29 June 2022, CP 2).



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# APPENDIX A: INFORMED CONSENT

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## REQUEST FOR PARTICIPATION AND INFORMED CONSENT

Dear Sir/Madam,

I, Tegan van der Westhuizen, am currently completing a PhD (Doctoral) study in Educational Psychology at the University of Pretoria on the following topic: “The effect of a holistic intervention for children with colour vision deficiency”. In my study I will aim to gain insight on how children experience colour vision deficiency and the effect of a holistic intervention on their emotional, social and academic functioning. Insight into this issue may provide valuable knowledge into how children with colour vision deficiency can be assisted and better supported by teachers, caregivers and parents in their everyday lives.

For the purposes of my study, you are requested to participate in this study. Your participation in this study will consist of being involved in a parent guidance intervention for approximately 14 weeks. The intervention will be conducted via a WhatsApp group with other parents who have children with colour vision deficiency. Information will be shared to you via this group on a different topic each week. The covered topics will hopefully assist you in understanding the needs of your child and providing/arranging support as you see fit. The intervention will be co-facilitated by Keshini Naidoo, a MEd student currently completing her master’s study in Educational Psychology at the University of Pretoria on the following topic: “Parents’ experiences of an intervention on parent support for children with colour vision deficiency”.

The aim of the intervention is to provide you with information and guidance, in support of your child. The nature of the WhatsApp group will be interactive where you will be able to ask questions, and initiate discussions with the other parents. You will be asked to share your experiences of how your child experiences colour vision deficiency and the effect it has on their emotional, social and academic functioning.

Your participation is voluntary, and you have the right to withdraw from the study at any time if you wish. All information which you provide will be treated as confidential and your name will be kept anonymous and will not be made public to anyone. This will be achieved by replacing your name with a pseudonym. During the study, you will be assigned a letter or number to identify them. For example, participant A or participant 1. Furthermore, you will not be asked to provide any information that could result in their identity being made public. I will always respect your dignity; ensure that you

are protected from harm. You will not be placed at risk while participating in the study. The generated data will be stored securely by the University of Pretoria for 15 years.

The study is not of such nature that any injuries may be experienced. However, should you feel vulnerable in any way during the intervention, you should please inform me so appropriate support may be arranged. Before completion of the study, I will refer to you for comments, ensuring that you agree with the information that you shared which forms part of the data.

I also would like to request your permission to use your data, confidentially and anonymously, for further research purposes, as the data sets are the intellectual property of the University of Pretoria. Further research may include secondary data analysis and using the data for teaching purposes. The confidentiality and privacy applicable to this study will be binding on future research studies.

Kind regards



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Miss Tegan van der Westhuizen  
(Researcher)  
Email: u12224342@tuks.co.za



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Prof Ronél Ferreira  
(Supervisor)  
Email: ronel.ferreira@up.ac.za

## REQUEST FOR PARTICIPATION AND INFORMED CONSENT

Title of research project: The effect of a holistic intervention for children with colour vision deficiency.

I, \_\_\_\_\_ the undersigned, in my capacity as parent of \_\_\_\_\_ (name of child/learner) hereby agree to participate in the above-mentioned research and be included in the WhatsApp group. I understand that my contribution will be treated as anonymous and confidential, and that I have the right to withdraw from the study at any time, if I wish to do so.

Signed at \_\_\_\_\_ on the \_\_\_\_\_ day of \_\_\_\_\_ 202\_

\_\_\_\_\_  
Signature of Parent/Teacher

\_\_\_\_\_  
Signature of Researcher

\_\_\_\_\_  
Signature of Witness



## APPENDIX B: INFORMED ASSENT

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## ASSENT FORM FOR MINORS



### TITLE OF THE RESEARCH PROJECT:

The effect of a holistic intervention for children with colour vision deficiency

**RESEARCHER'S NAME:** Tegan van der Westhuizen

**RESEARCHER'S CONTACT NUMBER:** XXX XXX XXXX



### What is RESEARCH?

Research is something we do to find **new knowledge** about the way things (and people) work. We use research projects or studies to help us find out more about children and teenagers and the things that affect their lives, their schools, their families and their health. We do this to try and make the world a better place! Research studies help us learn new things.

### What is this research project all about?

I am doing this research project to find out more about how children with colour vision deficiency experience life and what the outcome of an intervention with them will be. If we understand how colour vision deficiency influences the life of a child then parents, teachers and other people will have a better idea of how to support and help them.

### Why have you been invited to take part in this research project?

You have been asked to join this study because you have colour vision deficiency, and you are a child under the age of 18 years old.

### Who is doing the research?

I, Tegan van der Westhuizen, will be doing this research. I am a student at the University of Pretoria, and I would like to get a better understanding of how colour vision deficiency influences the lives of children and if there are ways that can help or support them.

### What would happen if you join this research?

*If you decide to take part in the research, you will be asked to do the following:*

- *Intervention:* You will be asked to take part in an intervention. An intervention is something which we do to help improve the health and wellbeing of the people who take part in the intervention. The intervention will consist of wearing specialised glasses that will hopefully help you see colours better. You will also participate in activities and sessions where you will talk about how colour vision deficiency affects your life and how you feel about it. I will speak to you often, check in with you and provide you with help and support.



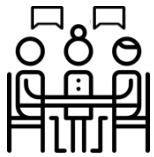
- *Wearing EnChroma glasses:* You will be asked to wear special EnChroma glasses while you participate in the research project. EnChroma glasses are specialised glasses, which can lessen colour vision deficiency-related difficulties and barriers. This means they could help you to see colour better even though they do not work for all people. You can keep the glasses after the intervention has finished, if you would like to.



- *Talking:* I will ask you questions about your life and how colour vision deficiency impacts what you do and how you feel. You will be expected to answer me out loud. Sessions will take place at time suitable to you either via a videocall or in person at a prearranged venue. Sessions will last between 30 to 60 minutes.



- *Sessions:* You will be asked to take part in sessions where you will be asked to talk about your life, and how colour vision deficiency influences you, if it does. You will also be asked to do some drawing and writing during the sessions as well as watch YouTube videos. These sessions will take place when you are available. They will last between 30 minutes to 60 minutes.



- *Writing and drawing activities:* You will be asked to take part in activities during the sessions where you will need to write or draw pictures about your experiences, feelings, and opinions. You will be asked to make drawings and complete posters. The posters will have questions written on them and you will need to write down your experiences and opinions. I will keep the drawings and posters after the sessions.



- *Online meetings:* Because of the Coronavirus disease (COVID-19), it may sometimes be better for our conversations to take place over video call, for example on Zoom or Google Meet. In these cases, we will have our discussions and interviews over video call where I will ask you questions. These calls will be prearranged with your parents.



- *Photographs:* Photographs of your drawings, writing activities, will be taken. The photographs will be used in my study to show how I gathered all my information. I will make sure that your face is not in the photographs so that no one can identify you.



- *Audio recordings:* I will record our interviews and workshops using a tape recorder, so that I can go back and listen to what we have talked about. I will then write out the audio recordings and use this when I write up my study.



- *Ongoing support:* I will provide you with help and support throughout the entire research project. We will speak often via online video calls or phone calls which will be organised with you so that I can check in and find out how you are doing, if there are any difficulties you may be experiencing, if you have any questions



and if any support can be offered. If you need any support at any point you can contact me.

•

### **Can anything bad happen to you?**

It may be scary talking to someone you do not know very well, especially about your feelings and experiences. I will try my best to make you feel at ease and supported throughout the study. If you are feeling uncomfortable at any time during the intervention you can contact me and I can answer any questions you have and provide you with the support you may need. I will always make sure that the information that I get from you is true and accurate. Before I finish the study I will discuss what we have discussed with you to make sure that I have accurately recorded it in my study.

When wearing the EnChroma glasses I hope that they will allow you to see colour better. However, the glasses work differently for everyone. They may work very well or they may have a limited effect on how you see colour when wearing the glasses. Also, when wearing any new glasses people can sometimes get headaches or experience physical discomfort. If you feel uncomfortable or experience any discomfort when wearing the glasses please let me know and I will try to provide you with advice. If the glasses are too uncomfortable or cause physical discomfort you can stop participating in the study at any point.

### **Can anything good happen to you?**

Being part of this research project may help you because you will get ongoing support from me which may help you to overcome some of the challenges you face. I will also support your parents and teachers so that they will be able to support you at home and in the school environment. By wearing the EnChroma specialised glasses you may be able to see a wider range of colours. It may also help to talk about how colour vision deficiency has affected you. I hope that the information we get from you will help other children with colour vision deficiency and allow their teachers and parents to support them better.

### **Will anyone know that you are in the study?**

Participating in this study is voluntary. This means that you get to decide if you want to take part in the study or not. You can say 'yes' or 'no'. You can leave the study at any time if you would like too.

Everything that we talk about and that you share with me will be treated as confidential. This means that no one will ever know that the information came from you. Your name and any information about you will be kept anonymous and confidential. Instead of using your name, you will be given a letter or number and you will be called Child A or Child 1. You will also not be asked to provide any information that will allow other people to identify you when they read the study. I will always respect you and make sure that you are protected from harm.

All the information that I get from the study will be kept safely at the University of Pretoria for 15 years. I would like to ask for your permission for the University of Pretoria to use the information you

give me during this study for other studies. Your personal information will be kept private and confidential.

### Who can you talk to about the study?

You can talk to me, Tegan, if you have any questions or if you are worried about anything. Please feel free to call or message me if you need help or support related to the study.

### What if you do not want to do this?



- You get to decide if you want to take part or not.
- You can say 'No', or you can say 'Yes'.
- Even if your parents have agreed for you to participate, you can still say 'no'.
- No one will be upset if you say 'No'.
- If you say 'Yes', you can always say 'No' later.
- You can say 'No' at any time.

### A few things to know...



Your safety is my top priority. I will be present throughout the study. Due to the outbreak of the Coronavirus disease (COVID-19), I will do everything I can to make sure that you are safe at all times. If necessary I will schedule meetings via videocall to ensure your safety. If sessions are conducted in person, we will wear a face mask at all times. Safe social distancing will be practiced during any in person sessions. I will sanitise the area, my hands and your hands with alcohol-based sanitiser and ensure that the sanitiser is responsibly handled. I will strive to maintain the utmost level of hygiene and safety so that I can ensure your safety and protection.



### Is there anything else?

Your parents have given permission for you to participate in my study. If you are willing to participate in the study, kindly sign this letter to indicate your consent. This will mean that you agree to voluntarily participate and that you understand that you can leave the study at any time.

If you want to be in the research after we talk, please write your name below. I will write my name too. This shows we talked about the research and that you want to take part.

Do you understand this research study and are you willing to take part in it?

YES

NO

Has the researcher answered all your questions?

YES

NO

Do you understand that you can STOP being in the study at any time?

YES

NO

**Name of Participant** \_\_\_\_\_  
(To be written by child/adolescent)

\_\_\_\_\_  
Signature of Child

\_\_\_\_\_  
Date

**Name of Researcher** \_\_\_\_\_

\_\_\_\_\_  
Signature of Researcher

\_\_\_\_\_  
Date



# APPENDIX C:

## RESOURCE BOOKLET FOR CHILDREN WITH CVD

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A support guide for children with




# Colour vision deficiency (colour blindness)



What  
support  
do I need?



I am  
unique



What do I  
need to  
know?

Developed by Tegan van der Westhuizen  
University of Pretoria



Welcome to your guide on colour vision deficiency (CVD)! In this booklet, we use the term CVD because, while some people call it colour blindness, that's not exactly what it is. You aren't blind to colour – you just see colour in a different way. So, instead of thinking of it as being "blind," we prefer to say you perceive colour differently.

This booklet is made especially for **YOU** – someone who sees the world a little differently. Inside, you'll find fun facts, helpful tips, and creative ways to handle challenges that might come up because of CVD. Whether it's in school, at home, or when you're out exploring, this guide will show you that seeing colours differently is just one part of who you are – and with a little knowledge and support, you can do anything!





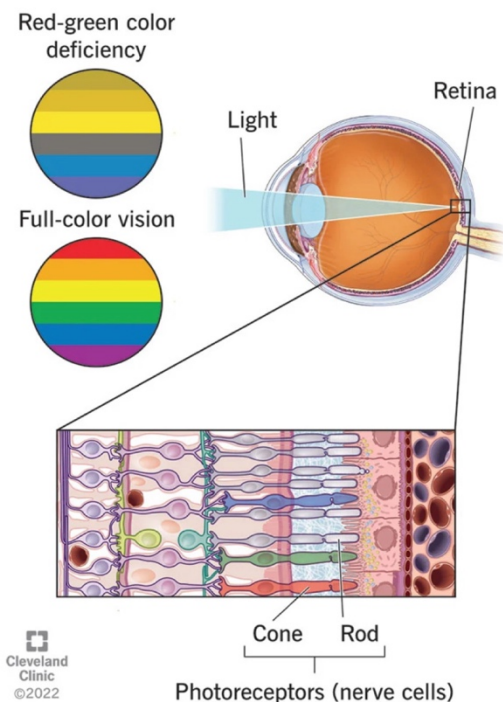
## WHAT IS COLOUR VISION DEFICIENCY (CVD)?

CVD, sometimes called colour blindness, is a condition that affects how your eyes see colours. If you have CVD, you might see colours differently than most people, making it hard to tell some colours apart.

At the back of your eyes, there are special cells called rods and cones that help you see. Rods help you see when it's dark, and cones help you see colours. Cones take in light and change it into colour so your brain can understand what colour you're seeing.

Most people have three types of cones in their eyes: one that sees red light, one that sees green light, and one that sees blue light. These cones work together by picking up different kinds of light, and your brain puts all this information together to help you see colours.

If you have CVD, one or more of your cones doesn't work as it should. This means that your eyes don't send the right signals to your brain about the colours you're seeing, so some colours might look different to you than they do to other people.





## WHAT CAUSES CVD?

CVD can be something you're born with or something that sets in later in life.

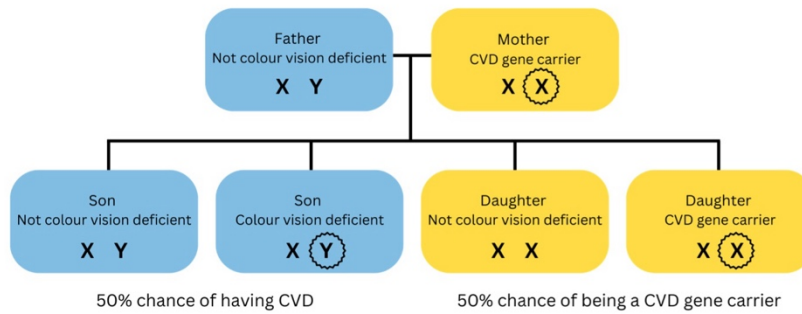
- **Inherited or congenital CVD** is passed down through your family and is more common in boys. About 1 in 12 boys and 1 in 200 girls have CVD. That means in a typical class of 30 children, there could be one child with CVD!
- **Acquired CVD** (which affects blue and yellow colours) can happen if someone has a long-term illness like diabetes or after an injury, a stroke, taking certain medications, or just when getting older.

**Red-green colour vision defects are linked to your genes.**

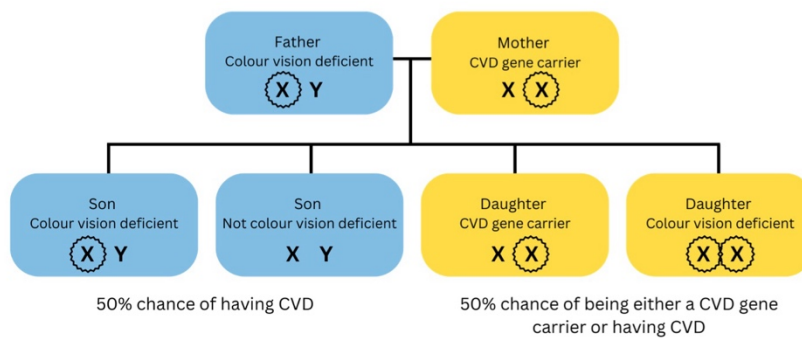
- Boys have one X chromosome and one Y chromosome, while girls have two X chromosomes.
- CVD is attached to the X chromosome. Boys inherit their X chromosome from their mum and their Y chromosome from their dad. Girls inherit one X chromosome from their mum and one X chromosome from their dad.
- For girls to have CVD, both of their X chromosomes must carry the condition. Since boys have only one X chromosome, if it is affected, they will have CVD.
- Dads cannot pass CVD to their sons; only mothers can pass CVD to their sons. However, a girl can inherit CVD from both her dad and mum.

# HOW CVD CAN BE INHERITED

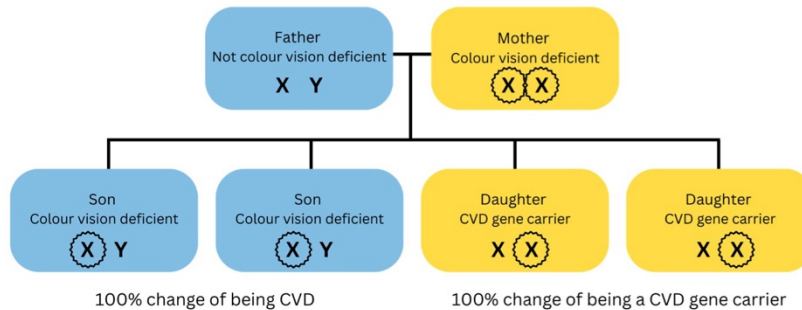
## A NON CVD FATHER AND A CVD GENE CARRIER MOTHER



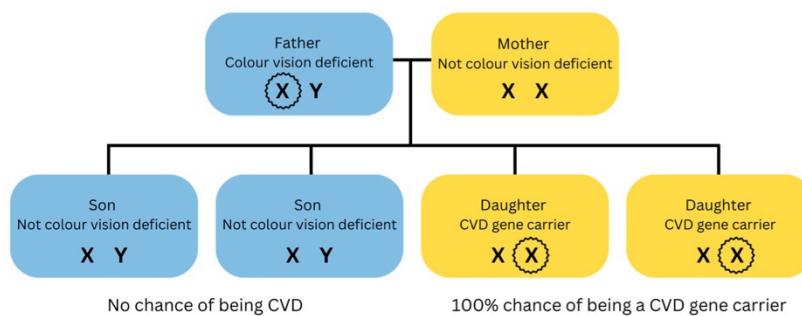
## A CVD FATHER AND A CVD GENE CARRIER MOTHER



## A NON CVD FATHER AND A CVD MOTHER



## A CVD FATHER AND A NON CVD MOTHER



# TYPES OF CVD

CVDs come in different types, and affects how you see colours. Here are the main types:

## Red-green colour vision defects

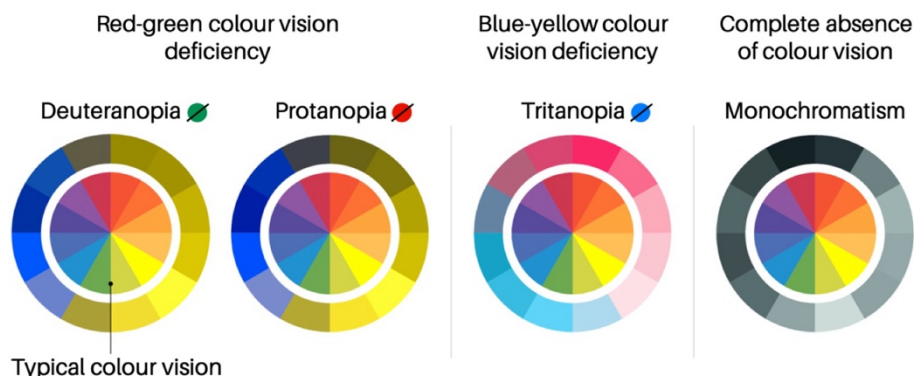
These are the most common types of CVD and affect how you see red and green light. There are four main types:

- **Deutan-type colour vision deficiencies (difficulty seeing green light)**
  - **Deuteranopia (green-blind):** Your green cone is missing, so you can't see green light at all. You mostly see shades of blue and gold, and it might be hard to tell different reds and greens apart.
  - **Deuteranomaly (green-weak):** You have a defect in your green cone, so you can see green, but not as well as most people. This is the most common type of CVD. You mostly see shades of blue, yellow, and muted colours.
- **Protan-type colour vision deficiencies (difficulty seeing red light)**
  - **Protanopia (red-blind):** Your red cone is missing, so you can't see red light at all. You mostly see shades of blue and gold. It might be hard to tell different reds apart, and dark brown might look like dark shades of other colours, like red or green.
  - **Protanomaly (red-weak):** You have a defect in your red cone, so you can see red, but it looks different. Red might seem like grey, and colours with red in them might look less bright and more muted.

## Blue-yellow colour vision defects

These are much less common and affect how you see blue and yellow light:

- **Tritan-type colour vision deficiencies (difficulty seeing blue light)**
  - **Tritanopia (blue-blind):** Your blue cone is missing, so you can't see blue light at all. You mostly see reds, light turquoise, pinks, and lavender.
  - **Tritanomaly (blue-weak):** You have a defect in your blue cone, so you can see blue, but not as well as most people. Blues might look green, and you might see very little or no yellow.



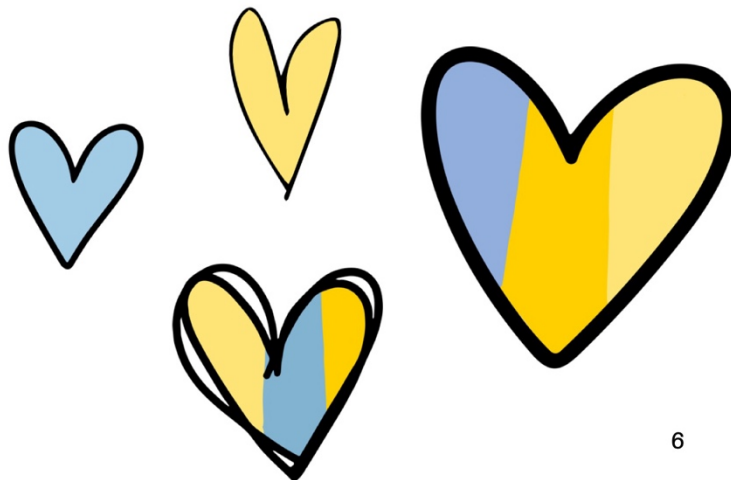
The differing colours people with red-green, blue-yellow, and complete colour vision deficiency see against the full colour vision wheel.

5



## INTERESTING FACTS ABOUT CVD

- You can see colour, you just see it differently than typically sighted children.
- If you're born with CVD, it stays the same throughout your life. It won't get worse.
- CVD doesn't make your eyesight blurry; it just changes how you see colours.
- Some children with CVD might not even know they have it! Since they've always seen the world this way, they might think everyone else sees colours like they do.
- Children with CVD often figure out ways to tell colours apart on their own. But sometimes, those strategies aren't enough, and it can make learning or social situations tricky.
- Understanding and support are very important! In school and in everyday life, lots of things depend on colours. With the right help, you can overcome any challenges that come your way.
- You can differentiate between patterns and textures better than children with typical colour vision.



6



## WHAT CHALLENGES WILL I FACE?

### Emotionally:

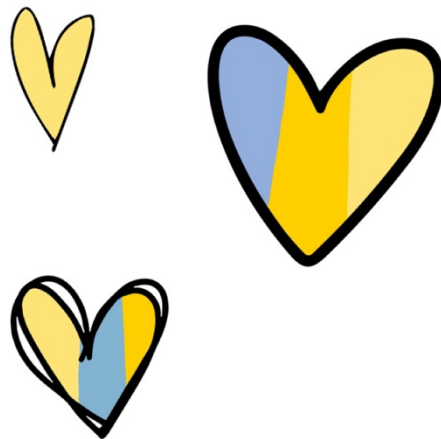
- **Frustration:** You could feel frustrated or embarrassed when you can't join in on fun activities like colouring or arts and crafts because of colour confusion.
- **Low Self-esteem:** You might feel a bit sad or different if you can't do things that involve colour, which can make you feel less confident.
- **Anxiety:** You might get nervous in situations, like during tests or group work, where colour matters a lot.

### Socially:

- **Playing with Friends:** It could be hard to join games that use colours, like when you need to pick teams based on colour T-shirts, and this might make you feel left out.
- **Talking About It:** Explaining to your friends that you see colours differently can be tough, and they might not always understand.
- **Working in Groups:** You might struggle with team projects where colours are used to show different parts of the work, making it harder to join in.

### Academically:

- **Identifying Colours:** You might find it tricky to tell some colours apart in your school books or when doing assignments, like telling the difference between red and green.
- **Reading Graphs and Charts:** Sometimes, you may have trouble understanding pictures or graphs that use colours to show information, like how many kids like each type of ice cream.
- **Art and Crafts:** Choosing the right colours for your art projects might be hard, especially if the instructions say to use specific colours.

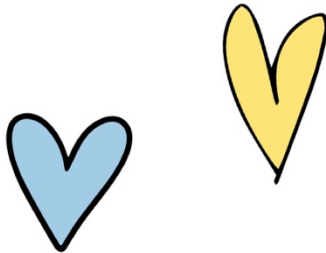




## WHAT CHALLENGES WILL I FACE?

### Daily Living:

- **Choosing Clothes:** Picking out your clothes might be tricky if you can't tell which colours match well together, and that can make you feel unsure about what to wear.
- **Crossing the Street:** Sometimes, you might have trouble seeing traffic lights or signs that use colours to tell you when it's safe to cross the street.
- **Food Choices:** It might be hard to tell if fruits and veggies are ripe just by their colour, which could affect what you choose to eat.



### Career Choices:

- **Certain Jobs:** Some jobs, like being a painter or graphic designer, might be tricky because they need you to see colours clearly.
- **Workplace Tasks:** In some jobs, like being a doctor or safety worker, you might need to read colour-coded signs or charts, which can be challenging.
- **Finding Help:** Sometimes, teachers and career advisors might not know much about CVD, which can make it harder for you to get advice about what jobs you can do.

Although it may be tough at times and you may face challenges, remember that you can overcome them by adopting a positive mindset and asking for help. There are many resources available to support people with colour vision deficiency (CVD), including special tools and understanding teachers. Plus, there are more career opportunities than ever before for people with CVD. You are not alone in this journey; with the right support, you can achieve your goals and fulfil your potential!



## HOW CAN I SUPPORT MYSELF?

### Be understanding and accepting

Remember that not everyone sees colours the same way. Accept that you might see colours differently and that it's okay. Embrace your unique way of seeing the world and understand that others will need to accommodate your needs.

### Practice patience and empathy

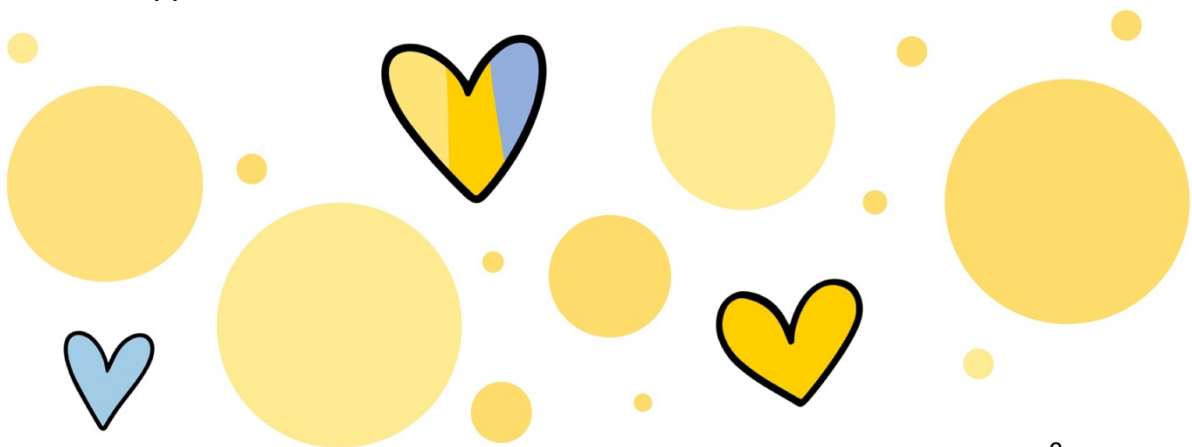
It's important to be patient with yourself. You can't change how you see colours, and that's okay. If you ever feel different from others, try to understand how your condition affects you and be kind to yourself about it.

### Advocate for your needs

If you need special help or tools, don't be afraid to ask for them. Talk to your teachers or parents about what you need to learn best. This could include colour-friendly materials, extra time for tasks, or tools that help you see better.

### Embrace inclusivity

Be open about your unique way of seeing colours. If you're in a classroom or group, make sure your friends and teachers understand how you see things. Let them know how they can help you, and encourage everyone to support and include each other.





## HOW CAN I SUPPORT MYSELF?

### **Celebrate your unique perspective**

Understand that there's no cure for CVD, and that's okay. Celebrate the way you see the world differently and be proud of it. Your perspective is special and valuable, and it can offer insights that others might not notice.

### **Be assertive**

Don't be afraid to speak up if you're having trouble or need something. Tell your friends and teachers about your CVD and how it affects you. Ask for help when you need it and let others know if something is confusing.

### **Empower yourself**

Remember that everyone has their own strengths and weaknesses. See CVD as a unique ability that gives you a special way of viewing the world. Your unique perspective might help you notice things like textures and shapes that others might miss. Embrace and value your special abilities!

### **Educate others about CVD**

Help others understand what CVD is and how it affects the way you see the world. Share your experiences and explain the challenges you face. By educating friends, family, and classmates, you can foster a supportive environment and encourage empathy and inclusion. Your efforts can help others see things from your perspective and make it easier for everyone to work together and support each other.

### **Use of assistive resources**

There are assistive devices out there that can help you interact with colour. These tools can help you navigate the world of colour. EnChroma glasses, for example, can alter how some people with CVD perceive colour. There are also apps that identify colours and colour changing modes on games that change how colours appear on screens. These assistive devices can make it easier for you to understand colour and help you interact with the world in ways that work best for you.



## **ADOPT A RESILIENCE MINDSET**

### **What is resilience?**

Resilience is about bouncing back and adapting positively when we face challenges or tough times. It's about using what we know and the skills we have to handle difficulties and keep moving forward.

### **Why is resilience important?**

Having a *resilience mindset* helps us deal with problems and find ways to overcome obstacles. It's about focusing on our strengths and the tools we have to get through hard times. This mindset helps us to keep going and grow stronger even when things are difficult.

### **How can you build resilience?**

- **Identify the CVD-related challenges you face:** Dealing with CVD-related challenges can be tough, especially if others don't fully understand how you see the world. You might face difficulties that others don't know how to help with. Educate the people around you on what you find difficult and how they can help.
- **Recognise your unique view:** Your perspective with CVD is special and different. Embrace it and know that while it may come with challenges, it also has its own strengths and advantages.
- **Develop resilience-enabling coping skills:** Practice using your strengths and resources to help you overcome challenges. Try to look on the *brightside* and focus on finding a solution to your challenges.
- **Ask for help:** Ask those around you for help and support when you need it. Remember everyone needs help, so don't be afraid to ask. Your family and friends will be happy to help.
- **Be proud of your strengths:** Understand that everyone faces difficulties, but your unique way of seeing the world gives you special abilities. Use these strengths to help you adapt and succeed.

By developing resilience, you can navigate through life's ups and downs with confidence and find ways to thrive despite the challenges you may face.



## WHAT SUPPORT CAN I ASK FOR IN THE CLASSROOM?

- **Adapted learning materials just for you:** Teachers can make special versions of learning materials for you. For example, when studying maps, you could have a version that uses patterns or shapes instead of just colours.
- **Label colours:** If a graph or diagram uses colours to show information, the colours should be labeled so you can easily tell what they mean.
- **Mark your art supplies:** Your crayons, pens, and paints should have words or symbols on them to help you know what colour they are.
- **Use other ways to show differences:** Make sure that important information is not only shown through colours. Instead of only using colours to show differences in information, your teacher could use patterns, shapes, sizes, or textures too.
- **Pick easy-to-see colours:** Sometimes certain colours, like red and green, can be hard to tell apart. Your teacher should pick colours that are easier for you to see clearly. Tell her what colours you can see best.
- **Avoid tricky combinations:** Your teacher should avoid putting red writing on a green background because it can be hard to read.
- **Help with colour-based content:** Your teacher should provide extra support when you are learning something that involves colour, like chemical reactions in science. If your teachers forget to provide you with support, remember to ask them and remind them about your CVD.
- **Use helpful apps:** There are apps that can help you with identifying colours, such as ones that can name colours for you.
- **Adjust colours and contrast:** In digital learning, you can change the colours or contrast in games and programs on your tablets or computers to help make things easier to see.

This support will help make your classroom experience more inclusive, ensuring that you can learn and thrive alongside your classmates!



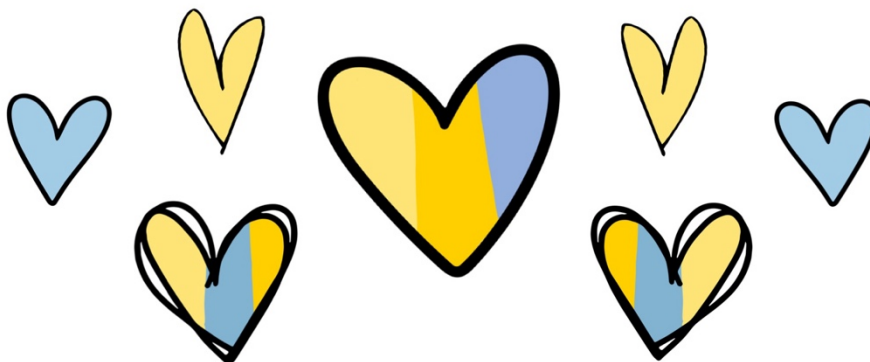
## DID YOU KNOW?

CVD is recognised as a learning barrier, which means you can get special accommodations in school to help you succeed. These adjustments allow you to show your abilities during tests, exams, and assignments without being held back by colour challenges.

When you receive accommodations for CVD, you might get support like:

- **Adapted learning materials and exam papers:** These materials are designed to be more accessible for you.
- **Extra time for completing tasks:** You'll have more time during tests and assignments.
- **Larger print:** Bigger letters and numbers make reading easier.
- **Help with colour identification:** Someone can assist you in identifying colours during certain tasks.
- **A reader for exams:** You may have someone read exam questions aloud to you if colour is causing confusion.
- **A quiet space for tests:** You could take your exams in a separate room to help you focus better.

These support strategies are there to help you learn and succeed by recognising your unique way of seeing the world!





## REMEMBER...

You are unique

You are capable of great things

Your differences make the world more interesting

Trust your instincts when navigating the world

Celebrate the way you see things that others might not notice

How you see the world is beautiful



Your perception of the world is valuable and important

You have the power to overcome any challenge

Embrace creativity and explore your unique way of using colour!

Be kind to yourself



Your voice deserves to be heard



It's okay to ask for help

You bring something special to the world no one else does





As you reach the end of this guide, remember that seeing the world differently is **your superpower!** You have unique strengths that make you **YOU**, and CVD is just one part of your amazing story.

The world is full of colour in so many ways beyond what our eyes see. You have the ability to explore, learn, and achieve anything you set your heart on. Whether in school, at home or out with friends, know that ***your view*** is just as valuable and beautiful as anyone else's.

Always believe in yourself, ask for help when you need it, and keep discovering new ways to make the world your own. Your journey is just beginning, and the future is bright - in every colour imaginable.





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# APPENDIX D:

## RESOURCE BOOKLET FOR PARENTS AND TEACHERS

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# Supporting children with



# Colour vision deficiency

## A guide for parents and teachers

Developed by Tegan van der Westhuizen  
University of Pretoria

This resource guide has been developed to provide parents and teachers with valuable insight into how children with colour vision deficiency (CVD) perceive the world and experience their surroundings. It highlights the unique challenges these children face and offers strategies to provide the necessary support to help these children overcome the unique adversity they face.

Even though CVD is not classified as a special educational need in many countries, emerging research indicates that CVD can present as a barrier to learning. Without appropriate accommodations and support, CVD may hinder a child's ability to function optimally.

The purpose of this guide is to raise awareness of CVD, illuminate the challenges these children may encounter, and serve as a tool for fostering a better understanding of this often misunderstood and misdiagnosed visual impairment.

Some of the content in this resource booklet was co-conceptualised by Keshini Naidoo and Ronél Ferreira as part of a broader research initiative on developing a parent guidance intervention to support parents of children with CVD.



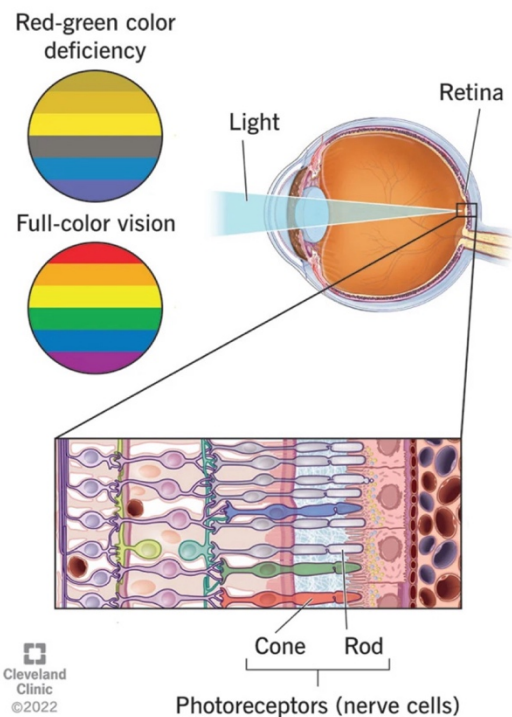
## WHAT IS COLOUR VISION DEFICIENCY (CVD)?

Colour vision deficiency (colour blindness) is a medical condition that affects the eye. It influences one's ability to perceive colour. People with CVD see colours differently from people with typical vision and have difficulty telling the difference between certain colours.

The retina of our eyes has two types of specialised light receptors that are sensitive to light; they are rods and cones and are found in the back layer of the eye that help us see the world around us. Rods help us to see in low light conditions while cones help us discriminate and differentiate between colours. Cones convert and translate light into colour.

Each of us has three retinal cones in our eyes that translate light into colour. Cones receive different coloured light wavelengths that our brain then interprets so that we can see the colour we are looking at. Each cone is sensitive to different light wavelengths; they are blue light, green light, and red light. When light enters our eye, cones process this light and send signals to our brain about which colour they are perceiving.

A person with CVD has a defect in one or more of these cones which then influences the brains' ability to perceive and differentiate colour. When a cone is defective it does not filter out light wavelengths correctly, which means the eye does not perceive the colour correctly.





## WHAT CAUSES CVD?

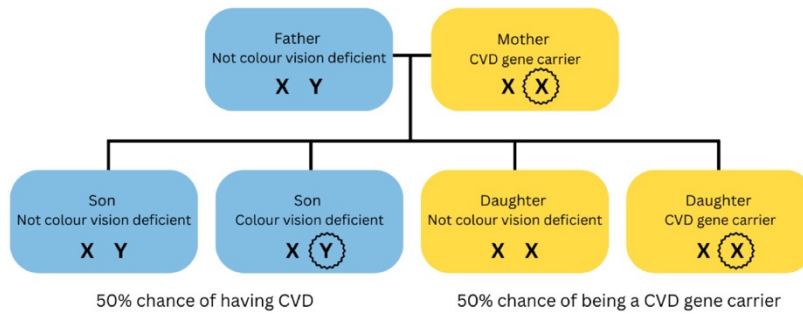
- CVD is either genetically inherited or acquired.
  - Genetically inherited CVD is passed down from one generation to the next through the X chromosome, and is more likely to affect males. It is estimated that approximately one in 12 (8%) of all males and one in 200 (0.5%) of all females are affected by a CVD. Approximately 95% of people with CVD are men. This means that statistically, there should be one child with CVD in every average sized class of 30 children.
  - Acquired CVD (blue-yellow CVD) usually occurs as a result of chronic illness (e.g. diabetes, Alzheimer's disease, Parkinson's disease and liver disease), accidents, strokes, medication side effects and age.
- Red-green colour vision defects are carried on the X-chromosome only.
  - For females (who have two X chromosomes), a mutation must be present in both X chromosomes to cause CVD, whereas for males (who have one X chromosome), one mutated gene is enough to cause CVD.
  - Fathers cannot pass CVD onto their sons.
- If a child has inherited CVD their condition will not worsen throughout their life but will stay the same.

## SOME INTERESTING FACTS

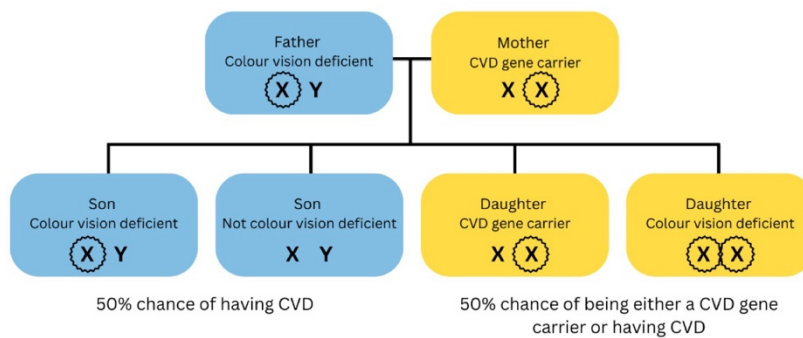
- CVD does not affect the sharpness of vision but only the way colours are perceived.
- CVD is often misdiagnosed and many children with CVD are unaware that they have the condition as it is something they were born with, and they assume that the way they see the world is how everyone else does.
- People with CVD will typically develop coping strategies that enable them to function within a world filled with colour. However, these strategies are not always enough, and they may develop learning difficulties as well as emotional and social difficulties.
- Without adequate understanding, support and accommodation CVD can pose many challenges for children as colour is often an essential learning tool within classrooms and the world.

# HOW CVD CAN BE INHERITED

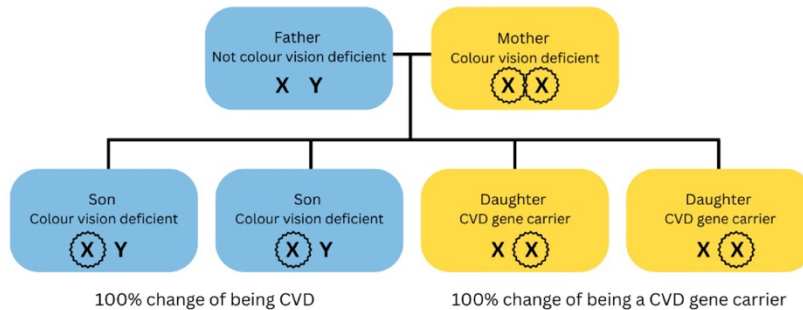
## A NON CVD FATHER AND A CVD GENE CARRIER MOTHER



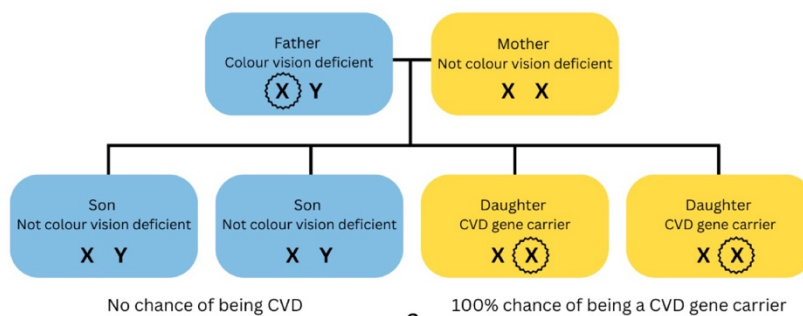
## A CVD FATHER AND A CVD GENE CARRIER MOTHER



## A NON CVD FATHER AND A CVD MOTHER



## A CVD FATHER AND A NON CVD MOTHER



## TYPES OF CVD

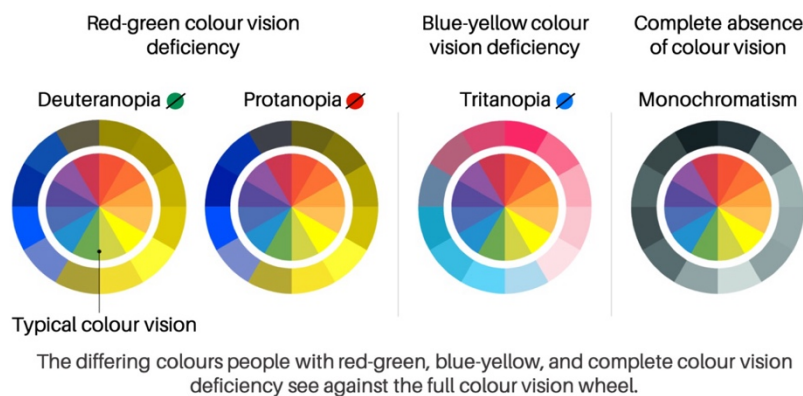
Colour vision deficiencies are divided into three major categories: red-green colour vision defects, blue-yellow colour vision defects, and a complete absence of colour vision.

Red-green colour vision defects are the most common forms of CVD and cause a reduced sensitivity to red and green light. This causes difficulty distinguishing between shades of red and green. There are four main subtypes:

- **Deutan-type** colour vision deficiencies (reduced sensitivity to green light)
  - **Deuteranopia (green-blind)**: The green retinal cone is missing that means that such children with CVD cannot perceive green light. They see mostly in shades of blue and gold and may have difficulty differentiating between shades of red and green. They may also confuse yellows with bright shades of green.
  - **Deuteranomaly (green-weak)**: This is the most common type of CVD. All three cone types are present, but the green cones are less sensitive to green light than they should be. Children with this category of CVD mostly see in shades of blue, yellow, and generally muted colours.
- **Protan-type** colour vision deficiencies (reduced sensitivity to red light)
  - **Protanopia (red-blind)**: The red retinal cones are missing that means a child with CVD cannot perceive red light. They see mostly in shades of blue and gold and may easily confuse different shades of red with black and grey. They may also confuse dark brown with dark shades of other colours, including red, green or orange.
  - **Protanomaly (red-weak)**: All three cone types are present but the red retinal cones are less sensitive to red light than they should be. Red may appear as different shades of grey, and every colour that contains red may be less bright and muted.

Blue-yellow colour vision defects are much less common and include:

- **Tritan-type** colour vision deficiencies (reduced sensitivity to blue light)
  - **Tritanopia (blue-blind)**: The blue retinal cones are missing which means that a child with CVD cannot perceive blue light. They will mostly see reds, light blues, pinks, and lavender.
  - **Tritanomaly (blue-weak)**: All three cone types are present, but the blue retinal cones are less sensitive to blue light than they should be. Blues look green, and a child with CVD may see very little or no shades of yellow.



## HOW TO IDENTIFY A CHILD WITH CVD

CVD is often misdiagnosed due to a lack of awareness. Children may be incorrectly labelled as being difficult, having other learning difficulties or experiencing attention deficits. It is essential for early detection of CVD so that children can be given the appropriate support and so that negative learning experiences can be minimised.

Many people with CVD do not realise that they have a colour vision defect as they do not realise that the way they see the world is different. If CVD is undiagnosed, it can cause distress and lead to academic, emotional and social challenges.

CVD may be suspected when a child:

- uses the wrong colours consistently for an object (e.g. purple leaves on trees, brown grass etc.);
- avoids school work and tasks that involve colour;
- displays a drop in attention when using colour in tasks;
- experiences difficulty telling the difference between certain colours or shades and seeing the brightness of certain colours;
- smells food before eating it;
- complains that their eyes hurt or they have headaches when looking at colourful text on coloured backgrounds.



Typical colour vision



Deuteranopia  
(green-blind)



Protanopia  
(red-blind)



Tritanopia  
(blue-blind)

## WHAT TO DO IF YOU AS PARENT SUSPECT YOUR CHILD HAS CVD:

### 1. Pay attention to signs:

- Watch for recurring difficulties your child may have with identifying or naming colours. This could include confusing certain colours, like red and green, or having trouble with colour-based activities, such as sorting objects by colour.
- Notice if they avoid tasks that involve colour, or seem frustrated when dealing with colour-related learning materials.

### 2. Communicate with your child:

- Talk to your child in a supportive manner to understand what they are experiencing. Ask them if they ever feel unsure or confused about colours and whether they struggle with tasks that involve colour.
- Be open and curious without being alarmed so that your child feels comfortable sharing their experiences.

### 3. Speak to your child's teacher:

- If the issue appears to affect your child's learning, discuss your concerns with their teacher. Teachers may have noticed similar difficulties in class and can provide insight into how your child manages colour-related tasks.
- Ask the teacher if they have any suggestions for adjustments or support that could be implemented in the classroom. Share any ideas you may have with teachers.

### 4. Schedule an eye examination:

- Book an appointment with an optometrist or ophthalmologist for a comprehensive eye examination. Ensure the examination includes specific tests for colour vision to determine if your child has CVD. The specialist can confirm whether your child has CVD and provide advice on how to manage it.

### 5. Seek support and guidance:

- After receiving a diagnosis, ask the eye specialist for resources and recommendations for managing CVD at home and school. They may suggest practical tips, such as colour identification tools or strategies for improving your child's experience in colour-reliant environments.

### 6. Advocate for accommodations:

- Once CVD is confirmed, work with the school to advocate for any necessary accommodations. These may include modified learning materials, extended time for tasks that involve colour, or special assistance during examinations.
- Ensuring that these accommodations are in place will help your child feel supported and able to perform to the best of their ability.

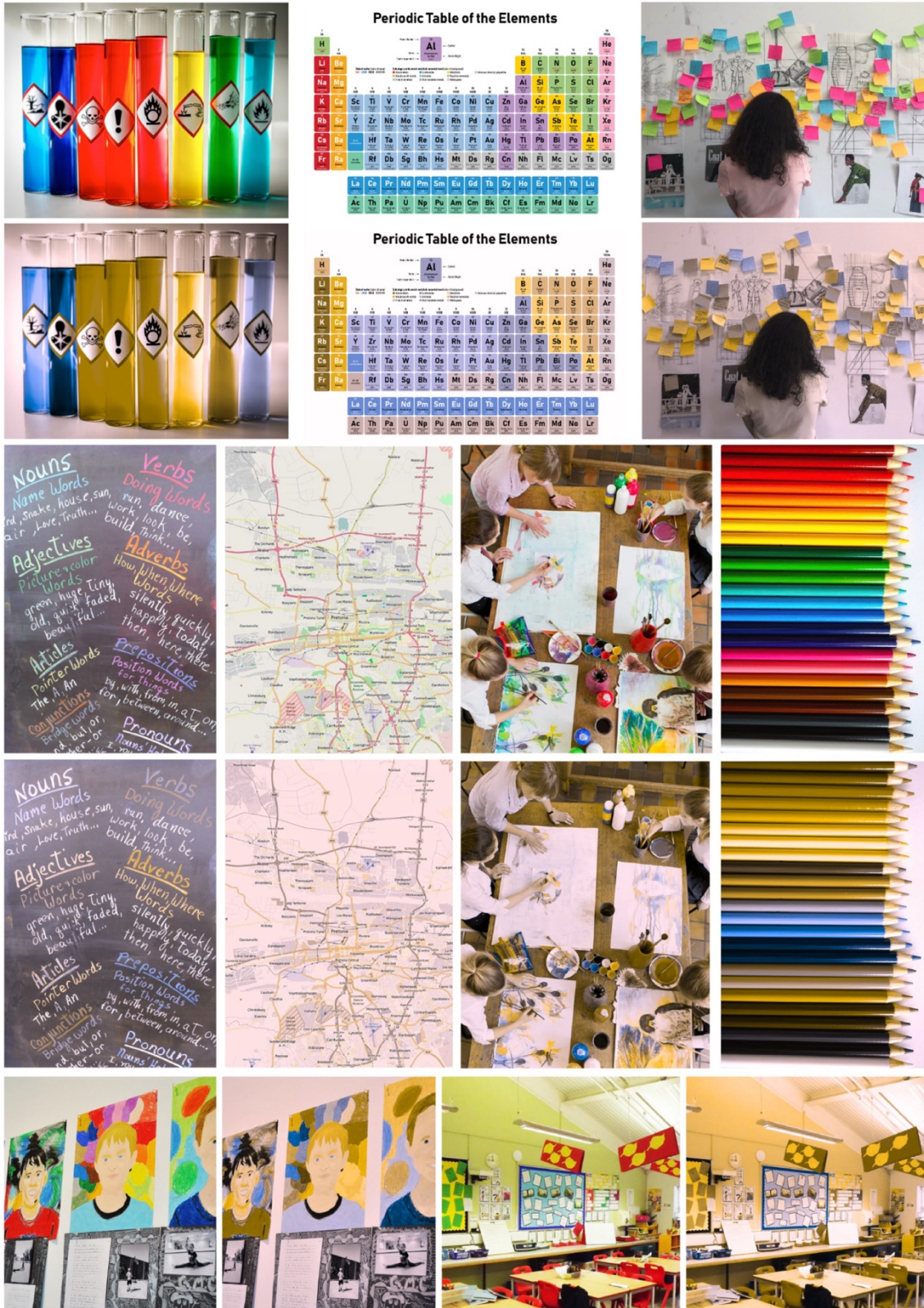
### 7. Provide emotional support:

- Support your child emotionally by helping them understand that having CVD does not define their worth or abilities. Reinforce that everyone experiences the world differently, and that their unique way of seeing things is valuable.
- Encourage your child to express their feelings and to seek help when they encounter challenges related to CVD.

### 8. Educate family and friends:

- Help family members, friends, and your child's peers understand what CVD is, so they can offer appropriate support. By educating others, you can foster a more inclusive and empathetic environment for your child.

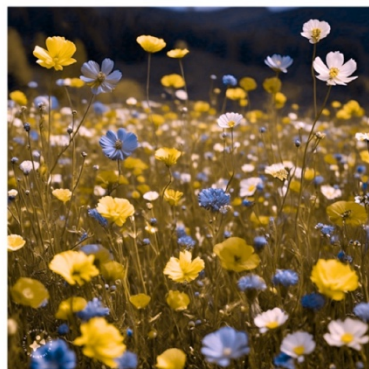
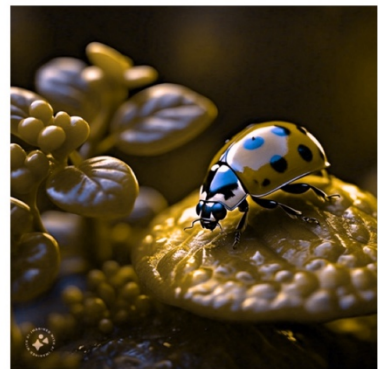
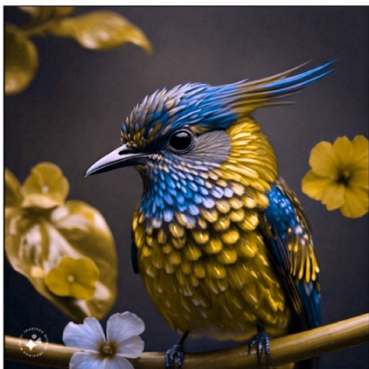
## EXAMPLES OF WHAT A CHILD WITH DEUTAN-TYPE CVD MAY SEE VS TYPICAL COLOUR VISION



## EXAMPLES OF WHAT A CHILD WITH DEUTAN-TYPE CVD MAY SEE VS TYPICAL COLOUR VISION



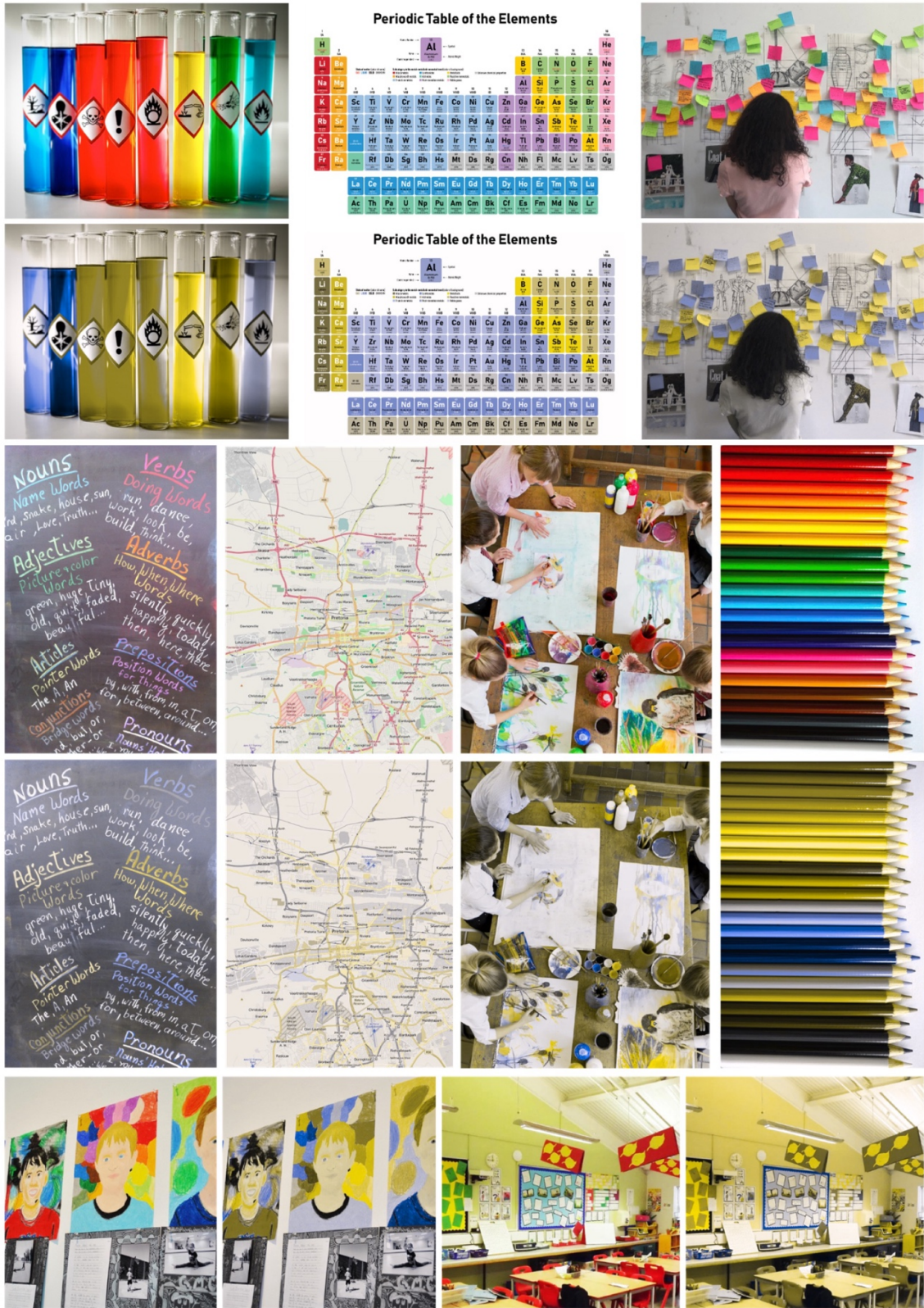
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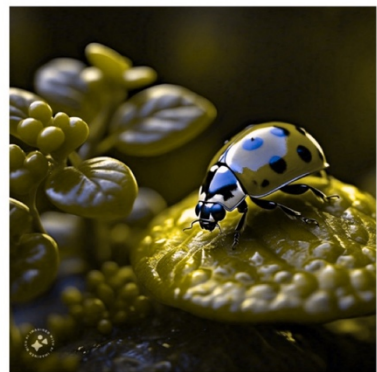
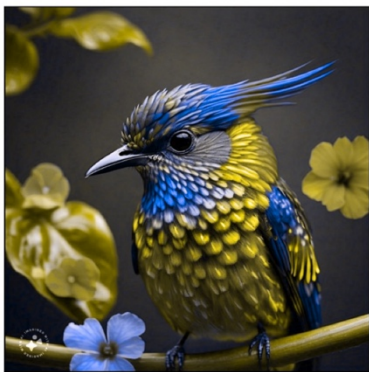
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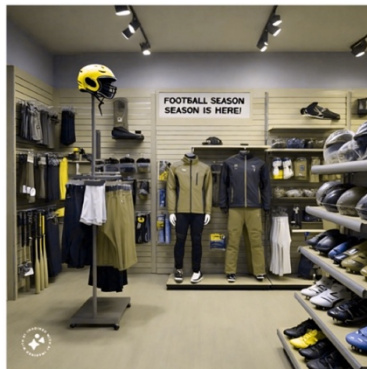
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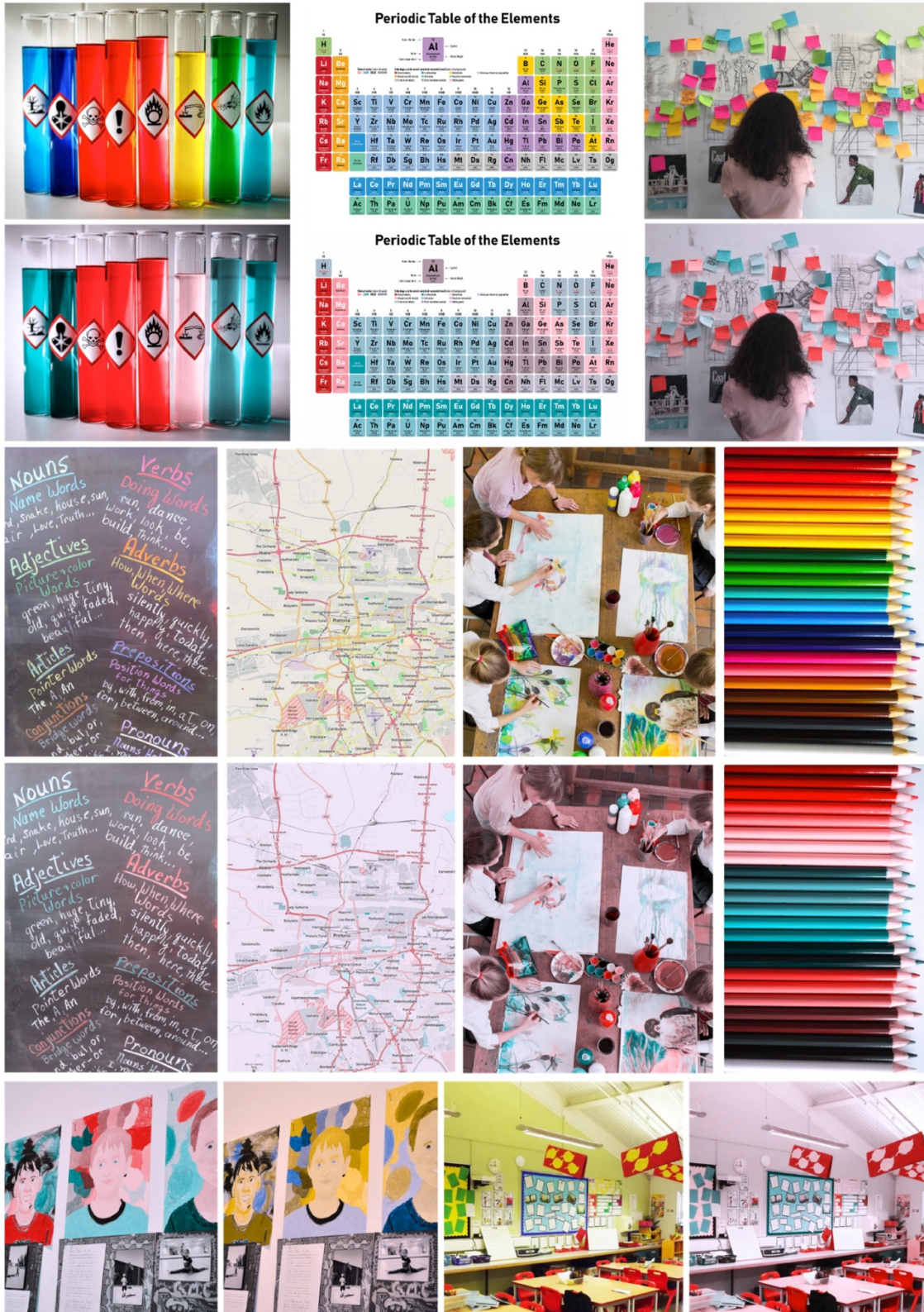
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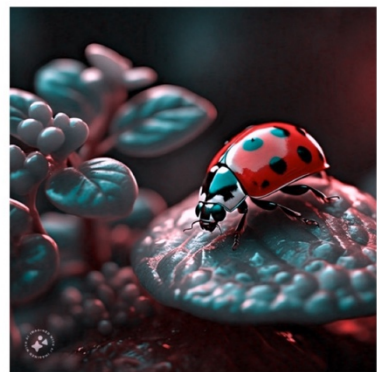
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## EXAMPLES OF WHAT A CHILD WITH TRITAN-TYPE CVD MAY SEE VS TYPICAL COLOUR VISION





## How does CVD affect children?

### DAILY LIVING

Children with CVD may encounter obstacles in their everyday lives, often in tasks that require colour recognition. This affects various aspects of daily living, from choosing appropriate clothing to interpreting signs and labels that rely on colour cues. Here are some common challenges children with CVD may experience:

- **Difficulty distinguishing clothing colours:** Matching outfits, choosing clothes, or identifying stained or mismatched clothing can become frustrating tasks.
- **Issues with food identification:** Differentiating between ripe and unripe fruits or judging whether food is cooked properly can be challenging, as many cues rely on colour.
- **Navigating public spaces:** Reading colour-coded maps, interpreting traffic lights, and following colour-based instructions in public settings can be a significant barrier.
- **Struggles with visual entertainment:** Identifying characters in video games, cartoons or books based on colour or engaging in art-related activities may lead to frustration or disengagement.
- **Household tasks:** Distinguishing between cleaning products, organising items, or interpreting warning labels can be tricky, as many rely on colour differentiation for safety or effectiveness.
- **Personal independence:** Daily tasks like packing a school bag (distinguishing notebooks by colour) or picking out personal items can sometimes lead to confusion or mistakes, causing children to feel less independent.
- **Difficulty identifying skin conditions:** Children with CVD may struggle to identify visual cues like skin rashes, bruises or blood, which can be critical for personal health or emergency situations. This can lead to delays in seeking medical attention or properly addressing injuries.



## How does CVD affect children?

### IMPACT ON CAREER CHOICES

As children with CVD grow older, they may need to consider the impact of their condition on potential career paths. Some professions heavily rely on accurate colour perception, and these may pose limitations or require accommodations. Examples include the following:

- **Design and Art-Related Fields:** Careers in graphic design, painting, fashion or interior design often involve using and distinguishing between specific colours that may be challenging for individuals with CVD.
- **Medical Professions:** Fields such as radiology, pathology or surgery may be difficult for those with CVD, as accurate colour perception can be crucial in diagnosing conditions, reading medical charts or interpreting patient symptoms.
- **Electrical and Engineering Jobs:** Jobs that involve colour-coded wiring or visual inspections of equipment may pose safety concerns for individuals with CVD.
- **Aviation:** Pilots and air traffic controllers need to distinguish between colours on panels and in the sky. While some countries have historically had restrictions on individuals with CVD becoming commercial pilots, regulations in certain countries have been updated to allow individuals with CVD to pursue these roles. It is important to check the specific regulations in your country.
- **Hospitality and Retail:** Jobs in these sectors often require individuals to assist customers with selecting items or identifying features based on colour that may require additional support or accommodations.

It is important to note that with the right support and adjustments, children with CVD can thrive in many careers. With the right guidance and support, children with CVD can navigate the challenges they face and pursue fulfilling careers.



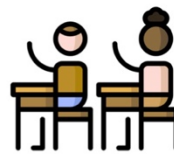
## How does CVD affect children?

### ACADEMIC CHALLENGES

- Children with CVD may face challenges in colourful classroom environments or when colour is used in teaching. This can hinder their ability to learn or perform optimally, as they may not feel fully capable.
- Many teachers have not received adequate training to identify and support children with CVD. As a result, a significant portion of children with CVD may not receive appropriate support.

Challenges often experienced by children with CVD in the classroom:

- Difficulty distinguishing between certain colours or shades in learning material.
- Needing frequently to ask peers and teachers for help, more so than other children.
- Struggling with group activities in the classroom and during sports that require colour recognition.
- Difficulty reading text that is highlighted in contrasting colours.
- Struggling to complete assignments or projects that require the use of colour.
- Difficulty following visual presentations and demonstrations that rely on colour, such as graphs, science experiments or art lessons.
- Challenges with following content in textbooks that use colour for emphasis or differentiation.
- Requiring additional time to complete assignments where colour plays a role.
- Needing extra lighting in the classroom as well as special seating accommodations.
- Feelings of frustration and self-consciousness due to the inability to identify colours.
- Experiencing emotional distress from feeling different or having unmet needs.
- Attention difficulties stemming from an inability to understand the work or appropriately engage with learning materials.

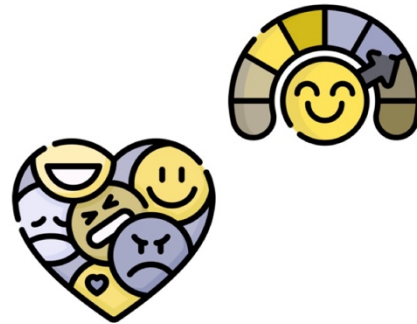




## EMOTIONAL CHALLENGES

Children with CVD often experience a range of emotional challenges:

- Anxiety and stress.
- Low self-esteem and poor self-image.
- Low self-efficacy (lack of self-belief and confidence in their ability to achieve and perform well).
- Acting out in class or at home.
- Avoiding schoolwork and tasks that involve colour.
- Being withdrawn and shy.
- Not feeling heard or understood.
- Feelings of inferiority and insecurity.
- Attention and concentration difficulties.



Understanding low self-esteem:

Self-esteem is the overall opinion we have of ourselves, including the value and worth we believe we possess. Positive self-esteem plays a crucial role in helping individuals lead flourishing and successful lives. Children with CVD may struggle to develop high self-esteem due to the unique challenges they face – challenges that many others may not understand. It is essential to recognise low self-esteem in children, especially those experiencing differences, so they can receive the support they need.

Signs of low self-esteem in children:

- Being highly self-critical and doubting their abilities.
- Ignoring or dismissing their positive qualities.
- Frequently comparing themselves to others.
- Using negative words to describe themselves or struggling to say something positive about themselves and their abilities.
- Engaging in negative self-talk that is critical, belittling and self-blaming.
- Feeling powerless or believing they lack the ability to change an outcome.
- Hesitating to ask for help or support.
- Fearing judgement or teasing from others.
- Finding it difficult to cope with challenging life events due to a lack of confidence in their abilities.



## SOCIAL CHALLENGES

Children with CVD often face a range of social challenges:

- Experiencing learning, communication and social difficulties due to struggles in expressing their needs and explaining how they perceive the world around them.
- Being misdiagnosed, mislabelled or misunderstood.
- Suffering from low self-esteem or a lack of belief in their own abilities.
- Struggling accurately to participate in games or activities that rely on colour, such as UNO, Twister, or sports (e.g. differentiating between teams wearing different colours).
- Finding it hard to tell others when they cannot see a colour.
- Facing ridicule or rejection for perceiving the world differently.
- Being teased or mocked for incorrectly naming colours.
- Risk of being misled by peers when asking for help with colour identification.
- Fear of being judged or perceived as different by others.
- Experiencing feelings of uncertainty and not being on the same level as their peers.

These social challenges can impact a learner's confidence, social engagement and overall well-being. Recognising and addressing these difficulties through support, understanding and tailored interventions can help children with CVD thrive in social environments.





## How can you support a child with CVD?

### Adopt a mindset of acceptance and understanding

Support for children with CVD is about understanding that not everyone sees and understands colour in the same way and that we need to accommodate their specific and unique needs.

### Adopt a mindset of patience and empathy

A child with CVD cannot control the way they see the world. Be patient with them and understand that this may cause them to feel isolated and different from their peers. Ask questions and try to understand how their condition may influence their ability to learn and interpret visual information.

### Advocate for the child's special educational needs

As a parent or teacher, be proactive in advocating for the child's special educational needs. Ensure that the school understands the challenges of CVD and works towards providing appropriate accommodations and support, such as modified learning material, extra time on assignments, and access to assistive technology.

### Adopt a mindset of inclusivity

Be mindful of your attitude to their difference, make an effort to include them and the way they see the world in the classroom. If you, as teacher, do not value their experiences and the challenges they face, children with CVD may feel that they are a burden and that they should not share when they are experiencing challenges. Encourage the other children in class to accept and support one another. Explain what CVD is to the class, and how they can help and support the child.

### Celebrate and champion the child's UNIQUE difference

Understand that there is no cure for CVD and that a child with CVD may long to see the world as typically sighted people do. Celebrate their difference and encourage them to share how they see the world. Reinforce that everyone is different with their own unique and special abilities. Encourage them to value and accept themselves. Their perspective is valuable, and they may be able to see and offer things other children may not.

### Encourage assertiveness

Encourage the child to express their needs and explain if they are experiencing a difficulty. Encourage them to talk about their condition and how they see the world. Encourage them to tell you when they are confused. Encourage them to ask their peers for support.

### Empower the child

Empower the child by teaching them that everyone has unique abilities, weaknesses, and strengths. Encourage them to view CVD as a unique ability which allows a person to see the world in a way that no one else can and provides them with a unique perspective that no one else has. The child with CVD might e.g., notice things like different textures, shapes, and forms which other people may not notice.



## ASSISTIVE RESOURCES

Due to the challenges children with CVD face in distinguishing certain colours, various tools and technologies have been developed to support them. These assistive technologies aim to enhance their ability to engage with digital content and daily activities more effectively.

### Assistive Apps and Software:

**Colour Identification Apps:** These apps help users identify and distinguish colours by using the camera on their device to provide colour names and descriptions.

**Filter Modes:** Many modern digital devices and applications offer filter modes designed to enhance colour visibility for users with CVD. These filters incorporate patterns, textures, alternative colour schemes, and customisable settings to make games more accessible and inclusive.

### Browser add-ons:

**Daltonise:** This Google Chrome browser add-on allows users to adjust and recolour images on websites. By using algorithms to alter the colour composition of images, Daltonise helps make colour distinctions more apparent, thereby improving the accessibility of online content for individuals with CVD.

### Specialised eyewear:

**EnChroma lenses** use an iron-based filter to enhance colour differences by selectively filtering overlapping light wavelengths, thus boosting the separation of colours. While these lenses do not cure CVD, they can improve the ability to distinguish between colours. Research indicates that sustained use of EnChroma lenses may lead to perceptual learning where the brain becomes more sensitive to colour differences, potentially even after the lenses are not worn. However, the degree of improvement varies, and some individuals may not notice significant changes.

### Augmented Reality Devices:

Wearable augmented reality devices, such as Google Glass, can enhance colour vision by remapping the colours of a scene to make them more distinguishable for individuals with CVD. Studies have shown these devices to be effective in improving colour vision in a significant percentage of cases.

By integrating these assistive technologies and resources into educational and daily environments, you can significantly improve the quality of life for children with CVD, making their experiences more inclusive and accessible.



## ENCOURAGE A RESILIENCE MINDSET

- Resilience is the process of adapting positively when we are exposed to hardship or adversity.
- It is the process of developing knowledge, skills and resources that will support us as we face difficult situations.
- Resilience-enabling skills are important for us to have so that we can thrive and flourish as we progress through life and as we overcome difficulties and uncertainties.
- A *resilience mindset* helps us focus on using our skills, resources and knowledge to cope well with challenging circumstances.

### How can I assist a child with CVD with this?

- A child with CVD has a unique view of the world that many of us struggle to understand. This means that they may experience challenges and difficulties that we are not aware of and that we do not know how to solve.
- Promoting and encouraging a **resilience mindset** in a child with CVD could support them as they navigate circumstances and events that present them with unknown challenges.
- It is important for parents and teachers of children with differences to encourage a *resilience mindset*, so that the children can overcome the unique challenges they might face.
- A *resilience mindset* empowers us to be able to use the skills and resources we have around us to overcome and adapt to diverse situations.

Encourage the child with CVD to:



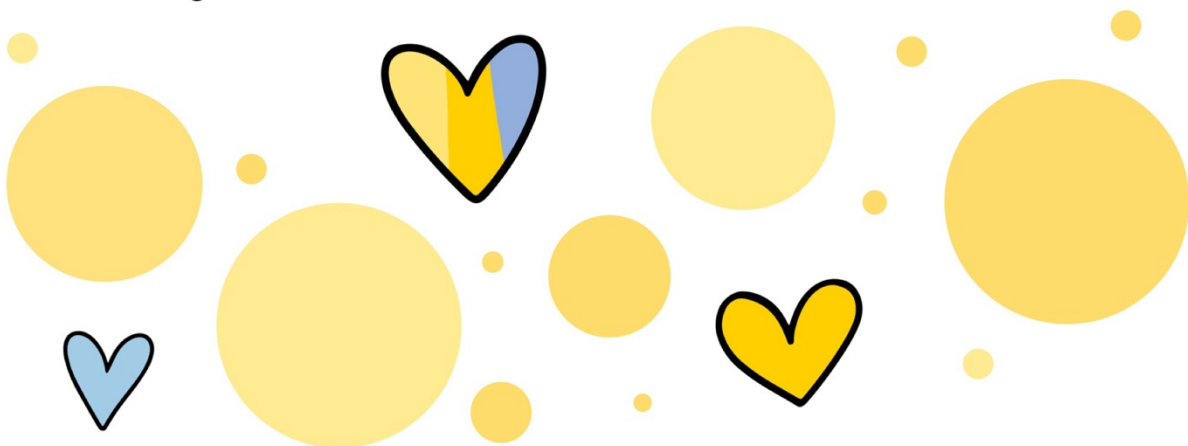
## HOW CAN A CHILD WITH CVD BE SUPPORTED IN THE CLASSROOM?

### Adapt instructional media:

- Ensure that **instructional media does not rely solely on colour** to convey important information. Use symbols, labels, patterns or textures alongside colours to help all children, including those with CVD, understand the content.
- **Create alternative instructional media**, especially for children with CVD.
  - Have a colourful version for typically sighted children and an adapted version for children with CVD. For example, create another key using patterns for a child with CVD when doing map work.
- **Label** colours in graphs and other learning materials if colour is important in answering a question.
- **Label** crayons, pens, paints with words and symbols.
- **Avoid printing text on coloured backgrounds that can cause confusion**, e.g. red writing on a green background.
- **Be mindful** of using **colours that are difficult to differentiate** in learning materials and rather **use colours** that may be more **easily identifiable**.
  - Avoid using red and green to differentiate visual information.
- **Avoid using red, orange or green** on a green chalk board.
- **Provide additional support** and help with learning content that involves colour.
- In Chemistry, Biology, and Physical Science provide support in identifying colours in experiments and interpreting chemical reactions.

### Use Technology:

- Consider using **assistive technology** that can help children with CVD, such as colour identification apps, which can label colours for them.
- Use **digital tools** that allow children to adjust colours and contrast settings to make learning materials more accessible.



## HOW CAN A CHILD WITH CVD BE SUPPORTED IN THE CLASSROOM?

### Provide Alternative Assessment Methods:

- Offer alternative ways for children to demonstrate their knowledge. For example, allow learners to use black and white materials or give options for assignments that do not involve colour recognition.

### Create a Buddy System:

- Pair children with CVD with supportive classmates (colour buddies) who can assist them in identifying colours during activities when necessary. This also fosters teamwork and inclusivity.

### Plan Inclusive Activities:

- Organise activities that do not rely on colour differentiation. For sports and games, use team names or symbols instead of just coloured jerseys to distinguish between groups.

### Be Flexible and Accommodating:

- Provide extra time when assignments or tasks involve colour, understanding that children with CVD may need more time to complete them.
- Be open to feedback from the child and adapt your teaching methods as needed to accommodate their unique learning needs.

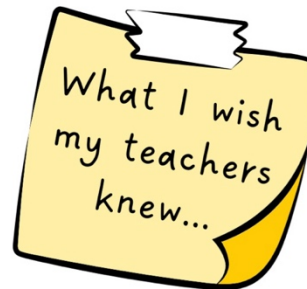
## DID YOU KNOW?

CVD is considered to be a barrier to learning, and children can apply for accommodations to support them within the school setting. Help children with CVD apply for these accommodations so that their differences can be recognised, allowing them to flourish and accurately showcase their true abilities during tests, examinations and formal assessments.

When an accommodation for CVD is granted, children may receive the following support:

- Adaptation of colour-coded information.
- Additional time for completing tasks with colour.
- Enlarged font for easier reading.
- Practical assistance to identify colours.
- Assistive devices or applications to identify colours.

## Dear Teachers... Advice for teachers from learners with CVD



As part of my doctoral study, I asked the child-participants what they wanted teachers to know and understand about someone living with CVD. The information below reflects their hopes for what they wish their teachers had known or had been aware of when they were in school. I hope you can use this information in your classroom to support future children with CVD and that by giving you this insight, it will make these children's school journey easier.

- When creating PowerPoint presentations, graphs and other learning materials be careful which colours you pair. Sometimes words on a colour cannot be easily seen, e.g. green writing on a yellow background, or red writing on a green background.
- Use the following colour combinations:
  - Use high contrast colours together, e.g. black with orange, yellow, white, etc.
  - Light backgrounds with darker colour writing, e.g. a light blue background with black writing.
- Educate yourself about CVD and develop an understanding of what it is, how it works and how it affects children so that we do not feel so excluded and different.
- Understand that we might be afraid to speak up because we do not want to be judged.
- Try to look at the world from our perspective and see the beauty in it.
- If you do not understand our perspective ask us to explain it to you; we just want to be understood.
- When you make the effort to accommodate our needs in class, we will appreciate it and feel heard and seen.
- Because we are usually the minority in a classroom teachers find it hard to accommodate our differences. Please change this view; we matter.
- Be careful not to invalidate our condition because you do not understand it. It causes challenges that can be hard for us to deal with when we are not accommodated.
- Do not tell a person with CVD that they are wrong when they name a colour; to them that is what that colour is. When people say we are wrong it makes us feel that our view of the world is wrong.
- Stop using colour and expecting us to use it like typically sighted children; it is frustrating to have to use colour in the way you think we should. We should be able to use colour in the way we think looks good and enjoy using it, instead of always feeling self-conscious.
- Understand and appreciate that we see the world differently.

**“To see the world in my way isn't wrong, it's just different”**

- Child participant Age 17

**“I see things other people don't”**

- Child participant Age 11



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# APPENDIX E: INTRODUCTORY E-MAIL TO INTERVENTION

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**RE: Intervention for children with colour vision deficiency**

To whom it may concern

I hope you are well.

My name is Tegan van der Westhuizen and I am a registered Educational Psychologist, currently busy with my PhD at the University of Pretoria.

I am currently conducting a study for my PhD focusing on the effect of an intervention with children who are colour vision deficient (“colour blind”). The planned intervention will include support for the participating children for academic, emotional and social functioning. In addition, the families of the child-participants will be involved to explore their experiences and for them to receive guidance on how to best support their children. A support programme will be developed and implemented for both the children and parents so that they can learn skills and strategies which can best support their specific needs.

I am currently looking for child-participants who are between the ages of 9 – 18 years old who have colour vision deficiency and I just wanted to find out if you perhaps have any such children at WHPS whose parents would be interested in participating in my study.

Any assistance would be greatly appreciated! Please let me know if you’d like any further information and we could set up a meeting or a call.

Have a lovely weekend.

Kind regards

Tegan van der Westhuizen  
PhD Student  
University of Pretoria



## APPENDIX F: EXAMPLE OF CHILD-PARTICIPANT 4'S POST-INTERVENTION DATA

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## Appendix F1: BYI-II

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Here is a list of things that happen to people and that people think or feel. Read each sentence carefully, and circle the one word (Never, Sometimes, Often, or Always) that tells about you best. THERE ARE NO RIGHT OR WRONG ANSWERS.

	0	1	2	3
1. I work hard.	Never	Sometimes	Often	<del>Always</del>
2. I feel strong.	Never	Sometimes	Often	<del>Always</del>
3. I like myself.	Never	Sometimes	Often	<del>Always</del>
4. People want to be with me.	Never	Sometimes	Often	<del>Always</del>
5. I am just as good as the other kids.	Never	Sometimes	Often	<del>Always</del>
6. I feel normal.	Never	Sometimes	<del>Often</del>	Always
7. I am a good person.	Never	Sometimes	Often	<del>Always</del>
8. I do things well.	Never	Sometimes	Often	<del>Always</del>
9. I can do things without help.	Never	Sometimes	Often	<del>Always</del>
10. I feel smart.	Never	Sometimes	Often	<del>Always</del>
11. People think I'm good at things.	Never	Sometimes	Often	<del>Always</del>
12. I am kind to others.	Never	Sometimes	Often	<del>Always</del>
13. I feel like a nice person.	Never	Sometimes	Often	<del>Always</del>
14. I am good at telling jokes.	Never	Sometimes	<del>Often</del>	Always
15. I am good at remembering things.	Never	Sometimes	Often	<del>Always</del>
16. I tell the truth.	Never	Sometimes	<del>Often</del>	Always
17. I feel proud of the things I do.	Never	Sometimes	Often	<del>Always</del>
18. I am a good thinker.	Never	Sometimes	Often	<del>Always</del>
19. I like my body.	Never	Sometimes	<del>Often</del>	Always
20. I am happy to be me.	Never	Sometimes	<del>Often</del>	Always

BSCI-Y  
Total RS

55

Here is a list of things that happen to people and that people think or feel. Read each sentence carefully, and circle the one word (Never, Sometimes, Often, or Always) that tells about you best. THERE ARE NO RIGHT OR WRONG ANSWERS.

	0	1	2	3
21. I worry someone might hurt me at school.	<del>Never</del>	Sometimes	Often	Always
22. My dreams scare me.	Never	<del>Sometimes</del>	Often	Always
23. I worry when I am at school.	Never	Sometimes	<del>Often</del>	Always
24. I think about scary things.	Never	<del>Sometimes</del>	Often	Always
25. I worry people might tease me.	Never	Sometimes	<del>Often</del>	Always
26. I am afraid that I will make mistakes.	Never	<del>Sometimes</del>	Often	Always
27. I get nervous.	Never	Sometimes	<del>Often</del>	Always
28. I am afraid I might get hurt.	<del>Never</del>	Sometimes	Often	Always
29. I worry I might get bad grades.	Never	Sometimes	<del>Often</del>	Always
30. I worry about the future.	Never	Sometimes	<del>Often</del>	Always
31. My hands shake.	Never	<del>Sometimes</del>	Often	Always
32. I worry I might go crazy.	<del>Never</del>	Sometimes	Often	Always
33. I worry people might get mad at me.	Never	<del>Sometimes</del>	Often	Always
34. I worry I might lose control.	Never	<del>Sometimes</del>	Often	Always
35. I worry.	Never	Sometimes	<del>Often</del>	Always
36. I have problems sleeping.	Never	<del>Sometimes</del>	Often	Always
37. My heart pounds.	<del>Never</del>	Sometimes	Often	Always
38. I get shaky.	Never	<del>Sometimes</del>	Often	Always
39. I am afraid that something bad might happen to me.	Never	<del>Sometimes</del>	Often	Always
40. I am afraid that I might get sick.	<del>Never</del>	Sometimes	Often	Always

BAI-Y  
Total RS

21

Here is a list of things that happen to people and that people think or feel. Read each sentence carefully, and circle the one word (Never, Sometimes, Often, or Always) that tells about you best. THERE ARE NO RIGHT OR WRONG ANSWERS.

	0	1	2	3
41. I think that my life is bad.	Never	<del>Sometimes</del>	Often	Always
42. I have trouble doing things.	Never	<del>Sometimes</del>	Often	Always
43. I feel that I am a bad person.	Never	<del>Sometimes</del>	Often	Always
44. I wish I were dead.	Never	<del>Sometimes</del>	Often	Always
45. I have trouble sleeping.	Never	<del>Sometimes</del>	Often	Always
46. I feel no one loves me.	Never	<del>Sometimes</del>	Often	Always
47. I think bad things happen because of me.	<del>Never</del>	Sometimes	Often	Always
48. I feel lonely.	Never	Sometimes	<del>Often</del>	Always
49. My stomach hurts.	<del>Never</del>	Sometimes	Often	Always
50. I feel like bad things happen to me.	<del>Never</del>	Sometimes	Often	Always
51. I feel like I am stupid.	<del>Never</del>	Sometimes	Often	Always
52. I feel sorry for myself.	Never	<del>Sometimes</del>	Often	Always
53. I think I do things badly.	<del>Never</del>	Sometimes	Often	Always
54. I feel bad about what I do.	<del>Never</del>	Sometimes	Often	Always
55. I hate myself.	<del>Never</del>	Sometimes	Often	Always
56. I want to be alone.	Never	Sometimes	<del>Often</del>	Always
57. I feel like crying.	<del>Never</del>	Sometimes	Often	Always
58. I feel sad.	<del>Never</del>	Sometimes	Often	Always
59. I feel empty inside.	<del>Never</del>	Sometimes	Often	Always
60. I think my life will be bad.	<del>Never</del>	Sometimes	Often	Always

BDI-Y  
Total RS

11

Here is a list of things that happen to people and that people think or feel. Read each sentence carefully, and circle the one word (Never, Sometimes, Often, or Always) that tells about you best. THERE ARE NO RIGHT OR WRONG ANSWERS.

	0	1	2	3
61. I think people try to cheat me.	Never	<del>Sometimes</del>	Often	Always
62. I feel like screaming.	<del>Never</del>	Sometimes	Often	Always
63. I think people are unfair to me.	Never	<del>Sometimes</del>	Often	Always
64. I think people try to hurt me.	<del>Never</del>	Sometimes	Often	Always
65. I think my life is unfair.	Never	<del>Sometimes</del>	Often	Always
66. People bully me.	Never	<del>Sometimes</del>	Often	Always
67. People make me mad.	Never	<del>Sometimes</del>	Often	Always
68. I think people bother me.	Never	<del>Sometimes</del>	Often	Always
69. I get mad at other people.	Never	Sometimes	Often	Always
70. When I get mad, I stay mad.	Never	<del>Sometimes</del>	Often	Always
71. When I get mad, I have trouble getting over it.	Never	<del>Sometimes</del>	Often	Always
72. I think people try to control me.	Never	<del>Sometimes</del>	Often	Always
73. I feel people try to put me down.	Never	<del>Sometimes</del>	Often	Always
74. I feel mean.	<del>Never</del>	Sometimes	Often	Always
75. I feel like exploding.	Never	<del>Sometimes</del>	Often	Always
76. I think people are against me.	<del>Never</del>	Sometimes	Often	Always
77. I get angry.	Never	<del>Sometimes</del>	Often	Always
78. When I get mad, I feel mad inside my body.	Never	<del>Sometimes</del>	Often	Always
79. I hate people.	Never	<del>Sometimes</del>	Often	Always
80. I get mad.	Never	<del>Sometimes</del>	Often	Always

BANI-Y  
Total RS

16

Here is a list of things that happen to people and that people think or feel. Read each sentence carefully, and circle the one word (Never, Sometimes, Often, or Always) that tells about you best. THERE ARE NO RIGHT OR WRONG ANSWERS.

	0	1	2	3
81. I steal.	<del>Never</del>	Sometimes	Often	Always
82. Other people get me into trouble.	Never	<del>Sometimes</del>	Often	Always
83. I think about running away from home.	Never	<del>Sometimes</del>	Often	Always
84. I do mean things.	<del>Never</del>	Sometimes	Often	Always
85. I break into cars, houses or other places.	<del>Never</del>	Sometimes	Often	Always
86. I fight with others.	<del>Never</del>	Sometimes	Often	Always
87. I like getting people mad.	<del>Never</del>	Sometimes	Often	Always
88. I skip school.	<del>Never</del>	Sometimes	Often	Always
89. I hate listening to other people.	<del>Never</del>	Sometimes	Often	Always
90. I argue with adults.	<del>Never</del>	Sometimes	Often	Always
91. I hurt people.	<del>Never</del>	Sometimes	Often	Always
92. I like being mean to others.	<del>Never</del>	Sometimes	Often	Always
93. I break the rules.	<del>Never</del>	Sometimes	Often	Always
94. I like it when people are scared of me.	<del>Never</del>	Sometimes	Often	Always
95. I like to hurt animals.	<del>Never</del>	Sometimes	Often	Always
96. I like to bully others.	<del>Never</del>	Sometimes	Often	Always
97. I tell lies.	<del>Never</del>	Sometimes	Often	Always
98. I like to trick people.	<del>Never</del>	Sometimes	Often	Always
99. I break things when I am mad.	<del>Never</del>	Sometimes	Often	Always
100. I swear at adults.	<del>Never</del>	Sometimes	Often	Always

BDBI-Y  
Total RS

2

**For Office Use Only After All Testing Is Complete**

When the booklet is returned, ensure that all items are completed. Follow the instructions below to score the inventories.

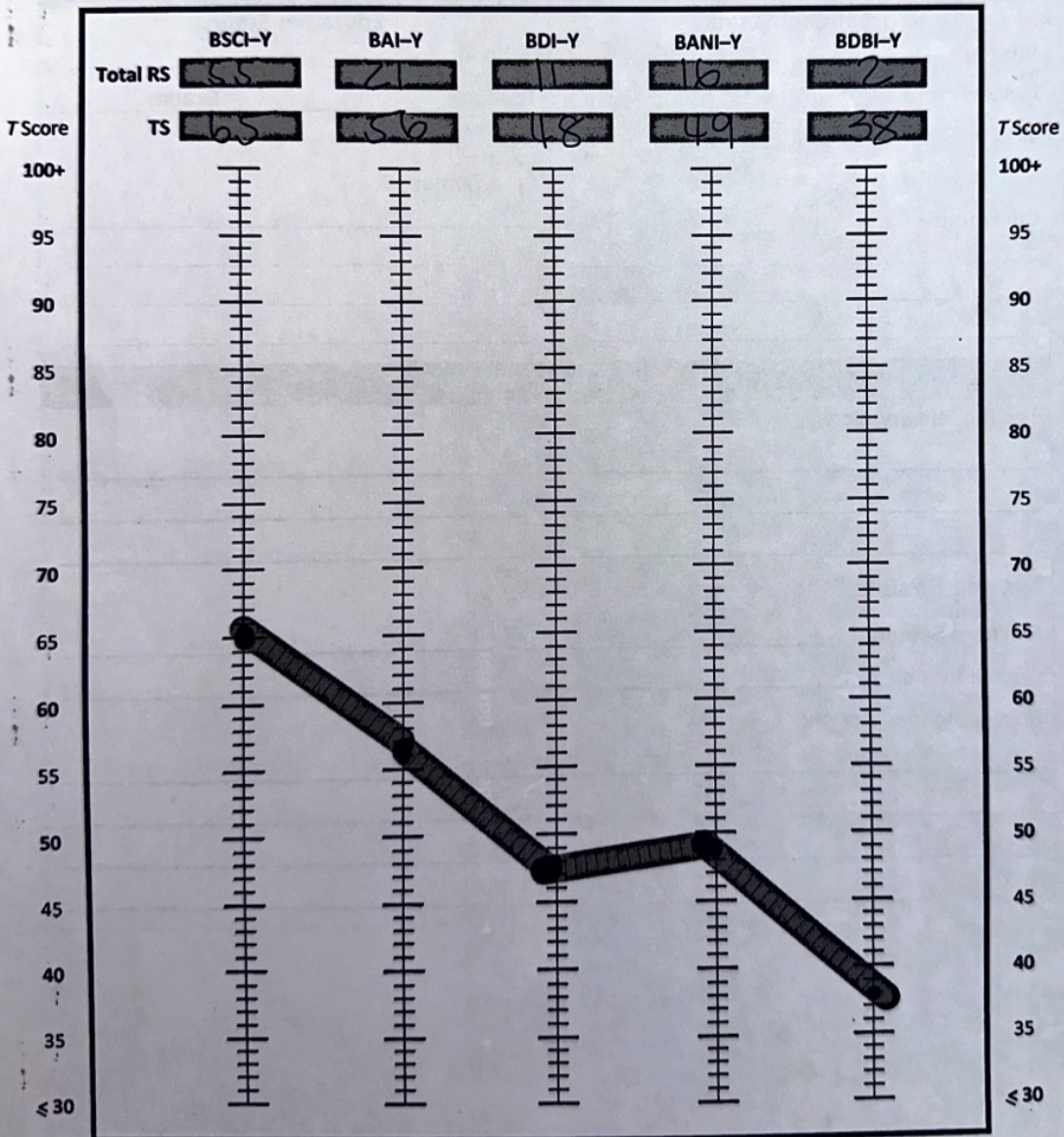
Starting on page 2, total the value of the responses for all 20 items of the inventory. Record the total raw score in the box at the bottom of the page. Repeat this for pages 3-6.

Use Tables A.1-A.3 to convert the raw scores to T scores. The tables are presented age-by-sex across the five inventories.

Transfer each total raw score to the total raw score box (in the row labelled Total RS) for the inventory.

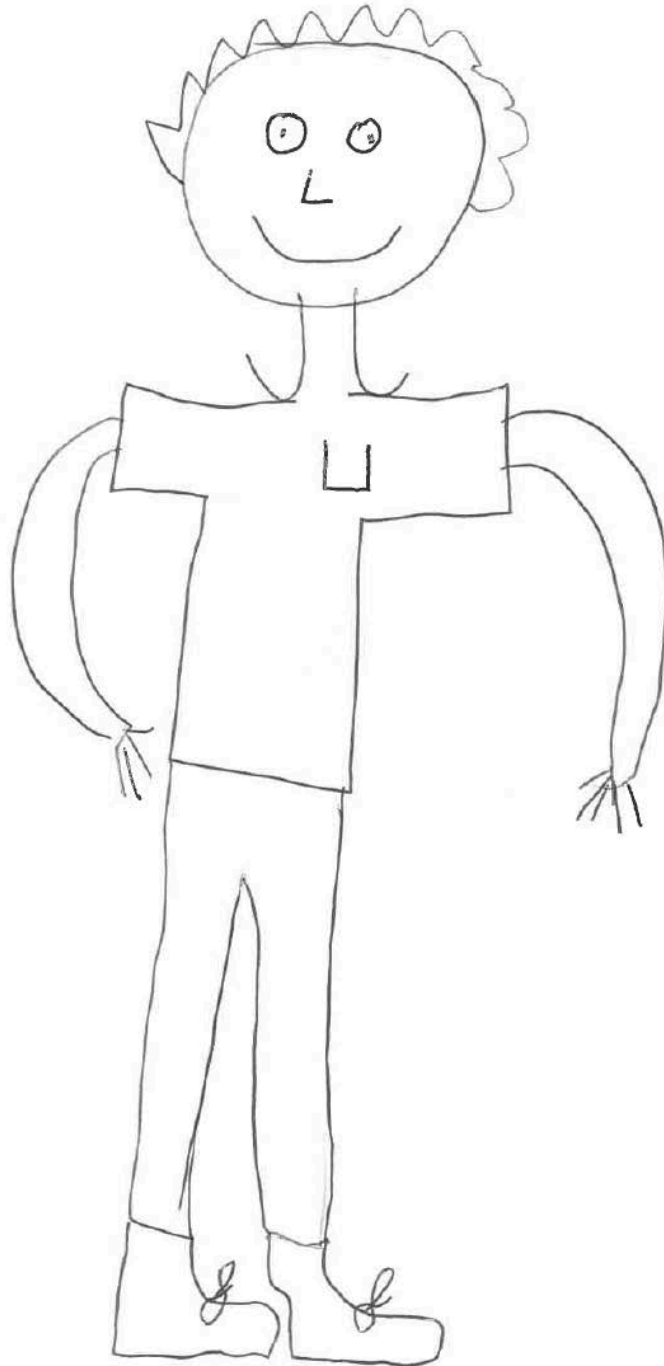
Enter the T score for each inventory in the corresponding T score box (in the row labelled TS). The profile can be plotted after the T scores are obtained.

T Score Profile

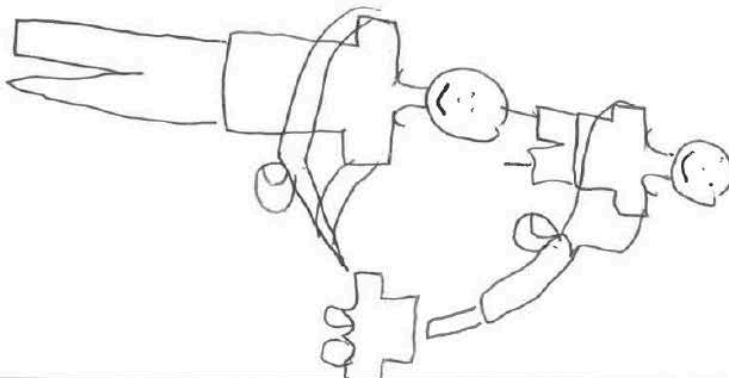
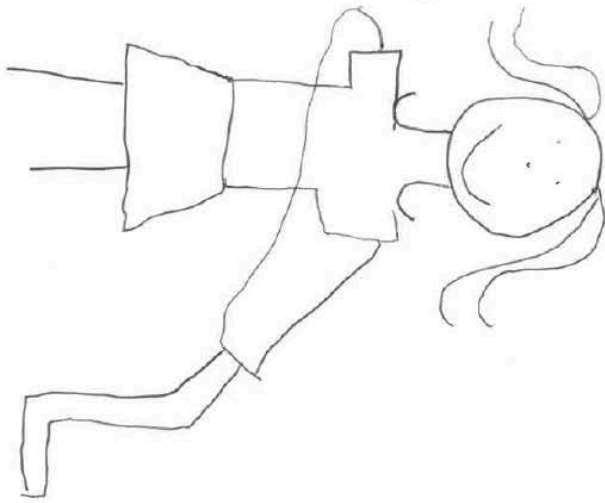
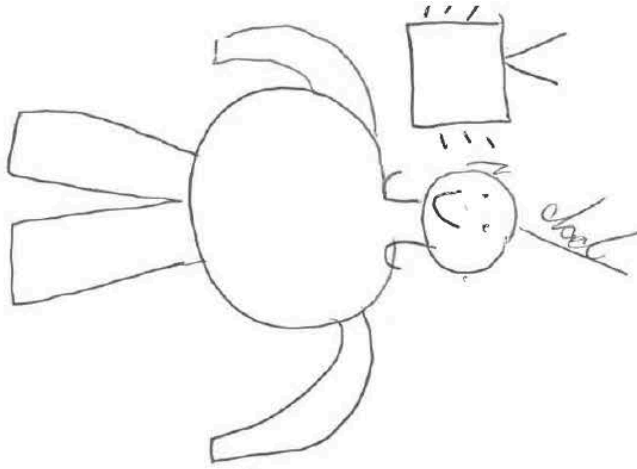


## Appendix F2: DAP

---



## Appendix F3: KFD



## Appendix F4: RISB

Complete these sentences. Try to do every one. Be sure to make a complete sentence.

1. I like Food, rugby, cricket

2. The happiest time with my family

3. I love my family

4. I am big strong

5. I badly want to be a photographer

6. I don't like vegetables, lions

7. I want to cry when is dont know what to do

8. I get angry when people teases me

9. My mother is a loving person

10. My father is a strong person

11. I worry about school work, my weight

### Incomplete Sentences (Gr 4-7)

12. I will never forget the first time I played rugby

13. When I am grown up I want to be an entrepreneur

14. I can't \_\_\_\_\_

15. People who don't like me \_\_\_\_\_

16. I have no time for liars, people who pretend

17. I don't like angry people

18. In secret I like to sleep and read

19. Sometimes I imagine me to be a photographer

20. My friends are loving people




# APPENDIX G: RESOURCES USED IN THE RESILIENCE- ENABLING INTERVENTION

---

**WHO AM I?**

I am \_\_\_\_\_



My strengths...  
Things that I am good at

I like...

I dislike...

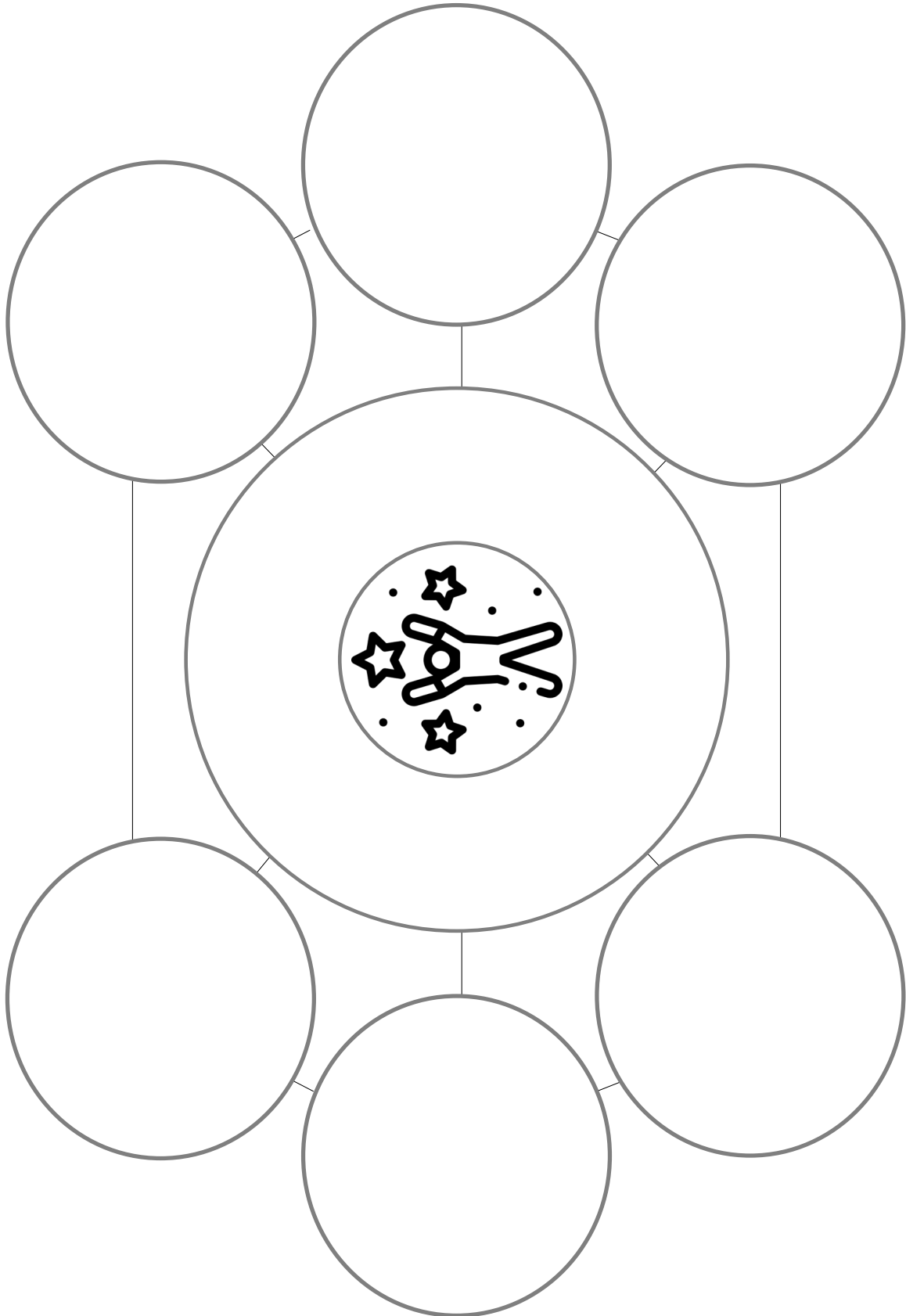
My weaknesses...  
Things that I struggle to do

I am unique  
because...

My resources...

Skills that I can  
use to help me....

Things that  
others say I am good at...



# STOP... and take a breath



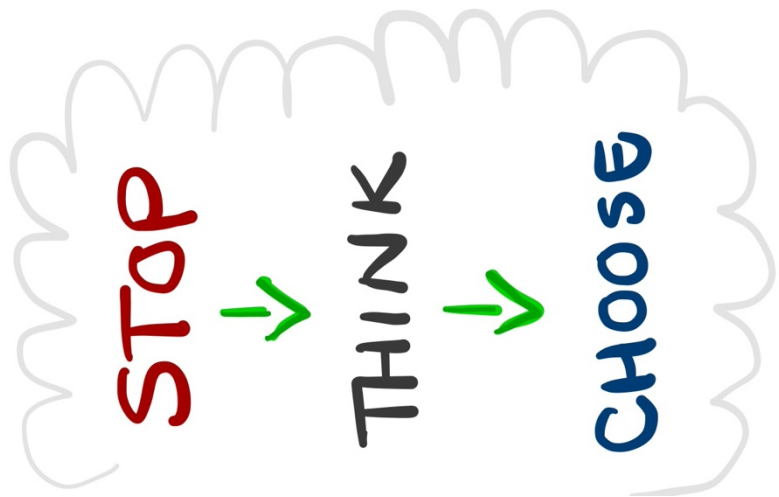
AND

THINK

1... 2... 3...  
USE your head →

THEN

CHOOSE



Think about YOUR

CHOICE!!

What will happen next?



What is a different choice you can make?

What are your other options?

Which choice is the BEST for you and others? What will make me feel the best?

# APPENDIX H: PARENT GUIDANCE INTERVENTION

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<b>WEEK 1: INTRODUCTION TO CVD AND WHAT IT ENTAILS</b>		
<b>DATES</b>	<b>TOPIC / FOCUS</b>	<b>FORMAT OF WHATSAPP MESSAGES</b>
16 May 2022	Introduction to the topic, with a focus on: <ul style="list-style-type: none"> <li>• What CVD is</li> <li>• What parents need to know about it</li> <li>• Challenges (academic and social) that children may experience</li> </ul>	<ul style="list-style-type: none"> <li>• Three infographics</li> </ul>
18 May 2022	Introduction to the topic, with a focus on: <ul style="list-style-type: none"> <li>• The effect of CVD on children's self-esteem</li> <li>• Examples of how children with CVD see colour and how colour is used in the classroom</li> </ul>	<ul style="list-style-type: none"> <li>• Two information sheets</li> <li>• Pictures as examples of how children with CVD see colour, also in the classroom</li> </ul>

### **PART 1: MONDAY, 16 MAY 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear Parents,

In this first week of our intervention, we provide an introductory overview of CVD, what it is and how it may affect your child.

Please find attached the information media and please send us your questions and comments.

Have a wonderful week ahead!

Keshini and Tegan 🌸

## COLOUR VISION DEFICIENCY (CVD)

### What is it?



#### WHAT IS CVD?

- Everyone has three retinal cones in their eyes which absorb different wave lengths of light. They are red, green and blue cones.
- A person with CVD has a defect in one or more of these cones, which causes them to see colour differently.
- The most common forms of CVD are protanopia (red-cone deficient) and deuteranopia (green-cone deficient), they are called red-green colour vision deficiencies. This happens when there is a defect in the red or green retinal cone.
- People with CVD will either (i) confuse colours in the red-green range, (ii) confuse colours in the blue-purple range, (iii) see all colours in shades of grey, (iv) have a combination of (i) and (ii).

#### WHAT PARENTS NEED TO KNOW:

- CVD (colour blindness) influences people's ability to see colour.
- It is a genetic inherited condition linked to the X chromosome.
- CVD can also be acquired when there is damage to the optic nerve caused by injury or diseases such as diabetes.
- 1 in every 12 males and 1 in every 200 females are colour vision deficient.
- This implies that there should be at least 1 child with CVD in a class of 30 children.
- The way in which children with CVD view the world is completely different than others.
- People with CVD cannot change the way they see colour.

#### EXAMPLES OF WHAT A CHILD WITH CVD SEES



Typical (normal) vision

Protanopia (red deficient)

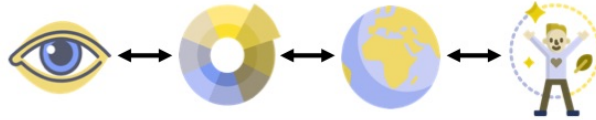
Deuteranopia (green deficient)



Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

# COLOUR VISION DEFICIENCY (CVD)

## What is it?



## ACADEMIC CHALLENGES

### *Important facts*

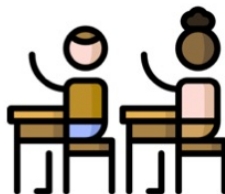
- Children with CVD may feel challenged within colourful classroom environments or when colour is used to teach content. This may hinder their ability to optimally learn or perform.
- Not many teachers have received training in identifying and supporting learners with CVD. A large portion of children with CVD may thus not be appropriately supported.

### *Challenges often experienced*

- Not being able to tell the difference between certain colours or shades of colours
- Needing to ask peers and teachers for support more often than other learners
- Difficulty with group activities (classroom and sport) that require colour recognition
- Difficulty reading when words are highlighted in contrasting colours
- Difficulty completing assignments or projects that require the use of colour
- Difficulty following visual presentations and demonstrations, e.g. graphs, science experiments, art lessons
- Difficulty following content in textbooks where colours are used
- Requiring additional time to complete assignments where colours are used
- Needing more light in the classroom as well as special seating accommodations
- Feelings of frustration and self-consciousness when not able to identify colours

First step of supporting your child with the academic challenges he/she may experience:

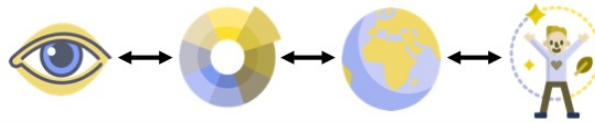
***INFORM THE SCHOOL AND TEACHER OF YOUR CHILD'S CONDITION.***



Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

# COLOUR VISION DEFICIENCY (CVD)

## What is it?



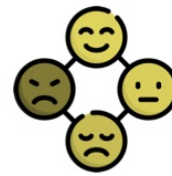
## SOCIAL CHALLENGES

- May experience learning, communication and social difficulties as they do not always know how to express their needs and explain to others what they experience
- May be misdiagnosed in schools, mislabelled and/or misunderstood
- Low self-esteem or belief in their own abilities
- Difficulty accurately playing games with others that involve colours e.g. UNO, Twister, Sport (wearing different colours to differentiate between two teams)
- Difficulty telling people when they cannot see a colour
- Being ridiculed or rejected because they see the world differently
- Being teased or mocked for naming colours incorrectly
- Being misled by peers when asking for help with the identification of colours
- Being afraid others will judge them or think they are different
- Feelings of uncertainty and not being on par with their peers



## EMOTIONAL CHALLENGES

- Low self-concept and self-image
- Anxiety and stress
- Low self-efficacy (lack of self-belief and confidence in their own ability to achieve and do well)
- Acting out in class or at home
- Avoiding school work and tasks that involve colour
- Being withdrawn and shy
- Not feeling heard
- Feelings of inferiority and insecurity



Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

## **PART 2: WEDNESDAY, 18 MAY 2022**

### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

We continue our discussion on the possible effects of CVD on your child and look at how your child views the world. We specifically focus on possible challenges associated with a low self-esteem and what you as a parent can do to support your child.

Please also find photos of how colour is used in school. We have put a photo of what a typically sighted person would see and then used a CVD filter over the other example so that you can see how your child may see the world.

Next week we will focus on what support can be given to encourage your child to live a flourishing and resilient life.

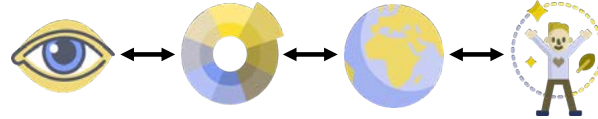
We are looking forward to receiving any questions and comments you may have.

Keshini and Tegan 🌸

18 MAY 2022: INFOGRAPHICS SHARED WITH PARENT-PARTICIPANTS

## COLOUR VISION DEFICIENCY (CVD)

How it influences me?



### Effects of having a low self-esteem

Self-esteem is the overall opinion we have of ourselves and the value and worth we think we have. A positive self-esteem plays an important role in allowing us to live a flourishing and successful life. A child with CVD may struggle to develop a high self-esteem as they experience difficulties that many people do not understand. It is important to be able to identify low self-esteem in children, especially, those that experience differences so that support can be given to them.

Typically, a child with low self-esteem:

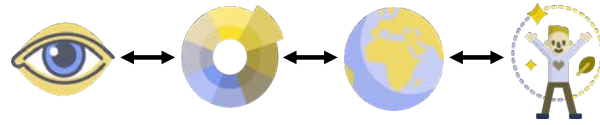
- Is very critical of themselves and their abilities
- Disregards or dismisses their positive qualities
- Judges and compares themselves with their peers
- Uses negative words to describe themselves or has difficulty saying something nice about themselves and their abilities
- Their self-talk (the inner discussions we have with ourselves) is critical, belittling and self-blaming
- Feels like they have very little power and ability to change an outcome
- Has trouble asking for help and support
- Fears being judged and teased by others
- May experience low resilience where they find it hard to cope with a challenging life event because they think they aren't capable



Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

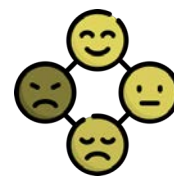
# COLOUR VISION DEFICIENCY (CVD)

How it influences me?



## What parents can do to support a positive self-esteem

- **Challenge your child's negative 'self-talk' – every time they criticise themselves, stop them and help them to see if the criticism is true.**
  - For example, if a child says they can't do something point out that this isn't true. They have accomplished things before and they will do it again. Give specific examples of when they have overcome a difficulty.
- **Encourage kindness towards self**
  - Encourage your child to treat themselves with the same kindness they treat others. Encourage them to be supportive, forgiving and understanding with themselves.
- **Acknowledge the positive**
  - Don't allow your child to brush off compliments or be dismissive when they receive positive praise. Encourage them celebrate their strengths and positive qualities and be proud of these.
- **Encourage your child to be proud of their uniqueness**
  - Reinforce that everyone is different with their own unique and special abilities. Encourage your child to value and accept themselves.
- **Encourage assertiveness**
  - Encourage your child to express their needs, wants, feelings, beliefs and opinions in a honest and direct manner



Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

**18 MAY 2022: EXAMPLE PICTURES OF COLOUR USED IN THE CLASSROOM**

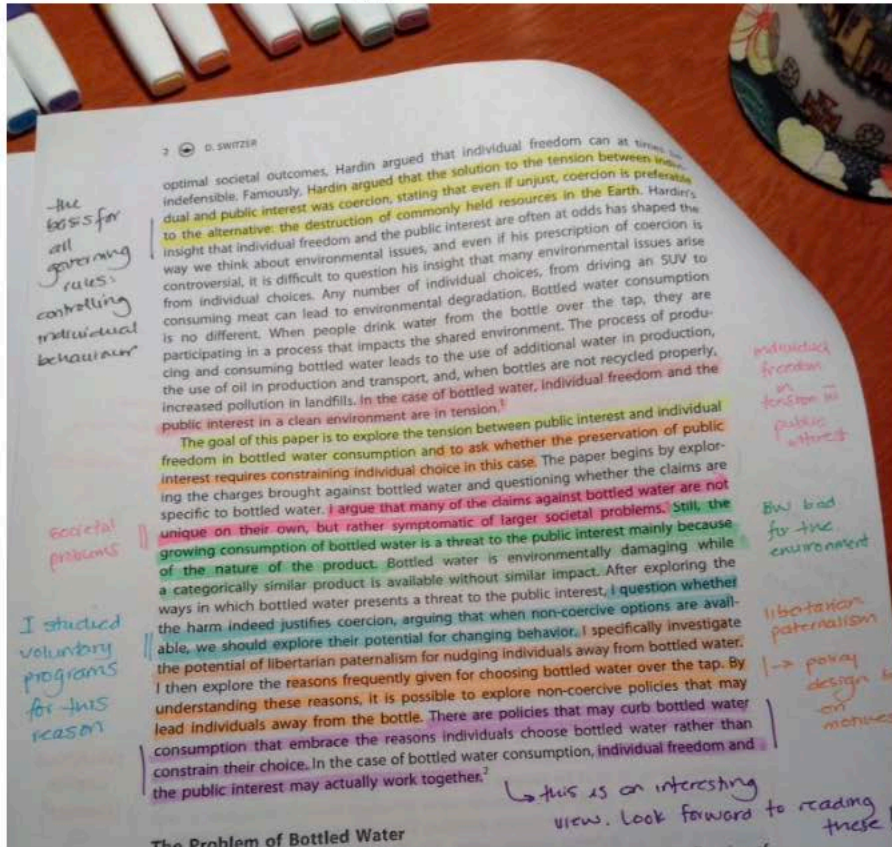
**Typical vision**



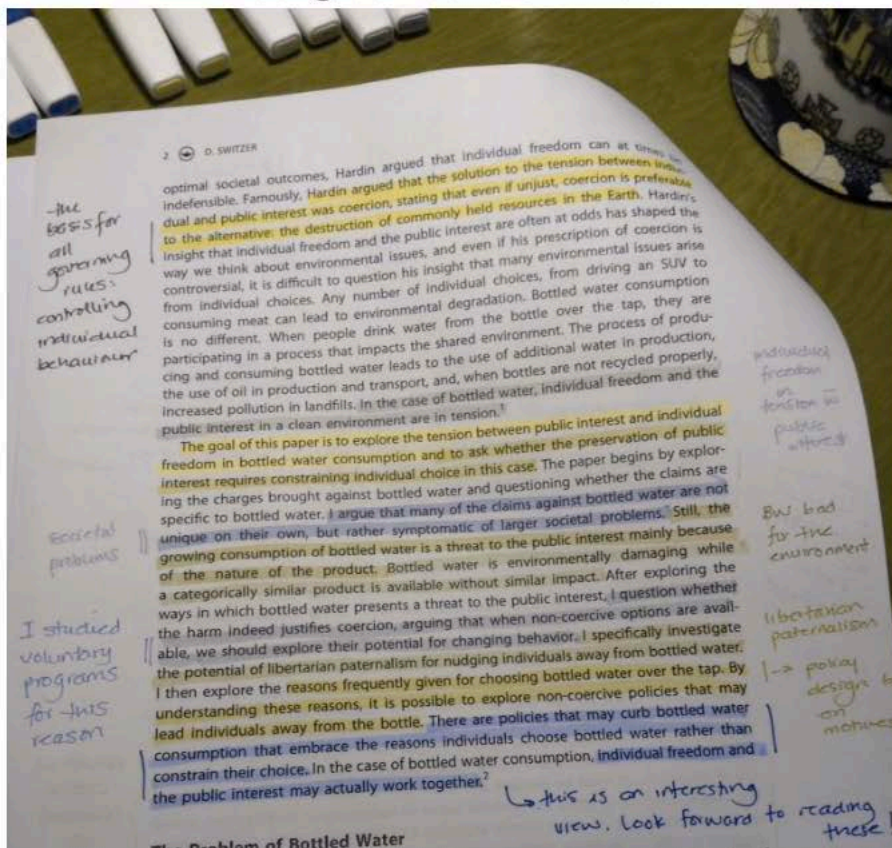
**Red-green deficient vision**



## Typical vision



## Red-green deficient vision



### Typical vision

**UNESCO's GEM Report presents a new financing model:**

Centralising the textbook market at the national level could reduce costs by **US\$3** per textbook.

This would save almost **US\$1 billion** per year on textbooks in sub-Saharan Africa

Pooling funds in this way could enable new finance mechanisms

For example, matched private-donor funding could, we estimate, increase external funding ...

...and **triple** the number of textbooks available for children worldwide

**GEM Report**  
@GEMReport  
bit.ly/GEMtextbooks

### Red-green deficient vision

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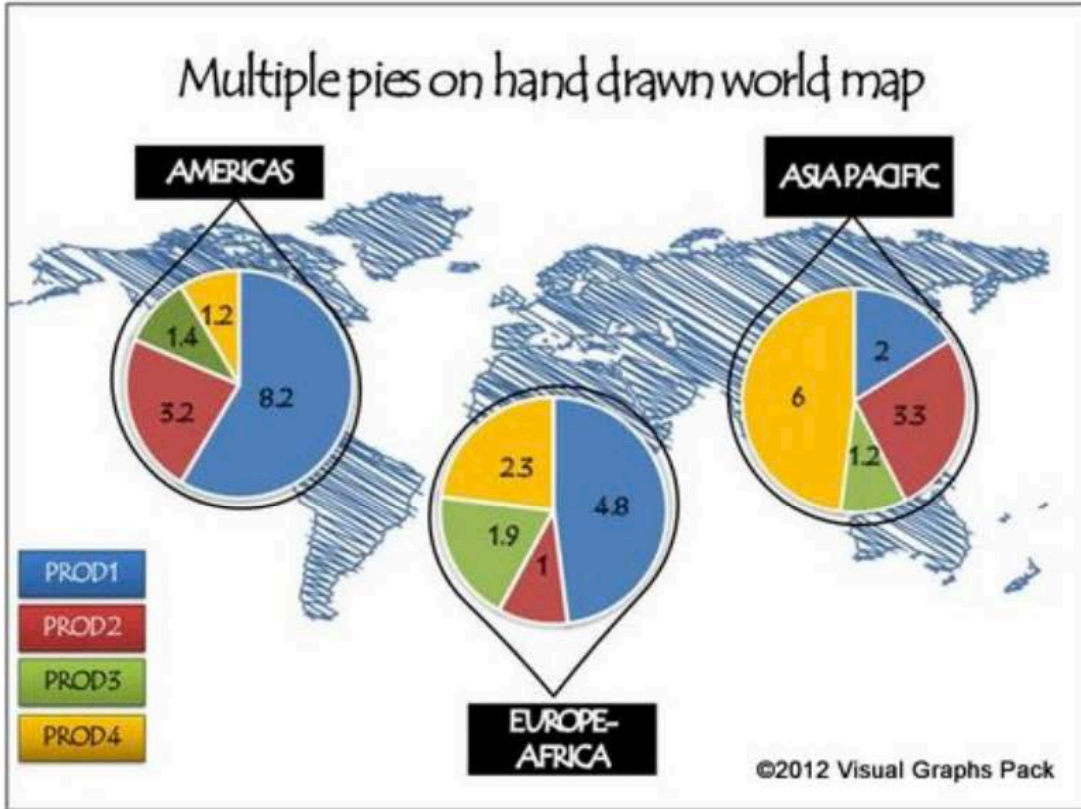
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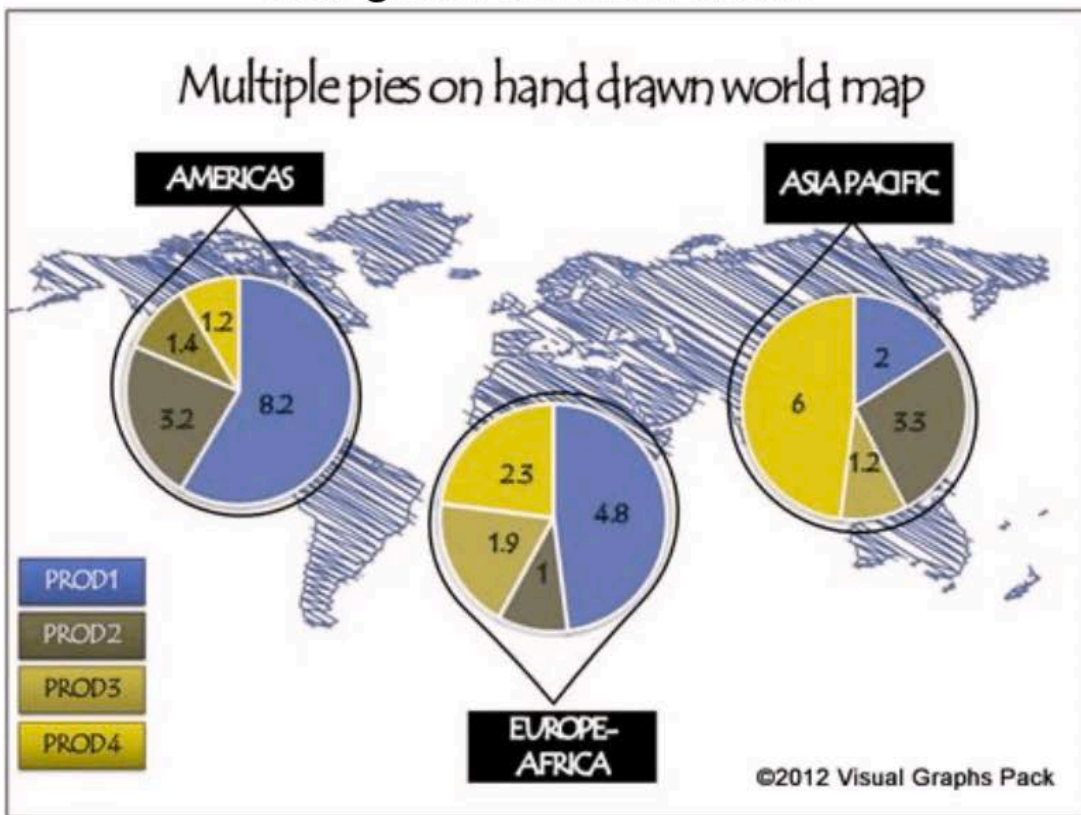
...and **triple** the number of textbooks available for children worldwide

**GEM Report**  
@GEMReport  
bit.ly/GEMtextbooks

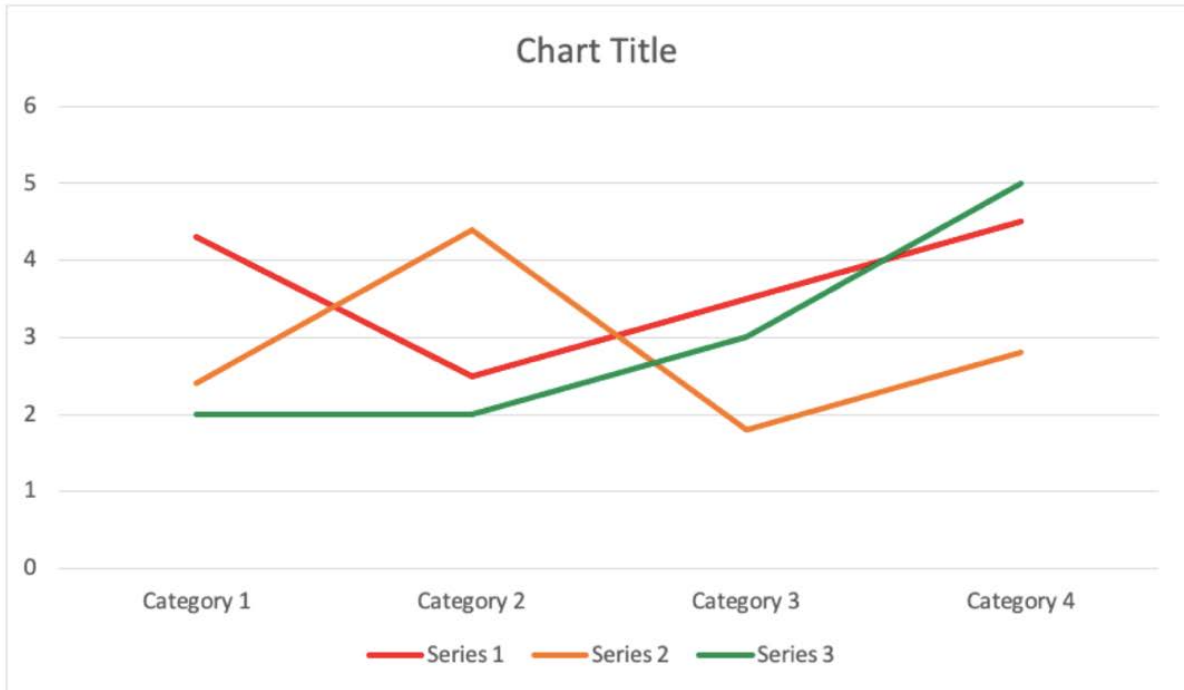
## Typical vision



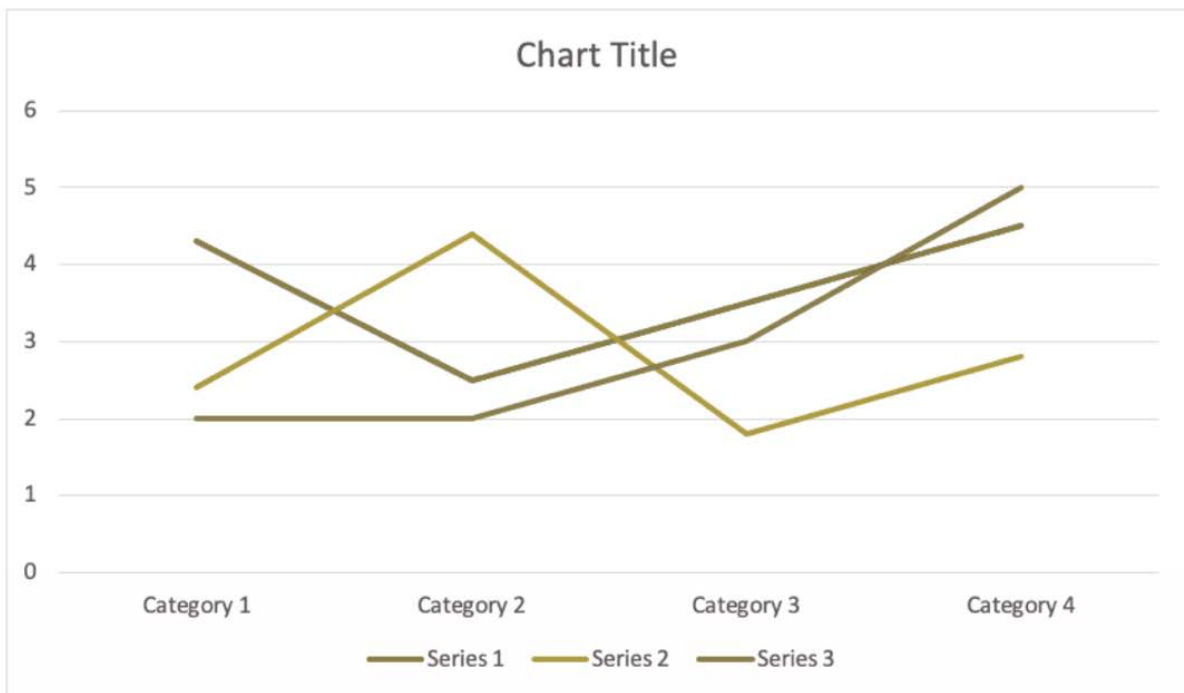
## Red-green deficient vision



## Typical vision



## Red-green deficient vision



## Typical vision



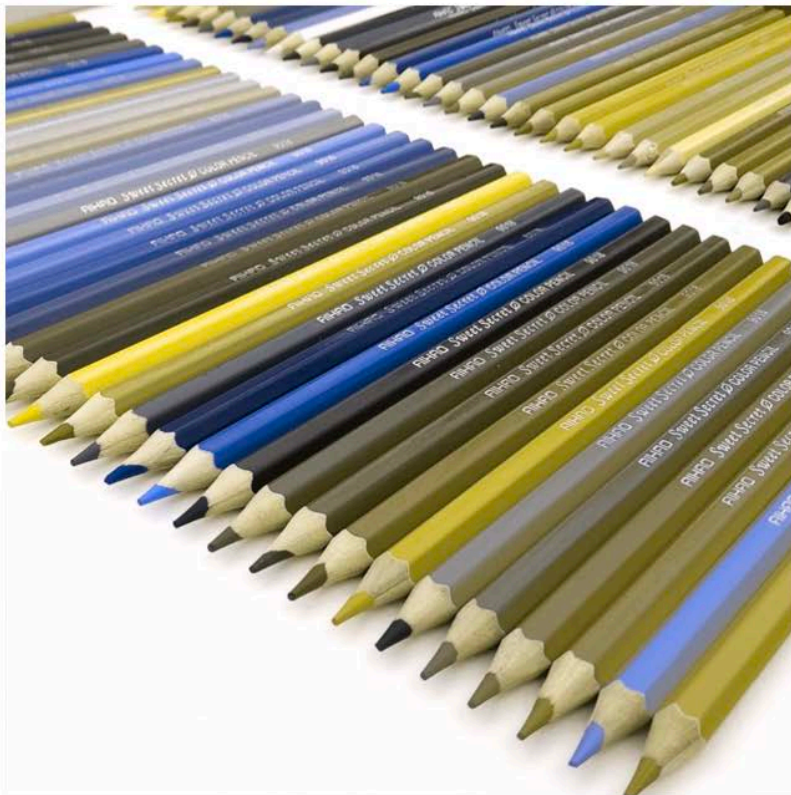
## Red-green deficient vision



## Typical vision



## Red-green deficient vision



<b>WEEK 2: PROMOTING RESILIENCE BY FOCUSING ON ENCOURAGING A RESILIENT MINDSET</b>		
<b>DATES</b>	<b>TOPIC / FOCUS</b>	<b>FORMAT OF WHATSAPP MESSAGES</b>
23 May 2022	Introduction to the topic, with a focus on: <ul style="list-style-type: none"> <li>• what is resilience encouraging a resilience mindset</li> </ul>	<ul style="list-style-type: none"> <li>• One information sheet</li> <li>One video on “what is resilience”</li> </ul>
25 May 2022	Introduction to the topic, with a focus on: <ul style="list-style-type: none"> <li>• Dream, do and connect concept</li> </ul>	<ul style="list-style-type: none"> <li>• One information sheets</li> <li>One video on “how resilience is built”</li> </ul>

### **PART 1: MONDAY, 23 MAY 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parent,

In this second week of our intervention, we discuss resilience, what it is and how you as a parent can encourage a resilience mindset. Please find below a video on building resilience and how we can overcome toxic stress in our lives by being resilient. Please send us your questions and comments.

Have a wonderful week!

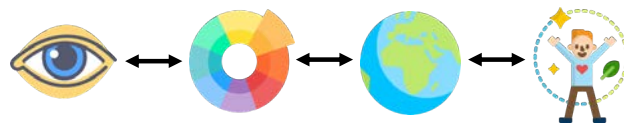
Keshini and Tegan 🌸

Video shared with parents:

What is resilience - Chapter 1 by Kunal Cholera:

Link to video: <https://www.youtube.com/watch?v=nBNltnnjZaQ>





## PROMOTING RESILIENCE

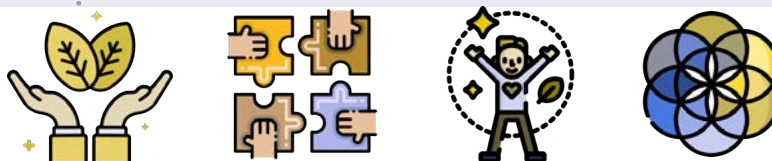


**“Resilience is all about being able to overcome the unexpected.  
The goal of resilience isn’t to just *survive* but *thrive*.”**






- Jamais Cascio

### WHAT IS RESILIENCE?

-  Resilience is the process of adapting positively when we are exposed to hardship or adversity.
-  It is the process of developing knowledge, skills and resources that will support us as we face difficult situations.
-  Resilience-enabling skills (skills that promote resilience) are important for us to have so that we can thrive and flourish as we progress through life and as we overcome difficulties and uncertainties.
-  A *resilience mindset* helps us focus on using our skills, resources and knowledge to cope well with challenging circumstances.



### ENCOURAGING A RESILIENCE MINDSET

-  Dealing with adversity can be difficult, especially when people may not understand how we see the world.
-  A child with CVD has a unique view of the world that many of us struggle to understand. This means that they may experience challenges and difficulties that we are not aware of and that we do not know how to solve.
-  Promoting and encouraging a *resilience mindset* in your child with CVD could support them as they navigate circumstances and events that present them with unknown challenges.
-  It is important for parents of children with differences to encourage a *resilience mindset*, so that your child can overcome the unique challenges they might face.
-  A *resilience mindset* empowers us to be able to use the skills and resources we have to overcome and adapt to diverse situations.

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

## **PART 2: WEDNESDAY, 25 MAY 2022**

### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

We continue our discussion on resilience and how you can empower your child to use resilience enabling coping skills in their everyday lives. We focus on the ability to DREAM, CONNECT & DO. We are looking forward to receiving any questions and comments you may have.

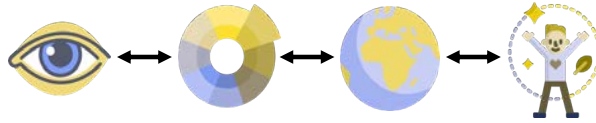
Keshini and Tegan 🌹

Video shared with parents:

InBrief: How Resilience is Built- by the Centre of the Developing Child at Harvard University:

Link to video: <https://www.youtube.com/watch?v=xSf7pRpOgu8>

## PROMOTING RESILIENCE







To do well in life encourage your child to  
**DREAM, CONNECT & DO!** (Theron, 2018)



### DREAM

*Dream* refers to having positive and hopeful expectations of the future, where we develop goals and explore how we can use our strengths and resources to overcome any difficulties that we face and reach our dreams.




Encourage your child to:

-  Have a positive vision of the future.
-  Have hope and be hopeful in situations where things may seem challenging.
-  See things differently, to focus on positive and uplifting thoughts.
-  Identify and set realistic goals that they can work towards.

### CONNECT

*Connect* refers to connecting with others and creating protective systems around us with these meaningful relationships.





Encourage your child to:

-  Connect with themselves – they need to explore and understand their own unique strengths and skills in order to support themselves.
-  Connect with others – explore the strengths and resources others offer them, so that they can get support from those around them.
-  Make an effort and be open to making meaningful and positive relationships with others.

### DO

*Do* refers to taking wellness-promoting action that can support us as we progress through life and overcome challenges.

Encourage your child to:

-  Identify and explore their available resources and the resources around them (i.e. people in their lives that can offer support).
-  Take wellness-promoting action where they can problem solve and figure out how they can use their available resources to assist them.
-  Ask for help and support when they need it.
-  Learn and be open to trying new things and ways of overcoming challenges.

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

WEEK 3: BUILDING CONFIDENCE AND RESILIENCE BY FOCUSING ON SUPPORT AND EFFECTIVE COMMUNICATION		
DATES	TOPIC / FOCUS	FORMAT OF WHATSAPP MESSAGES
30 May 2022	Introduction to the topic, with a focus on: building your child with CVD's confidence and resilience through parents supporting their child	<ul style="list-style-type: none"> <li>• One information sheet</li> </ul>
01 June 2022	Introduction to the topic, with a focus on: building your child with CVD's confidence and resilience through communication	<ul style="list-style-type: none"> <li>• One information sheets</li> </ul>

### **PART 1: MONDAY, 30 MAY 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

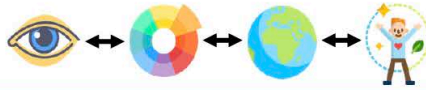
In this third week of our intervention, we provide further information on developing and building your child with CVD's confidence and resilience. We focus on support that can be given to your child that may help them to flourish and thrive. Please send us your questions and comments.

Have a wonderful week!

Keshini and Tegan 🌹

## **30 MAY 2022: INFOGRAPHICS SHARED WITH PARENT-PARTICIPANTS**

# **BUILDING YOUR CHILD WITH CVD'S CONFIDENCE AND RESILIENCE**



### **Support your child to:**

#### **1. Get a formal diagnosis**

If your child has not been diagnosed, it may be of value to obtain a formal diagnosis as children often depend on the view of professionals and the information they obtain from others. Once a diagnosis has been made, your child will have a name for his/her condition, which is a good starting point.

#### **2. Help your child to understand his/her condition**

Your child should understand what CVD is, why he/she has the condition and what this implies. As a parent, you can do research with your child about the functioning of the eye, CVD, and what it is all about. If a diagnosis is done by an optometrist or related specialist, this person can also be an important source of information.

#### **3. Guide your child to accept his/her condition**

It is very important that your child accept the fact that he/she is colour vision deficient. Reassure your child that you accept and love him/her unconditionally and that he/she should do the same. Treat the CVD condition as a unique trait that distinguishes your child from other children yet do not over-emphasise this. Your child should know that CVD is part of his/her unique making and that it is not something to be ashamed of or embarrassed about.

#### **4. Emphasise the strengths of having CVD**

Emphasise the ability of people with CVD to differentiate between texture and different shades of the same colour as a special skill. For example, people with CVD are excellent paintball players as they can see camouflage clothing whereas people with normal vision find this difficult. On perhaps a not so positive note, people with CVD similarly make for excellent snipers as they are not affected by colours that may draw attention away from a target. Children with CVD may value abilities such as these and may feel that they are "cool" if these things are pointed out to them.

#### **5. Guide your child to also know his/her limitations**

It is just as important that your child is aware of the implications and limitations associated with CVD. Tell your child to remain cautious of situations where colour differentiation is important and to seek assistance from others in such situations in order to be able to perform optimally. Also make your child aware from a young age that certain careers may not be optimal for him/her but that numerous other possibilities can be explored.

#### **6. Above everything, be proud of your child and communicate this message to him/her on a daily basis**

Your child should never doubt your love and acceptance, regardless of his/her performance, questions, possible mistakes or even uncertainties. Communicate your love to your child on a daily basis in different ways.

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

## **PART 2: WEDNESDAY, 1 JUNE 2022**

### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parent,

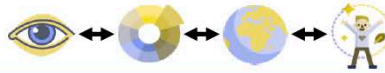
We continue our discussion on building your child with CVD's confidence and how you can support them to communicate with others and explain their condition to them.

Please let us know about your specific experiences with this. Looking forward to receiving any questions and comments you may have.

Keshini and Tegan 🌹

## 1 JUNE 2022: INFOGRAPHIC SHARED WITH PARENT-PARTICIPANTS

### BUILDING YOUR CHILD WITH CVD'S CONFIDENCE AND RESILIENCE FOCUS ON COMMUNICATION



**"Good communication is the bridge between confusion and clarity."**

- Nat Turner

In addition to you communicating in an open and accepting way to your child about his/her condition of CVD, parents are required to help their children to also communicate to others about their condition and their related needs. Guide your child and build his/her confidence to openly communicate in the following ways:

- 🌐 Explain to others what CVD is and make them aware of the challenges you experience
- 🌐 Tell others (friends, teachers, new acquaintances) that you do not see all colours in the way that the average person sees them
- 🌐 Tell others that you struggle to differentiate between certain colours
- 🌐 Tell others about your frustrations when not able to see or identify a colour
- 🌐 Ask others to assist in identifying a specific colour if you are uncertain about it, for example, when completing a task in class
- 🌐 Never argue with friends about colours – accept what they say, however, ask them to always be honest
- 🌐 Tell your teacher that you struggle with colours and ask for his/her assistance
- 🌐 Request additional time to complete a task where colour is involved
- 🌐 Request permission to ask a peer for assistance in class if needed
- 🌐 Explain to others that it frustrates you when others tease you about identifying colours or when they want to play a "game" where they want you to tell them what colours you see
- 🌐 Tell others what colours you prefer to use when doing school work so that you can differentiate between them better.

#### **HOWEVER**

Even though it is important to guide your child to communicate in this way, the parent should also protect and assist the child with this, especially if the child is still young. How can you do this:

- 🌐 Have a chat with other family members and your child's siblings to inform them about the condition and its implications. Request everyone's support to assist your child with CVD in subtle ways when it comes to colour, without embarrassing him/her.
- 🌐 Inform the school and class teacher annually at the beginning of the year of your child's condition and request their support.
  - You may need to educate teachers about your child's condition and continue to advocate for them when different challenges arise.



Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

<b>WEEK 4: UNDERSTANDING HOW CHILDREN WITH CVD AND HOW THEY SEE THE WORLD</b>		
<b>DATES</b>	<b>TOPIC / FOCUS</b>	<b>FORMAT OF WHATSAPP MESSAGES</b>
06 June 2022	Introduction to the topic, with a focus on: what you as a parent can do	<ul style="list-style-type: none"> <li>• One information sheet</li> <li>• One video</li> </ul>
08 June 2022	Introduction to the topic, with a focus on: examples of challenges that parents and children with CVD may face	<ul style="list-style-type: none"> <li>• Two videos</li> </ul>

### **PART 1: MONDAY, 6 JUNE 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

In this fourth week of our intervention, we delve deeper into understanding your child with CVD, how they see the world and what this means for you as a parent. Please find below the infographic as well as a video on how CVD works.

Please send us your questions and comments about your unique experiences with your child.

Have a wonderful week!

Keshini and Tegan 🌸

Video shared with parents:

How colour blindness works - by Human Interests:

Link to video: <https://www.youtube.com/watch?v=iNRQB5309yo>

**6 JUNE 2022: INFOGRAPHIC SHARED WITH PARENT-PARTICIPANTS**







## **UNDERSTANDING YOUR CHILD WITH CVD AND HOW THEY SEE THE WORLD**



All parents want the best for their children. They want them to enjoy life and be happy, healthy and confident. All children on the other hand face challenges such as peer pressure, bullying, pressure to perform well, sometimes learning difficulties, and establishing their own unique identity. In the case of children with CVD, they face these challenges as well as others related to them seeing the world in a different way.

Every child with CVD is unique as no two people with CVD see the world in exactly the same way. Children with CVD may not be able to read colour-coded labels, a rainbow may be dull and muted, a stoplight incomprehensible. Such a world is often characterised by confusion and uncertainty.

### **What can you as parent do?**

-  Be aware that CVD may affect your child's self-confidence and sense of belonging in the world.
-  Never imply that the way your child sees the world is lacking or less relevant than the images that others see.
-  Protect your child and ensure that teachers do not discriminate against him/her.
-  Celebrate your child's difference and emphasise the fact that his/her unique way of seeing the world provides him/her with a unique perspective that no one else has. Your child might e.g. notice things like different textures, shapes and forms which other people may not notice.
-  Encourage your child to explore the visual world and demonstrate how he/she can differentiate between objects with a related colour.
-  Be proud of your child for overcoming adversity and developing coping skills to function in a world dependent on colour.

**INSTEAD OF CHILDREN WITH CVD ALWAYS TRYING TO OVERCOMPENSATE FOR THEIR CONDITION, WE NEED TO TRY AND VIEW THE WORLD FROM THEIR PERSPECTIVE AND ACCOMMODATE HOW THEY VIEW THE WORLD.**

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

## **PART 2: WEDNESDAY, 8 JUNE 2022**

### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parent,

Today we share two videos exploring individuals with CVD's experiences and how it influences them in their daily lives. These videos also allow us to deepen our understanding of how seeing colours differently can influence your child.

Please feel free to share any questions and comments you may have.

Keshini and Tegan 🌹

Video shared with parents:

1. Seeing colours differently - by Great Big Story:  
Link to video: <https://www.youtube.com/watch?v=kwtSRw71URA>
2. Colour Blind Awareness Education Animation #1ineveryclassroom 2019 – by Colour Blind Awareness - <https://www.youtube.com/watch?v=0F01Q0581pl>

<b>WEEK 5: EXPERIENCING LIFE WITH CVD</b>		
<b>DATES</b>	<b>TOPIC / FOCUS</b>	<b>FORMAT OF WHATSAPP MESSAGES</b>
13 June 2022	Introduction to the topic, with a focus on: CVD and emotional and social wellbeing	<ul style="list-style-type: none"> <li>• One information sheet</li> <li>• Example pictures of how individuals with CVD perceive the world around them</li> </ul>
15 June 2022	Introduction to the topic, with a focus on: Recapping CVD and topics going forward	<ul style="list-style-type: none"> <li>• Two information sheets</li> <li>• Two motivational quotations</li> </ul>

### **PART 1: MONDAY, 13 JUNE 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parent,

In this fifth week of our intervention, we delve deeper into understanding how CVD may specifically affect your child and how they experience the world. We also propose tips that you, as a parent, can use to address the challenges they may experience in everyday life.

Please also find photos of how people with different types of CVD see the world, and how food may look to your child.

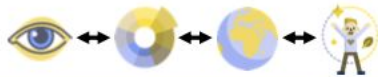
We are looking forward to receiving any questions and comments you may have.

Have a wonderful week!

Keshini and Tegan 🌸

## 13 JUNE 2022: INFOGRAPHIC SHARED WITH PARENT-PARTICIPANTS

### EXPERIENCING LIFE WITH A COLOUR VISION DEFICIENCY



**In a world where we rely heavily on colour usage, it is important for you, as parent, to be mindful of the following challenges your child with CVD may face.**

#### **Eating and food**

- Children with CVD do not see food as bright, colourful and appetising. They may even see food items (especially vegetables) as repulsive and off-putting. Spinach and other green vegetables may e.g. look like a cow pat and it could be true if your child says that some food looks like poo.
- Children with CVD find it difficult to tell when fruit or vegetables are ripe, for example, a green unripe banana and yellow ripe banana look very similar to them. Your child may also struggle to tell the difference between red and green tomatoes, tomato sauce and chocolate sauce.
- **Tips for parents to address this:**
- Use labels to mark products, separate different food items that may look the same to your child, use verbal cues and indications of food items.

#### **Everyday technology**

- Electrical goods often have green/orange/red LED lights to show when they are ready to use, if the battery needs charging or the machine is on standby. All these colours may look similar to your child, making it hard to know when to use a device or how to interpret a signal.
- **Tips for parents to address this:**
- Add labels to devices to indicate the meaning of signals where different LED lights apply, advise your child to ask for assistance when uncertain.

#### **Video games**

- Lights on game console controls or keyboards may be similar in colour. Colours used in video games may also be limiting, which means that important features may not stand out to your child.
- **Tips for parents to address this:**
- Purchase video games that include CVD modes whereby the colours of the game can be changed so that your child will be accommodated.

#### **Facial expressions**

- Relationships and communication rely heavily on non-verbal cues, which also include colour. It may be difficult for people with CVD to tell if someone is sunburnt, flushed with fever, or pale and about to pass out.
- **Tips for parents to address this:**
- Sensitise family members and significant others to make sure that they communicate meaningfully, and that their messages to your child are clear and not ambiguous.

**We need to keep in mind that each day your child comes into contact with colour, and is expected to interact with the world in the same way a typically sighted person would. Awareness needs to be raised surrounding how your child with CVD sees and understands colour so that they can be supported.**

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

**13 JUNE 2022: EXAMPLE PICTURES OF HOW PEOPLE WITH CVD SEE THE WORLD**



## **PART 2: WEDNESDAY, 15 JUNE 2022**

### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

Up until now, we have focused on your child's experiences of the world. Today we explore the topics we will be covering in the coming weeks.

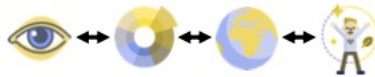
Please let us know if there are any other topics or points of discussion you would like us to explore and that you think would be useful for us to cover.

Have a wonderful week!

Keshini and Tegan 🌸

15 JUNE 2022: INFOGRAPHICS SHARED WITH PARENT-PARTICIPANTS

COLOUR VISION DEFICIENCY

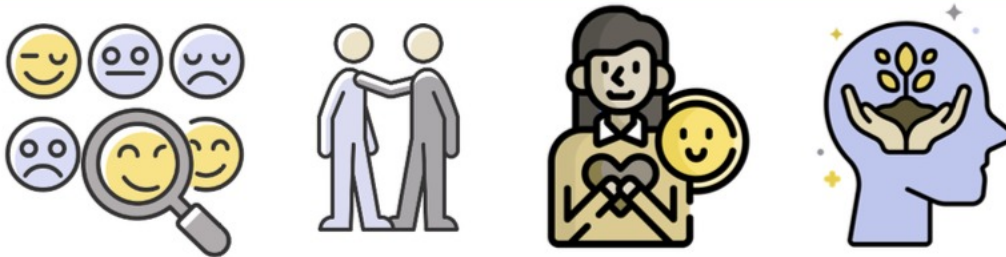


Up to now we have focused on your child's experiences of the world. We also touched on general functioning and common challenges that he/she may experience.

Over the next few weeks we will focus on different areas of functioning and how you as parent can support your child. The following questions will be addressed:

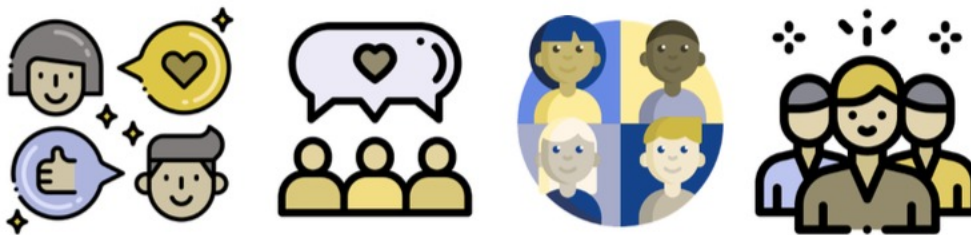
**For emotional well-being, how can you as parent support your child to:**

- develop a positive self-concept and self-esteem?
- overcome anxiety and stress?
- strengthen emotional awareness?
- cope with challenges that arise?



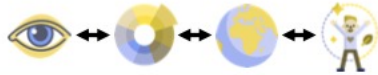
**For social well-being, how can you as parent support your child to:**

- establish and maintain healthy relationships?
- socialise with others?
- voice experiences to others (adults and peers)?
- deal with possible bullying and peer pressure?



Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

## COLOUR VISION DEFICIENCY



**For academic well-being, how can you as a parent support your child to:**

- enjoy and perform well in school?
- participate in extracurricular activities?
- succeed in class and in school-related tasks?
- deal with academic-related challenges?



**For future goals, dreams and career choices, how can you as a parent support your child to:**

- reach for his/her dream?
- set realistic future goals and work towards achieving them?
- identify and explore suitable career choices?



***Remember, you are your child's anchor in life.  
The key is unconditional acceptance, loving  
support and clear guidance!***

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

**15 JUNE 2022: MOTIVATIONAL QUOTATIONS SHARED WITH PARENTS**



<b>WEEK 6: STRENGTHENING A CHILD'S EMOTIONAL WELL-BEING</b>		
<b>DATES</b>	<b>TOPIC / FOCUS</b>	<b>FORMAT OF WHATSAPP MESSAGES</b>
20 June 2022	Introduction to the topic, with a focus on: <ul style="list-style-type: none"> <li>• Strengthening emotional awareness and self-acceptance</li> </ul>	<ul style="list-style-type: none"> <li>• Two information sheets</li> <li>• One motivational quotation</li> </ul>
22 June 2022	Introduction to the topic, with a focus on: <ul style="list-style-type: none"> <li>• Strengthening the development of a positive self-concept and self-esteem</li> </ul>	<ul style="list-style-type: none"> <li>• One information sheet</li> <li>• One motivational quotation</li> </ul>

### **PART 1: MONDAY, 20 JUNE 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

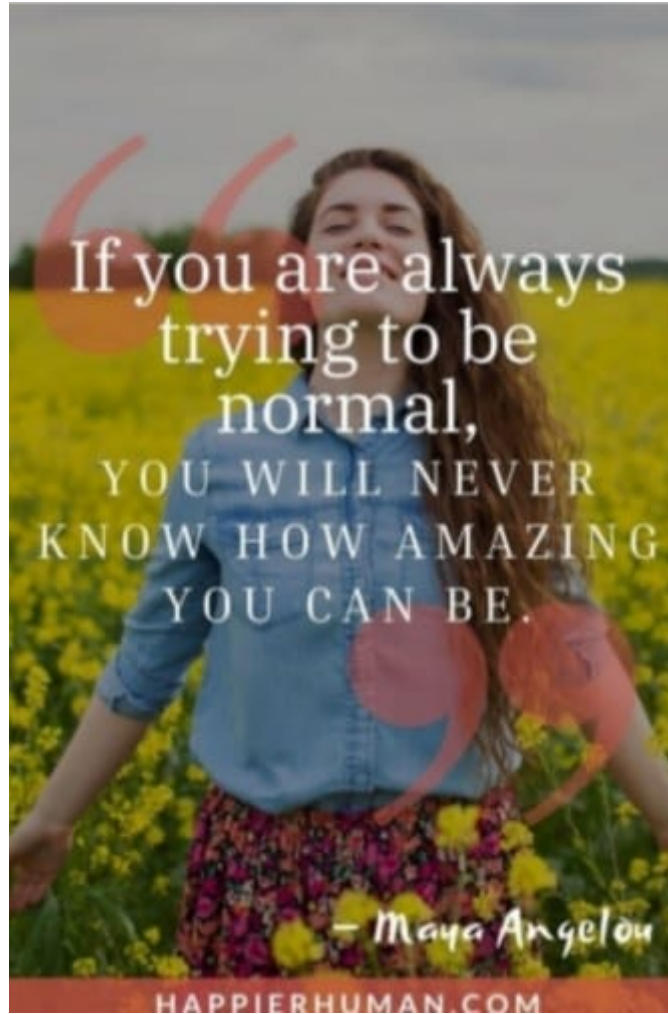
In the sixth week of our intervention, we take a deeper look into understanding how CVD may specifically affect your child's emotional wellbeing. We also provide tips that you, as a parent, can use to address the challenges they may experience and strengthen their self-confidence and self-esteem.

We are looking forward to receiving any questions and comments you may have.

Have a wonderful week!

Keshini and Tegan 🌸

**20 JUNE 2022: INSPIRATIONAL QUOTATIONS SHARED WITH PARENTS**



**20 JUNE 2022: INFOGRAPHICSHARED WITH PARENT-PARTICIPANTS**

## **ATTENDING TO EMOTIONAL WELL-BEING**

### **STRENGTHENING EMOTIONAL AWARENESS AND SELF-ACCEPTANCE**



#### **STRENGTHING EMOTIONAL AWARENESS**

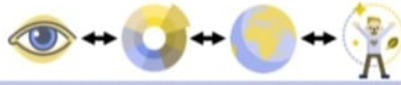
**It is important that you as parent support your child to be aware of, express and manage his/her emotion, by doing the following:**

- 🌐 **Help your child to identify and express his/her emotions** – be an example by talking about your own experienced emotions and asking your child how he/she feels in different situations.
- 🌐 **Encourage your child to keep a feelings journal** - this may help your child develop the ability to identify and process emotions, how they reacted, how they can help themselves to overcome certain emotions and what they can do in the future.
- 🌐 **Develop your child's "feelings" vocabulary** – encourage your child to use expressive and descriptive language when telling others how they felt in a certain situation. Be an example and engage in a daily family activity where all family members tell the others about their experiences e.g. my day was tiring, exciting, fun etc.
- 🌐 **Understand what upsets your child** - it is useful to pinpoint exactly what bothers your child and why, and how they can work through these situations in a healthy way.
- 🌐 **Emphasise that there are no good or bad feelings** - encourage your child to experience and voice any emotion, and never avoid or judge a negative emotional experience.
- 🌐 **See emotions as an opportunity for connection and guidance** – when talking about emotions with your child in a safe space, you can guide him/her to deal with negative experiences.
- 🌐 **Be available and LISTEN** – listen and pay attention when your child shares his/her experiences and emotions. Reflect what you hear and validate the experienced feelings.
- 🌐 **Use calming techniques** - teach your child how to stay calm during stressful situations by using breathing techniques, stress balls or even taking a walk to collect their emotions.

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

# ATTENDING TO EMOTIONAL WELL-BEING









## STRENGTHENING EMOTIONAL AWARENESS AND SELF-ACCEPTANCE



### STRENGTHING SELF-ACCEPTANCE

Help your child accept himself/herself, together with his/her strengths and weaknesses. Children who accept themselves will be more confident, feel proud of what they can do, think good things about themselves and believe in themselves.

#### What you as parent can do:

-  **Help your child to identify his/her own strengths** – encourage your child to identify his/her strengths by discussing these and how this makes your child unique. Pay attention to what your child does well and enjoys.
-  **Help your child to understand that differences make us special and should be cherished** – encourage your child to view CVD as a special and unique characteristic.
-  **Help your child to build positive relationships** - Encourage your child to build relationships with people who are accepting, supportive and appreciative of others.
-  **Praise your child** - Your praise is a way of showing your child that you're proud and accept them. Don't only praise your child when he/she gets a good mark. Rather praise effort, progress, and attitude, e.g. "You're working hard on that project".
-  **Be a good role model** - When your child sees you putting effort into everyday tasks such as cleaning up the dishes, you're setting a good example. Your child learns to put effort into doing things. Modelling the right attitude counts too.
-  **Reinforce positive self-talk** – Encourage your child to speak to him/herself in a positive uplifting way. Encourage positive affirmations such as "I am hardworking", "I can do tough things", "I don't always get the marks I want but I always try my best" etc.
-  **Help your child make their own choices** - When children make their own age-appropriate choices, they feel empowered and uplifted.
-  **Always let your child know that your love is unconditional** - Let your child know you love them even when they fail or make bad decisions or mistakes.

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

## **PART 2: WEDNESDAY, 22 JUNE 2022**

### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

We continue our discussion today on further understanding how CVD may affect your child's emotional wellbeing. We provide additional tips to help you strengthen your child's self-concept and self-esteem.

We are looking forward to receiving any questions and comments you may have.

Have a wonderful week!

Keshini and Tegan 🌹

**22 JUNE 2022: INSPIRATIONAL QUOTATION SHARED WITH PARENTS**

**“You can’t blend  
in when you’re  
born to stand out.”**

Ryan Buchanan  
7 Feb 2013 5:41 pm

**22 JUNE 2022: INFOGRAPHIC SHARED WITH PARENT-PARTICIPANTS**

## **ATTENDING TO EMOTIONAL WELL-BEING**










### **STRENGTHENING THE DEVELOPMENT OF A POSITIVE SELF-CONCEPT AND SELF-ESTEEM**



#### **POSITIVE SELF-CONCEPT AND SELF-ESTEEM**

Self-concept gives an indication of how we think about ourselves and how we value ourselves. It influences how we interact with others and the world around us. This goes hand in hand with our self-esteem and can boost our physical, social, emotional, and spiritual well-being.

**Help your child to develop a positive self-concept and self-esteem in the following ways:**

- 
**Identify and challenge your child's negative beliefs about him/herself** – Take note of your child's opinions, beliefs and thoughts about him/herself. In the event of negative self-talk, encourage your child to find solutions to problems and focus on positive attributes.
- 
**Encourage your child to build positive relationships** - with people who make him/her feel good and motivated.
- 
**Teach your child to give him/herself a break** - communicate and teach your child not to be too hard on him/herself, not be overly self-critical but to rather be kind to him/herself.
- 
**Focus on your child as an Individual** - respect his/her feelings and ideas, help him/her to treat others with respect; identify and focus on his/her strengths, possibilities, and unique qualities.
- 
**Teach your child to be kind to him/herself** – Teach your child to be kind to him/herself, proud of his/her own efforts and how to use self-praise, without bragging. Use examples such as: Bragging: "I can run faster than anybody else in our group!" Self-praise: "I feel very good about my running skills. I'm improving each day." Set an example as a parent by saying nice things about yourself.
- 
**Encourage your child to accept and love him/herself.**
- 
**Encourage your child not to focus on the negative opinions of others.**
- 
**Teach your child that it's okay to make mistakes, be afraid or worry sometimes.**
- 
**Celebrate all your child's efforts and recognise what he/she has achieved.**

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

WEEK 7: OVERCOMING AND COPING WITH EMOTIONAL CHALLENGES		
DATES	TOPIC / FOCUS	FORMAT OF WHATSAPP MESSAGES
27 June 2022	Introduction to the topic, with a focus on: <ul style="list-style-type: none"> <li>Overcoming anxiety and stress</li> </ul>	<ul style="list-style-type: none"> <li>One infographic</li> </ul>
29 June 2022	Introduction to the topic, with a focus on: Coping with other challenges that may arise	<ul style="list-style-type: none"> <li>Two infographics</li> <li>Two videos</li> </ul>

### **PART 1: MONDAY, 27 JUNE 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

This week we will provide some handy tips on how you as a parent can support your child on an emotional level by supporting them as they overcome anxiety and stress, and any challenges that may arise.

Thank you again for your comments and questions last week! Please feel free to share with us again.

Have a wonderful week.

Keshini and Tegan 🌹

## OVERCOMING ANXIETY AND STRESS



### Helping your child in an anxious/stressful moment



#### Express positive and realistic expectations.

You can't promise your child that they won't fail a test or that they'll enjoy something. But you can express confidence in your child's capabilities, which gives them reassurance that your expectations are realistic, and you won't ask them to do something they can't handle.

When your child is in the middle of an anxious or stressful moment it can often be difficult to help them calm down.

They may feel frightened, out of control, worried or physically ill. It is important to help them stay calm and feel safe.



#### Respect your child's feelings, but don't empower

It's important to validate and normalize your child's feelings but this doesn't mean you need to agree or amplify them. Listen, be empathetic and understanding & encourage an attitude of resilience.



#### Don't reinforce your child's worries.

Be careful not to encourage your child's feelings of fear and anxiety. Don't send them the message that they should be worried. Model that you can get through whatever challenge faces you.

**"I know you're scared, and that's okay, and I'm here, and I'm going to help you through this. You can do this; you are capable. Let's think what you can use or do to help yourself."**



#### Encourage your child to tolerate stress & anxiety.

Anxiety & stress are a normal part of life. Encourage your child to come to terms with this and express that we need to deal with these feelings, and they can't be avoided. Encourage your child to engage with life and deal with anxiety as it happens.

#### Think things through with your child.

It may help to talk through your child's anxieties and stresses with them. Talk through what could happen, and the different ways to solve the problem. Help your child come up with theoretical ways to solve problems and who they can ask for help.



**BELIEVE IN  
YOURSELF  
BECAUSE  
I DO**

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

## **PART 2: WEDNESDAY, 29 JUNE 2022**

### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

Today we will provide some handy tips on how you as a parent can support your child on an emotional level by supporting them as they cope with other challenges that may arise.

Please also find two videos below:

1. A video on stress and how we can keep our bucket from overflowing.
2. A video about deep breathing exercises for kids.

Please feel free to share any questions or comments you may have.

Have a wonderful week.

Keshini and Tegan 🌹

Video shared with parents:

1. The stress bucket - by Talk Mental Health:  
Link to video: <https://www.youtube.com/watch?v=MOPlaqObCrU>
2. 4-7-8 Breathing Exercise by GoZenonline  
Link to video: <https://www.youtube.com/watch?v=Uxbdx-SeOOo>

29 JUNE 2022: INFOGRAPHIC SHARED WITH PARENT-PARTICIPANTS

👁️ ↔️ 🌐 COPING WITH OTHER 🌐 ↔️ 🧠

# CHALLENGES THAT MAY ARISE

What can I do, & what can I teach my child to do?



**Focus on what you can change**  
You have control over your decisions and actions. Make choices that allow you to bounce back from challenges.

**STOP, breathe & think!**  
Take a moment to sit quietly and be kind to yourself. Take a few deep breaths and be present. Observe what is going on around you and what you can do to change or make a good choice. And then act.



*Remember, to work together with your child! They are the expert in their lives.*



**Figure out what the challenge is!**  
Take a moment to reflect on the challenges you face and divide them up. Don't lump them all together.

**Look to your resources!**  
What and who can help me through this challenge? Be mindful of the resources in your life and use these.



**Remember, focus on what you can change and control.**  
And then focus on being kind to yourself, do things that you enjoy and help you to feel calmer.

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)



WEEK 8: SOCIAL WELL-BEING FOCUSING ON COMMUNICATION, RELATIONSHIPS AND SOCIALISATION SKILLS		
DATES	TOPIC / FOCUS	FORMAT OF WHATSAPP MESSAGES
4 July 2022	Introduction to the topic, with a focus on: <ul style="list-style-type: none"> <li>• Communication skills and the voicing of experiences</li> </ul>	<ul style="list-style-type: none"> <li>• One infographic</li> </ul>
6 July 2022	Introduction to the topic, with a focus on: Healthy relationships and socialisation	<ul style="list-style-type: none"> <li>• One infographic</li> </ul>

### **PART 1: MONDAY, 4 JULY 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

This week we will provide some handy tips on how you as a parent can support your child on a social level by supporting good communication skills and voicing of their experiences to others.

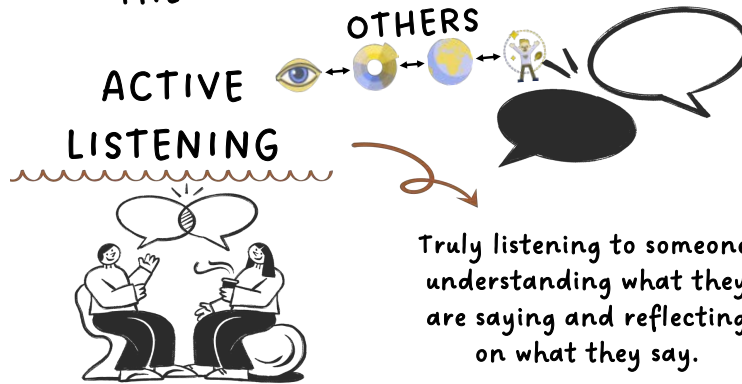
We look forward to your questions and comments.

Keshini and Tegan 🌸

# 5 WAYS TO SUPPORT

## GOOD COMMUNICATION SKILLS AND THE VOICING OF EXPERIENCES TO OTHERS

**ACTIVE LISTENING**




Truly listening to someone, understanding what they are saying and reflecting on what they say.

**Be KIND!**  
Try to understand what others are going through. Hear with a kind and open heart.

**EMPATHY**



**PURPOSE**



Listening purposefully to others, try to put yourself in their shoes. Be understanding and accepting of what they're telling you.

You are important. And this means that your story, experiences, feelings and needs matter. Don't be ashamed to voice your needs to others.

## YOUR STORY MATTERS



## YOU HAVE THE RIGHT TO SHARE

“We have two ears & one mouth so that we can listen twice as much as we speak” - Epictetus

How you see the world should be understood & celebrated. Share your experiences of CVD so people can accommodate you.

## **PART 2: WEDNESDAY, 6 JULY 2022**

### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

Today we will provide some handy tips on how you as a parent can support your child on a social level by encouraging healthy relationships and socialisation with others.

We look forward to your questions and comments.


Keshini and Tegan 🌸

**6 JULY 2022: INFOGRAPHIC SHARED WITH PARENT-PARTICIPANTS**


**ENCOURAGING HEALTHY RELATIONSHIPS AND SOCIALISATION WITH OTHERS**

Healthy relationships can remind us that we are not alone when we are facing challenges. They are essential in the development of your child's resilience as they support them as they overcome adversity. Encourage your child with CVD to seek out and build relationships that involve understanding, care, trust, and acceptance. Our relationships with people should empower and uplift us. These types of relationships enable your child to strengthen their resilience-enabling coping skills and overcome any challenges they are faced with.

Teach your child to **prioritize** their relationships. Relationships require both people to do work and make an effort. Teach your child to put effort into constantly building strong and healthy relationships.




Encourage your child to **invest** in relationships where they feel comfortable, can show vulnerability, and lean on their friends or family members for support. If we invest in our relationships, we can overcome challenging times feeling cared for and less alone.




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Teach your child how to identify who they can rely on and who can provide them with support in different areas in their lives. Our relationships and the people in our lives are all resources we can use to overcome challenges. E.g. your child can approach their teacher if they can't see the difference between colours in their textbooks.



---

**Today you are you,  
that is truer than true.  
There is no one alive  
who is Youer than You.**



**- DR. SEUSS**

Encourage your child to see their CVD as a unique and special characteristic about themselves. When explaining this to other children, encourage your child to emphasize their uniqueness and that they see the world in a way no one else does.

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

WEEK 9: SOCIAL WELL-BEING FOCUSING ON POSSIBLE TEASING, BULLYING AND PEER PRESSURE		
DATES	TOPIC / FOCUS	FORMAT OF WHATSAPP MESSAGES
11 July 2022	Introduction to the topic, with a focus on: dealing with possible teasing and even bullying	<ul style="list-style-type: none"> <li>• One infographic</li> <li>• Two pictures</li> </ul>
13 July 2022	Introduction to the topic, with a focus on: dealing with peer pressure	<ul style="list-style-type: none"> <li>• One information sheet</li> <li>• One video</li> </ul>

### **PART 1: MONDAY, 11 JULY 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

This week we continue to provide some handy tips on how you as a parent can support your child on a social level. We focus on how to deal with possible teasing and even bullying.

Please let us know if your child has experienced any difficulties with peers because of their condition. We look forward to your questions and comments.

Please could we request that you print the following resources and let your child put them up in their room, so they are reminded that bullying is never okay and how they should deal with it if it ever arises. Encourage your child to colour in the hand so that they take ownership of how to deal with any future bullying or teasing.

Keshini and Tegan 🌸

## 11 JULY 2022: INFOGRAPHIC SHARED WITH PARENT-PARTICIPANTS

**DEALING WITH POSSIBLE TEASING AND EVEN BULLYING**

**Encourage your child to set firm boundaries with friends and peers.**  
E.g. if your child with CVD doesn't like it when people test them on naming colours, encourage them to tell this to friends and be steadfast in standing up for themselves.

**Anything that makes your child feel unsafe or discriminated against is not okay.**  
Teasing and bullying should never be dismissed. Parents should listen to their child's story respectfully, acknowledge their feelings & emphasize that nobody should be bullied.

**Be direct.**  
Encourage your child to be assertive when telling friends or peers to stop teasing them, to leave it alone. They don't need to be confrontational but can tell them that it bothers them and it should stop.

**Discuss your own experiences and others who have been teased.**  
It's important for your child to know that they aren't alone, that most people have been bullied or teased. Share your experiences and positive ways that you overcame your difficulty.

**Educate people on your child's CVD.**  
It's important for your child's teachers and peers to be educated on CVD and what this means for your child and what they do and don't like to be asked.

**Encourage your child to speak out.**  
It is important to teach your child to report any bullying or teasing incidence that made them feel uncomfortable and unsafe. Encourage your child to seek help when discrimination occurs.

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

11 JULY 2022: IMAGES SHARED WITH PARENT-PARTICIPANTS



If you see **BULLYING**

**TAKE THEM AWAY FROM THE PERSON BULLYING.**

**WALK AWAY AND TELL AN ADULT**

**ASK THE KID BEING BULLIED TO JOIN IN AND BE YOUR FRIEND**

**TELL THEM TO STAY AWAY. NO-ONE DESERVES TO BE BULLIED**

**BE KIND TO THE KID BEING BULLIED. SHOW THEM YOU CARE**

**DON'T LAUGH AND JOIN IN**

**STAND UP AND TELL YOUR TEACHER**

Help make our school  
★ **A BULLYING FREE SCHOOL!**

## **PART 2: WEDNESDAY, 13 JULY 2022**

### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

Today we will provide some handy tips on how you as a parent can support your child on an academic level by helping your child deal with peer pressure.

We look forward to your questions and comments.

Keshini and Tegan 🌹

Video shared with parents:

1. Dealing with Peer Pressure - by Passara Chanchotisien:  
Link to video: <https://www.youtube.com/watch?v=dL5W5-gvIBE>



## Dealing with **PEER PRESSURE**

HELP YOUR CHILD TO OVERCOME PEER PRESSURE BY

### THEY ARE NOT ALONE.

There are many people and resources in their lives that can support them and help them overcome peer pressure.



### THEY NEED TO CHECK IN WITH THEMSELVES.

Your child should learn to ask the following questions:

- 🌐 Does this feel right for me?
- 🌐 Am I comfortable with this?
- 🌐 What will be the consequences if I listen to my peers?

### THEY HAVE THE RIGHT TO STAND UP FOR THEMSELVES.

When we experience a difference, it is important for us to learn to explain to others when we don't like how we are treated or that others need to accommodate our specific needs.

### ASKING FOR HELP IS OKAY.

There are many people and resources in their lives that can support them and help them overcome peer pressure.



### THEY SHOULD HAVE COURAGE.

It is never okay for others to pressure you into doing anything, or make you feel bad for how you feel. It takes courage to overcome peer pressure but you never have to do anything you don't want to.

### THEY ARE IN CONTROL.

Explain to your child that they always have a choice. They choose how they act, speak and react in a situation. They should always make the best choice for them and those around them.

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

<b>WEEK 10: ACADEMIC WELL-BEING FOCUSING ON ENJOYING SCHOOL, CLASSROOM SUCCESS AND PARTICIPATE WITH CONFIDENCE</b>		
<b>DATES</b>	<b>TOPIC / FOCUS</b>	<b>FORMAT OF WHATSAPP MESSAGES</b>
18 July 2022	Introduction to the topic, with a focus on: <ul style="list-style-type: none"> <li>• Helping your child enjoy school and perform well</li> </ul>	<ul style="list-style-type: none"> <li>• One infographic</li> <li>• Two motivational quotations</li> </ul>
20 July 2022	Introduction to the topic, with a focus on: <ul style="list-style-type: none"> <li>• Helping your child succeed in class and participate with confidence</li> </ul>	<ul style="list-style-type: none"> <li>• One information sheet</li> <li>• Two motivational quotations</li> <li>•</li> </ul>

### **PART 1: MONDAY, 18 JULY 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

Today we will provide some tips on how you as a parent can support your child's academic wellbeing by encouraging your child to enjoy school and perform to the best of their ability.

We look forward to your questions and comments.

Have a great week!!

Keshini and Tegan 🌸

## 18 JULY 2022: INFOGRAPHIC SHARED WITH PARENT-PARTICIPANTS

### HELPING YOUR CHILD TO ENJOY SCHOOL AND PERFORM WELL



#### DEVELOPING A RELATIONSHIP WITH YOUR CHILD'S TEACHERS AND SCHOOL STAFF

- Inform the teacher that your child has CVD and about the challenges they may face.
- Attend parent-teacher meetings and keep in touch with your child's teacher.
- Inquire how your child is coping at school academically, emotionally, and socially.
- Work with the teacher to find ways to best help your child.

#### SUPPORT YOUR CHILD ACADEMICALLY

- Find out how your child is doing academically by asking the teacher.
- Apply for accommodations for your child.
- Ensure your child gets their homework done by setting aside a place and time for school.
- Help your child with homework/projects by guiding and supporting them.
- Use technology - Windows has accessibility features for CVD that can be used to assist your child



#### SUPPORT YOUR CHILD AT HOME

- Model a positive attitude about education - Showing interest in your child's education can spark enthusiasm.
- Monitor your child's television, video game, and internet use - Rather encourage your child to use these media effectively.
- Encourage your child to read - it can help in all school subjects.
- Foster a supportive relationship - Ensure that your child feels comfortable asking for your help.
- Encourage your child with praise - This will promote your child's self-esteem.

#### DEVELOP A NETWORK WITH OTHER PARENTS

- Create relationships with parents who have children with CVD - You can find new ways to help your child through others' experiences.
- Find a support group - These groups can help you gain a new perspective to better help your child with his/her challenges.
- Create a support group - Sharing experiences and solutions can be beneficial for you as a parent and your child to socialise with children who are alike.



Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

**18 JULY 2022: INSPIRATIONAL QUATATIONS SHARED WITH PARENT-PARTICIPANTS**



**What makes a child gifted and talented may not always be good grades in school, but a different way of looking at the world and learning**

- Chuck Grassley

## **PART 2: WEDNESDAY, 20 JULY 2022**

### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

Today we continue our topic on how you as a parent can support your child's academic wellbeing. We provide some handy tips on helping your child to succeed in class and participate with confidence.

We look forward to your questions and comments.

Have a great week!!

Keshini and Tegan 🌸

## 20 JULY 2022: INFOGRAPHIC SHARED WITH PARENT-PARTICIPANTS

**HELPING YOUR CHILD TO SUCCEED IN CLASS AND PARTICIPATE WITH CONFIDENCE**

- Don't compare one child to another - Accept that your child has strengths different from others and create a home environment that fosters these unique abilities.
- Teach your child to trust themselves - Nurture feelings of self-worth by offering choices. This shows respect and helps build self-confidence.
- Challenge your child - Children can become stuck and monotonous. Challenging them will force them to work in different ways and use new methods of thinking.

- Boost your child's creativity - When your child expresses themselves confidently and creatively, they can become more open-minded.
- Don't overcorrect your child - Always let the child finish their idea or thought, before providing feedback and ideas.
- Praise and acknowledge accomplishments - both in private and in the presence of others.

- Create realistic expectations - Help your child create a list of goals for the school year that is manageable and attainable.
- Embrace a growth mindset - Use mistakes as teaching moments.
- Increase sense of ownership - Encourage your child to take ownership of their learning by providing opportunities for decision-making rules.

- Increase your child's responsibility - Giving your child a sense of importance with activities at home will boost their confidence and self-worth.

*Let your light shine*

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

20 JULY 2022: PICTURES SHARED WITH PARENT-PARTICIPANTS



How to Build a  
Child's Self-Esteem

Each time a child makes eye contact with you, burst into a big smile.

**BECOME A PARTNER TO ANY CHILD WHO GRAVITATES TO THE SIDELINES.** Come up with a handshake and use it to celebrate correct answers, crossing the finish line, good manners or any little success.

**GIVE A CHILD A UNIQUE RESPONSIBILITY AND THANK THEM EVERY SINGLE TIME THEY CARRY IT OUT.** Encourage the kids to make statements to one another that intentionally build up another person.

**Make positive comments to parents when the child can hear.**

WEEK 11: ACADEMIC WELL-BEING FOCUSING ON COMPLETING SCHOOL-RELATED TASKS AND EXTRACURRICULAR ACTIVITIES		
DATES	TOPIC / FOCUS	FORMAT OF WHATSAPP MESSAGES
25 July 2022	Introduction to the topic, with a focus on: Supporting your child to complete school- related tasks	<ul style="list-style-type: none"> <li>• Two infographics</li> <li>• Two motivational quotations</li> </ul>
27 July 2022	Introduction to the topic, with a focus on: Value of extracurricular activities	<ul style="list-style-type: none"> <li>• One infographic</li> <li>• Two motivational quotations</li> <li>•</li> </ul>

### **PART 1: MONDAY, 25 JULY 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

This week we will continue our conversation on how you as a parent can support your child's academic wellbeing. We focus specifically on providing some tips for you to support your child in completing school-related tasks.

We look forward to your questions and comments.

Have a great week!!

Keshini and Tegan 🌹

**25 JULY 2022: INFOGRAPHICS SHARED WITH PARENT-PARTICIPANTS**

## SUPPORTING YOUR CHILD TO COMPLETE SCHOOL RELATED TASKS




### ALLOW YOUR CHILD TO DETERMINE WHAT TO DO FIRST

Some children like to tackle challenging tasks first, while others might prefer to start simple and then ease into tougher tasks.




### ENCOURAGE ACTIVE LEARNING

All children need to do schoolwork on a daily basis to be able to succeed.




### BREAK DOWN LARGE TASKS INTO PARTS

Finishing a big task may be daunting. Help your child to break large tasks into smaller, do-able tasks. Ensure you reward every attempt in a sincere manner.



### INCORPORATE YOUR CHILD'S

Weaving your child's preferences and interests into social tasks can help promote learning and engagement.



### MAKE MODIFICATIONS

Teach your child new ways to complete activities. Consider ways to modify some of the steps so your child can learn and complete tasks with excitement and ease.


### BE AVAILABLE TO HELP

When your child is completing tasks or homework ask them what they are doing and if they need help.



### REINFORCEMENTS

You can do a lot to modify a task so that your child will be more motivated to start and finish the task. For example, give them a 5-minute break after each task is completed to do something they enjoy.



### REDUCE DISTRACTIONS

If there is a lot going on in the environment, it will be difficult for your child to focus on the task at hand. Ensure that there is minimal noise, a clutter-free space and limited visual stimuli that could distract them.



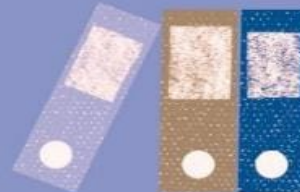
Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

# SUPPORTING YOUR CHILD TO COMPLETE SCHOOL RELATED TASKS



## HELP YOUR CHILD TO REMAIN MOTIVATED

Low motivation is one of the biggest problems your child may have when it comes to tackling activities. Without sufficient internal drive to achieve, getting through activities can feel impossible. Provide regular positive feedback and show your child how to work towards a goal.



## HAVE HIGH AND CONSISTENT EXPECTATIONS

Do not let your high expectations limit your child with what they can accomplish. Challenge your child and they will surprise you.

## HELP YOUR CHILD WITH TIME MANAGEMENT

Invest in a daily planner for them and encourage them to keep a calendar with all due dates of assignments and exams to ensure they are on time to hand in tasks and are well prepared for exams.



## HELP YOUR CHILD WITH STUDY SKILLS

Encourage them to ask questions and participate in class discussions. Encourage your child to understand their textbooks, take notes and increase their vocabulary.



## PROVIDE THE NECESSARY RESOURCES

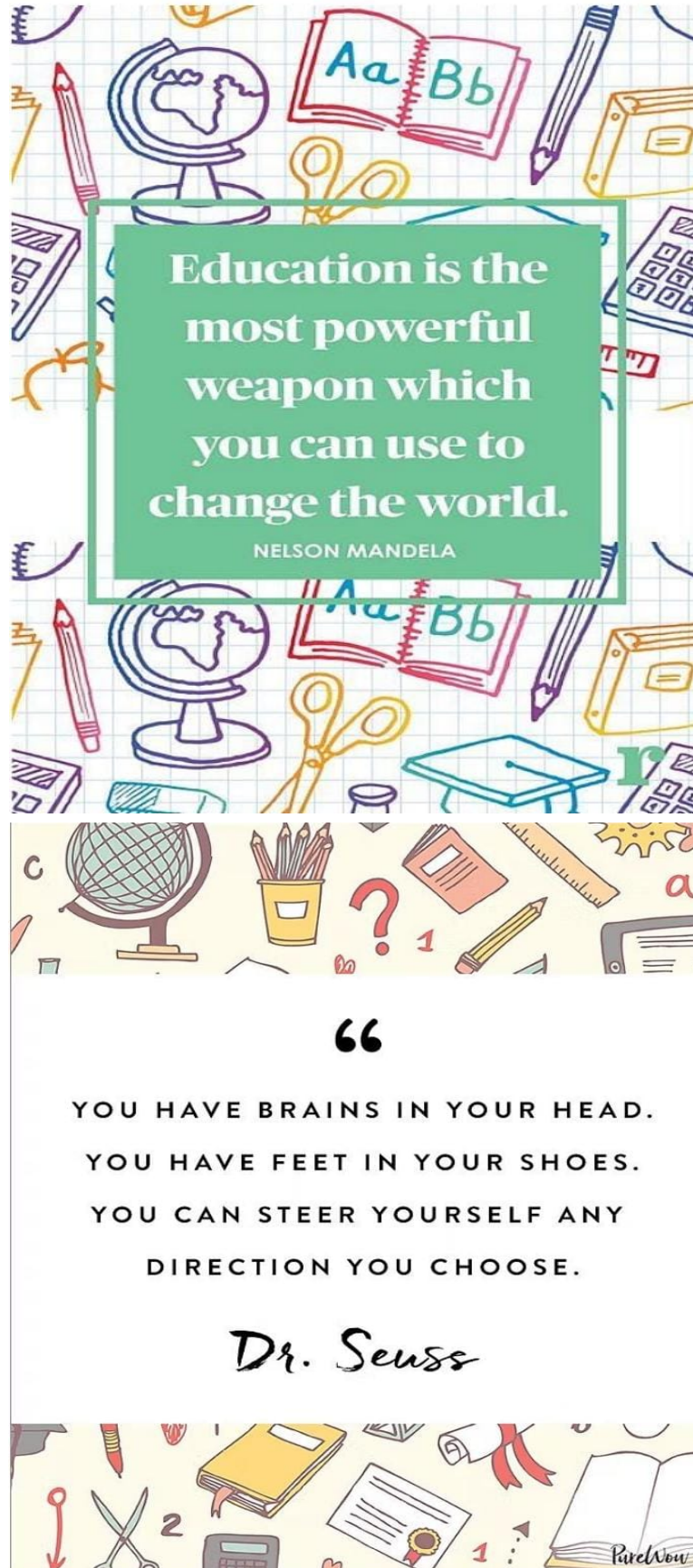
Academic success relies on having access to the right resources. Which may include extra classes or tutoring.



## IF YOUR CHILD DOES NOT LIKE A SPECIFIC SUBJECT

We all have subject that we do not like. Help your child to become confident in a subject by devoting a bit more time to getting better at it or consulting additional resources for them to be able to start enjoying it more.

25 JULY 2022: PICTURES SHARED WITH PARENT-PARTICIPANTS



## **PART 2: WEDNESDAY, 27 JULY 2022**

### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

In continuation of this week's conversation on how you as a parent can support your child's academic wellbeing. We focus on providing some handy tips for you to support and encourage your child to see the value of participating in extracurricular activities at school.

We look forward to your questions and comments.

Keshini and Tegan 🌹

## VALUE OF EXTRACURRICULAR ACTIVITIES

- 1**

**IMPROVED ACADEMIC PERFORMANCE**

Allowing your child to participate in extracurricular activities they are passionate about can increase their brain function, and help them concentrate and manage their time better, all of which can contribute to higher grades.
- 2**

**INCREASED SELF-KNOWLEDGE**

Your child will get the opportunity to explore a range of interests and unlock passions they never knew they had as well as, diversifying their interests which can in turn broaden their worldview.
- 3**

**HIGHER SELF-ESTEEM**

By doing extracurricular activities your child may learn to work hard and master new skills in a fun, relaxed and sometimes competitive way which can allow them to be successful without the pressure of getting a good grade. Once their confidence improves, they will be open to taking risks.
- 4**

**SOCIAL OPPORTUNITIES**

Making friends can be challenging, but one of the easiest ways to do this is through extracurricular activities. Each extracurricular your child engages in provides them with an opportunity to expand their social network.
- 5**

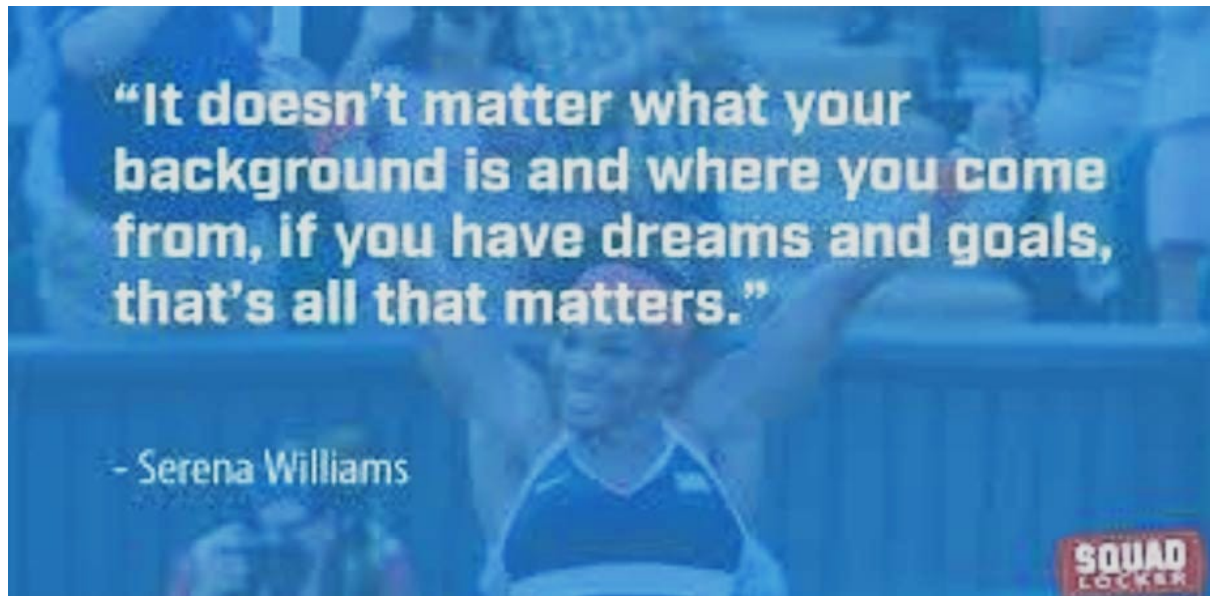
**GAINING LIFE SKILLS**

These skills include (but are not limited to):

  - Goal setting
  - Teamwork
  - Time management
  - Problem-solving
  - Leadership
  - Public speaking

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

**27 JULY 2022: PICTURES SHARED WITH PARENT-PARTICIPANTS**



<b>WEEK 12: FUTURE GOALS, DREAMS AND CAREER CHOICES</b>		
<b>DATES</b>	<b>TOPIC / FOCUS</b>	<b>FORMAT OF WHATSAPP MESSAGES</b>
1 August 2022	Introduction to the topic, with a focus on: Setting realistic goals and working towards reaching your dream	<ul style="list-style-type: none"> <li>• One information sheet</li> <li>• Two resource pictures</li> </ul>
3 August 2022	Introduction to the topic, with a focus on: Identifying and exploring career options	<ul style="list-style-type: none"> <li>• One information sheet</li> <li>• Two videos</li> <li>• Three additional resource links</li> <li>•</li> </ul>

### **PART 1: MONDAY, 1 AUGUST 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

This week we discuss supporting your child as they work to set realistic future goals and work towards reaching their dreams. We provide handy tips parents can use and teach their children when they set goals.

We look forward to your questions and comments.

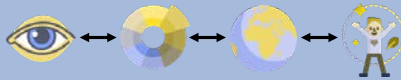
Have a wonderful week!

Keshini and Tegan 🌸

## 1 AUGUST 2022: INFOGRAPHICS SHARED WITH PARENT-PARTICIPANTS

Future goals, dreams and career choices

### SETTING REALISTIC GOALS AND WORKING TOWARDS REACHING YOUR DREAM



When your child is goal setting and looking to the future, parents should be mindful of the potential adversities they may face because of their CVD. Having a colour vision deficiency gives you and your child additional things to consider when making decisions about the future.

#### TO CONSIDER FOR THE FUTURE:

How your child's CVD may influence them in the future. E.g. in high school, university and later on...



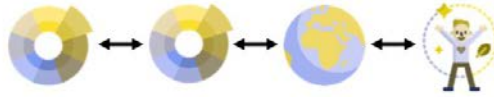
Who to inform about your child's condition and how you can empower your child to make others aware when they are more independent.

Support your child to set realistic and attainable goals by exploring options for the future together. Remember that your child has hopes and dreams and they should never be discouraged but supported to make good choices which will lead them to achieving their dreams.

#### ALWAYS REMEMBER:

Your child should never be unfairly discriminated against. Always inform those educating your child of their CVD and the difficulties they may encounter.

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)



## 6 Steps to help your child achieve their goals

- 1** ENCOURAGE YOUR CHILD TO SET SPECIFIC & REALISTIC GOALS - GET THEM TO WRITE THEM DOWN
- 2** HELP YOUR CHILD PLAN A WAY FORWARD FOR EACH TASK - WHAT CAN THEY DO TO ACHIEVE THIS GOAL?
- 3** BREAK DOWN THEIR GOALS INTO SMALLER GOALS AND STEPS THAT THEY CAN DO TO REACH THEIR DREAMS
- 4** HELP YOUR CHILD SET A TIMELINE OF WHEN THEY NEED TO COMPLETE TASKS
- 5** ENCOURAGE YOUR CHILD TO TAKE A STEP TOWARDS ACHIEVING THEIR GOALS EACH DAY UNTIL THEY COMPLETE THEM
- 6** SUPPORT & HELP YOUR CHILD BE FLEXIBLE AND ADAPT - GOALS & DREAMS MAY CHANGE

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

# Encourage your child to set SMART goals

## S

### PECIFIC GOALS

Plan with specific targets in mind.



## M

### EASUREABLE GOALS

Track your progress and reevaluate along the way.



## A

### TTAINABLE GOALS

Set realistic goals that are challenging but achievable.



## R

### ELEVANT GOALS

Ensure that all goals serve relevant purposes.



## T

### IME GOALS

Specify a deadline, monitor progress and reevaluate.



## **PART 2: WEDNESDAY, 3 AUGUST 2022**


### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

Today we discuss identifying and exploring suitable career options for your child. We provide support resources for CVD which may help your child overcome the challenges they face.

Please feel free to ask questions and share your comments and thoughts on this.

Please find below two videos on EnChroma glasses and how they can be a supportive resource.

Keshini and Tegan 

Video shared with parents:

1. This Is What Color Blind People See With These Viral Glasses- by Insider Tech:  
Link to video: <https://www.youtube.com/watch?v=1vWM2N3GRjE>
2. Hidden Talents of the Color Blind | Washington University by Washington University in St. Louis  
Link to video: <https://www.youtube.com/watch?v=9NrmH039ffI>

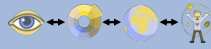
Additional resource link shared with parents:

1. <https://www.colourblindawareness.org/colour-blindness/living-with-colour-vision-deficiency/careers-and-the-workplace/>

Online colour identifiers:

2. [Colour Name & Hue](https://www.color-blindness.com/color-name-hue/)  
Link: <https://www.color-blindness.com/color-name-hue/>
3. [HueVue: ColourBlind Tools](https://alternativeto.net/software/huevue-colorblind-tools/)  
Link: <https://alternativeto.net/software/huevue-colorblind-tools/>

3 AUGUST 2022: INFOGRAPHICS SHARED WITH PARENT-PARTICIPANTS



Future goals, dreams & career choices

IDENTIFYING AND EXPLORING  
SUITABLE CAREER OPTIONS

Many people believe that CVD limits your child's future choices and career options. Parents need to be aware that CVD will pose unique difficulties in most careers, but as in their lives your child will learn how to cope and overcome any challenges they experience later in life.

DON'T LIMIT YOUR CHALLENGES. CHALLENGE YOUR LIMITS.

- 🌐 Research your child's career interests and if their CVD will restrict them in anyway.
- 🌐 Research how CVD can support your child in certain careers and how it can benefit them (there is always a silver lining).
- 🌐 Explore the 'pros' and 'cons' of different careers and how your child could overcome the 'cons'.



Careers which may be affected by CVD:

- 🌐 **Electrician** - it may be difficult for your child to differentiate between the colours of different wires.
- 🌐 **Pilot** - typically people with CVD are restricted when becoming pilots, however, a group of CVD pilots in Australia are contradicting this long held belief and proving that CVD doesn't affect one's ability to safely fly.
- 🌐 **Engineer** - CVD may cause safety problems when engineers are on site
- 🌐 **Doctor** - It may be difficult for people with CVD to differentiate between blood, skin rashes and other ailments which are red.
- 🌐 **Graphic/Web Designer** - design & art involve a lot of colour, and it may be difficult to mix and match colours.

The **severity** of your child's CVD may determine whether or not they are able to do certain jobs. This should be taken into consideration when exploring certain career paths as they may find it hard to do certain jobs which could negatively influence their mental health and confidence.

They should engage in jobs that they are able to do well and that they find meaningful.

**"You are one of a kind"**



Navigating our career journey can often be confusing, remember to support your child through this and encourage them to reach for their dreams & look for solutions.



Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

WEEK 13: THE PARENT'S ROLE VS THE CHILD'S ROLE		
DATES	TOPIC / FOCUS	FORMAT OF WHATSAPP MESSAGES
08 August 2022	Introduction to the topic, with a focus on: <ul style="list-style-type: none"> <li>• Thriving despite CVD</li> </ul>	<ul style="list-style-type: none"> <li>• One infographic</li> <li>• One video</li> <li>• One motivational quotation</li> </ul>
10 August 2022	Introduction to the topic, with a focus on: Dealing with frustrations	<ul style="list-style-type: none"> <li>• One infographic</li> <li>• Two resource pictures</li> <li>•</li> </ul>

### **PART 1: MONDAY, 8 AUGUST 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

This week we discuss both your role and your child's role with regards to their CVD. Today we specifically focus on both the parent's and child's responsibility to inform others about their challenges with CVD.

We provide handy tips you as a parent can use to guide and encourage your child to inform others about their CVD and the challenges they may face.

We look forward to your questions and comments.

Also, please find below a video that you as parents may want to use to guide your child in thinking about and dealing with CVD in a positive way.

Have a wonderful week!

Keshini and Tegan 🌸

Video shared with parents:


1. What is it like to be colour blind? by Lana Von Haught:  
Link to video: [https://www.youtube.com/watch?v=KfA79fB\\_S0A](https://www.youtube.com/watch?v=KfA79fB_S0A)

**8 AUGUST 2022: INFOGRAPHICS SHARED WITH PARENT-PARTICIPANTS**


## THRIVING DESPITE CVD: PARENTS' VS CHILD'S ROLE

### PARENT


- Ensure awareness of all teachers involved in your child's education about the colour deficiency.
- Inform teachers that your child will use labelled stationary that are marked with colours to assist him/her.



- Inform teachers of the challenges your child may experience with textbooks, worksheets and seeing colour markers on a board and suggest alternatives.
- Guide teachers on how they can better accommodate your child in the classroom, e.g. by allowing peer support when needed.




- Ask teachers to check up on your child, especially during assessments tasks, as they may need extra help.
- Inform physical education or extra mural teachers about your child's condition and how it will impact them during team play.

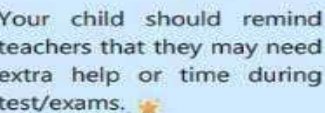


### CHILD


- Your child needs to inform teachers of any difficulties they experience with tasks that involve colour and ask for help.
- Your child should rely on alternative methods to support themselves for example using coloured pencils that have been marked with the colours.



- Your child should embrace their CVD and raise awareness amongst others about what this implies.
- Your child should ask peers for assistances with tasks in class if needed.



- Your child should give their best even during challenging tasks.



Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

**8 AUGUST 2022: INSPIRATIONAL QUOTATION SHARED WITH PARENT-  
PARTICIPANTS**

"Students are often capable of providing support to each other.

Students can be amazingly perceptive, and when given the chance we have seen them step up to coach their peers."

- Michael D. Toth in Education Week  
Teacher

## **PART 2: WEDNESDAY, 10 AUGUST 2022**

### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parents,

We continue our discussion focusing on both your role and your child's role in terms of dealing with frustrations and embracing the condition of CVD.

We provide handy tips you as parents can use to guide your child on how they can deal with the frustrations that come with their challenge and encourage them to embrace their CVD.

We look forward to your questions and comments.

Keshini and Tegan 🌹

10 AUGUST 2022: INFOGRAPHICS SHARED WITH PARENT-PARTICIPANTS

## DEALING WITH FRUSTRATIONS: PARENTS' VS CHILD'S ROLE

### PARENT

**ACCEPT YOUR CHILD AS THEY ARE**  
Embrace your child and accept them as they are, this will build a new connection between you. It is important to make them feel seen, heard and appreciated.

**ALLOW YOUR CHILD TO EXPERIENCE EMOTIONS**  
Stay calm and in control of your own emotions. When a strong feeling arises, observe it, pause and take a breath rather than immediately reacting.

**LISTEN TO THEIR WORDS OR BODY LANGUAGE**  
Listen and communicate with your child. Acknowledge when they are upset and ask them if they want to talk about it?

**APPLY A GROWTH MINDSET TO YOUR PARENTING**  
When you feel frustrated, use it as an opportunity to grow from the experience, and identify what you can do differently next time.

### CHILD

**EXPLORING HOW TO COPE WITH THEIR FRUSTRATIONS**  
Your child should find ways to cope with his/her frustration for example by asking if it would help to take a break and then come back to talk?

**UNDERSTAND THEIR TRIGGER**  
Your child should be able to understand what frustrated them and why so that they can be aware of the possibility of frustrations in future.

**FOLLOW RULES THAT REFLECT THEIR VALUES**  
Your child should act according to the standards of behaviour that is appropriate for family's upbringing and rules.

**SOLVING THEIR OWN FRUSTRATIONS**  
Your child should try to solve their frustrations before coming to you for help. Guide them on how to improve their critical and problem-solving skills.

**UNDERSTANDING THEIR OWN EMOTIONS**  
Your child should understand what they are feeling and how to calm themselves. Encourage relaxation techniques such as breathing exercises.

Developed by Tegan van der Westhuizen (Educational Psychologist & PhD candidate) & Keshini Naidoo (Student Educational Psychologist & MEd candidate) supported by the National Research Fund (NRF)

10 AUGUST 2022: IMAGES SHARED WITH PARENT-PARTICIPANTS



**things to remember when you get stuck**



<b>WEEK 14: QUESTIONS AND ANSWERS</b>		
<b>DATES</b>	<b>TOPIC / FOCUS</b>	<b>FORMAT OF WHATSAPP MESSAGES</b>
15 August 2022	Introduction to the topic, with a focus on: Quotations and videos	<ul style="list-style-type: none"> <li>• One infographic</li> <li>• One motivational quotation</li> </ul>
18 August 2022	Introduction to the topic, with a focus on: Questions and answers	<ul style="list-style-type: none"> <li>• One infographic</li> <li>• One resource picture</li> </ul>
19 August 2022	Conclusion of parent guidance intervention	<ul style="list-style-type: none"> <li>• One infographic</li> </ul>

### **PART 1: MONDAY, 15 AUGUST 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear Parents,

Thank you so much for participating in our parent guidance intervention. During this final week, we would like to explore any questions you may have.

We look forward to your questions and comments.

Keshini and Tegan 🌸

15 AUGUST 2022: INFOGRAPHIC SHARED WITH PARENT-PARTICIPANTS

# Question time



Thank you so much for participating in our parent guidance intervention. We trust that you have benefitted and feel empowered to guide and support your child to thrive.

For the rest of this week, we would like to attend to any questions you may have. Please send questions throughout the week.



**15 AUGUST 2022: QUOTATION SHARED WITH PARENT-PARTICIPANTS**

“  
**You should be  
persistent in  
asking questions  
until you're fully  
satisfied you  
understand what's  
happening.**

—  
DAVID WRAY

”

## **PART 2: WEDNESDAY, 17 AUGUST 2022**

### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear Parents,

Please feel free to raise any questions or comments you may have about the parent guidance intervention, or anything relevant to the intervention.

We look forward to your questions and comments.

Keshini and Tegan 🌸

# One last request from our side...

## Dear Parents

Thank you so much for being involved in our intervention. We hope that we have provided you with some useful support, guidance, and insight over the past 14 weeks.

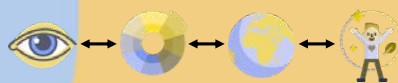
For us to be able to improve our efforts, we would like to hear about your experiences of the parent guidance programme. We'd appreciate your participation in an online interview/group discussion, to share your experience with us. We will contact you soon, to arrange a discussion for a time that will suit you.

In addition to sharing your experiences with us during our discussion, you are welcome to raise any further questions or concerns you may have.

One last thing, this group can continue with conversation in future. Even though we will no longer be sending messages on a weekly basis, we are here to guide and support you. You as parents can also support one another by sharing experiences with each other.

Kind regards

Tegan, Keshini & Ronél



**How did  
we do?**

**We'd like  
to know...**

### **PART 3: MONDAY, 19 AUGUST 2022**

#### **INTRODUCTORY MESSAGE TO PARENT-PARTICIPANTS:**

Dear parent

Please feel free to raise any questions or comments you may have.

Your child has the unique ability to see the world in a way we could never imagine.  
Encourage them to use their difference to explore and discover things we could not.

Keshini and Tegan 🌹



## APPENDIX I: FIELD NOTES

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An excerpt of the field notes from a PRA-guided session with Child-participant 1 is included here.

<b>Event:</b>	PRA-guided session with child-participant 1	
<b>Place:</b>	Google Meet	
<b>Date</b>	2 September 2022	
	<ul style="list-style-type: none"> <li>• Session conducted via Google Meet.</li> <li>• CP 1 wants to share his experiences with others, he is very expressive and vocal. He wants to others to understand how he sees colour.</li> <li>• Glasses seem to have a huge impact on how he sees colour, he seems to appreciate the glasses and the effect they have on his colour vision. He seems to believe that they enable him to see colour better and to some extent see colour as a typically sighted person would.</li> <li>• CP 1 showed me a comparison between light green and peach and when he wears his glasses, he is able to tell the difference.</li> <li>• In his specific case, the glasses seem to be helping him considerably.</li> <li>• He commented that he wears the glasses and just lives his life. They seem to help him quite a bit.</li> <li>• CP 1 commented that the world looks more green and more bland when I do not have my glasses on.</li> <li>• CP 1 stated that colours pop and the enviro is brighter when he wears the glasses. <ul style="list-style-type: none"> <li>○ Shades look different and look brighter.</li> <li>○ Fields look brighter and more vibrant and elevates it.</li> </ul> </li> <li>• Glasses also give him something to talk about with other people as they are interested and want to know what are they for and he feels confident to talk about the glasses.</li> <li>• The glasses seemed to have empowered him and supported the development of his self-confidence.</li> <li>• While the glasses are beneficial CP 1 still experiencing situations which cause frustration. For example, people asking what colour he sees.</li> <li>• CP 1 stated that he becomes irritated when people ask what colour this is, this triggers him. He stated that it feels like people are testing him.</li> <li>• It seems that when people make assumptions about what he sees, he feels like they are being critical.</li> <li>• Children with CVD need resources so they can use them to show others how they see the world. This will empower them to show others how they see the world. These resources developed as a result of the intervention can also be used in future to support others with CVD and provide them with resources.</li> <li>• Children with CVD need to have access to resources so they can share with people with typical vision.</li> <li>• I sent the comparison pictures to CP 1, and he said it was so clever because it is a good comparison and he can use these to show people.</li> </ul>	<p>Positive effect on psycho-social functioning</p> <p>Becoming confident to voice needs and experiences</p> <p>Positive effect on psycho-social functioning</p> <p>Effect on psycho-social functioning</p> <p>Children with CVD</p> <p>The power of being informed</p>

<ul style="list-style-type: none"> <li>• CP 1 told me about a game called Split gate which uses Ishihara tests to choose the best mode for the person with CVD. This helps people with CVD pick the most contrasting version of the game so they can play better.</li> <li>• He also stated that FIFA also has a CVD mode.</li> <li>• Letter to teachers: If the child-participants could write a letter to his teacher telling them how they could help a child with CVD, what would they say? CP 1 stated the following should be included:             <ul style="list-style-type: none"> <li>○ Look at comparison, make sure you know what a child with CVD sees.</li> <li>○ Get an understanding of what CVD is and how it works, so children do not feel excluded.</li> <li>○ Cater for kids with CVD do not just assume they will cope without any support.</li> <li>○ Consider that children with CVD might be afraid to speak up.</li> <li>○ Look at it from our perspective.</li> <li>○ Help if you see someone is CVD and do not expect them to just get on with it.</li> <li>○ Do not treat others with differences differently.</li> <li>○ Make sure you understand and learn how you can make a difference and gain a new perspective.</li> <li>○ Teachers need to realise if they make an effort to cater for children with CVD, they will appreciate it and feel heard. This will make them feel better.</li> <li>○ Use high contrast colours for example, black/yellow and blue/red.</li> <li>○ Teachers need to shift the colours they use to highly contrasting or white/black.</li> <li>○ Make small changes in the classroom to make it better for children with CVD.</li> </ul> </li> </ul>	<p>Supportive devices/resources</p> <p>Becoming confident to voice needs and experiences</p>
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## APPENDIX J: REFLEXIVE JOURNAL

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An excerpt of my reflexive journal is included here.

**15 December 2022**

The conclusion of the intervention sessions and the subsequent post-intervention assessments mark a significant milestone in my research journey. This phase has been both exhilarating and filled with moments of self-doubt, yet ultimately rewarding as I reflect on the impact of the intervention on the child-participants.

Throughout the implementation of the intervention, I was faced with occasional doubts about its efficacy and whether it was truly making a difference in the lives of the participants. I believe this uncertainty is a common experience for many researchers, exacerbated in my case by the unforeseen delays and disruptions caused by the COVID-19 pandemic. Despite these challenges, I remained steadfast in my commitment to the study's objectives and persevered through moments of doubt. Seeking guidance and support from my supervisor proved invaluable during times of uncertainty. Our discussions provided clarity and reassurance, serving as a sounding board for my thoughts and concerns. This collaborative approach helped me to navigate the complexities of the intervention process and reinforced my determination to see the study through to its conclusion.

As I reflect on the outcomes of the intervention, I am heartened to see the positive influence it has had on the participants. Witnessing the positive impact of the intervention on the participants has been incredibly rewarding. By having knowledge and being informed about their CVD child-participants seem to feel at peace with their condition in knowing that this is not something that is their fault or that it is wrong. It is something that happens and they could not have done anything to control the outcome, what they can do is control how they live with it and the support and assistance they ask for. Their growth and progress serve as a testament to the importance of perseverance and dedication in research. Moreover, I recognise the role of my conscientiousness and dedication in facilitating meaningful support for the participants, ensuring that their needs were met with care and consideration.

I am filled with a sense of fulfilment and pride in the contributions made through this research endeavour. The lessons learnt and experiences gained will undoubtedly inform my future work in the field, guiding me towards continued growth and impact. As I embark on the final post-intervention assessments with the remaining participant, I do so with renewed confidence in the importance and significance of my research. I am also reminded of the importance of remaining flexible and adaptable in the face of unforeseen obstacles. While the journey may have been longer and more challenging than anticipated, the outcomes reaffirm the significance of the research and its potential to make a meaningful difference in the lives of the participants.



## APPENDIX K: REFLEXIVE THEMATIC ANALYSIS

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Two examples of how I conducted reflexive thematic analysis (a PRA session with a child-participant and a semi-structured interview with a parent-participant) are included here.

<b>Event:</b>	PRA-guided session with child-participant 1	
<b>Place:</b>	Zoom	
<b>Date</b>	7 January 2021	
<b>Speakers</b>	Researcher Child-participant 1	
	<p>Child-participant 1 Can't see everything, so I can't really experience it to the max, but I can... like when I'm in walking in nature, I can't really see everything, so you can't experience it like how it actually is but you just...</p> <p>Researcher Okay, so you feel that you don't experience the world how it actually is. You're experiencing...</p> <p>Child-participant 1 Yes, but I'm experiencing my perspective, so I have a different perspective to everybody else.</p> <p>Researcher Yes, you do. You have a very unique perspective.</p> <p>Child-participant 1 Yes.</p> <p>Researcher Does that make you frustrated?</p> <p>Child-participant 1 No.</p> <p>Researcher Or angry?</p> <p>Child-participant 1 It actually makes me feel like wow, I see differently to everyone else. If you think about it, you're like I don't see the same. I see different.</p> <p>Researcher And you also... Do you know that you don't see the same as someone else with colour vision deficiency?</p> <p>Child-participant 1 Yes [overtalking]...</p> <p>Researcher Because you all have different degrees of it.</p> <p>Child-participant 1</p>	<p>Shift in mindset</p> <p>Shift in mindset</p>

<p>Yes.</p> <p>Researcher So, you and your dad don't see the world in the same way.</p> <p>Child-participant 1 No. That's why sometimes he'd say this is that colour. And I don't know what kind he has. I think he has the same as mine, but like I think he struggles to see greens more or something, I think so.</p> <p>Researcher So, you're like no dad, that's green and he's like no, it's brown.</p> <p>Child-participant 1 I'm not sure if he like things red or greens more or if it's just less severe than or more than mine but... I can't think of anything else.</p> <p>Researcher Think about like with clothing or your school stationery.</p> <p>Child-participant 1 Yes.</p> <p>Researcher Does it influence you with any of that kind of stuff?</p> <p>Child-participant 1 Yes, it's also, like I also struggle to like if I can't determine something and it kind of affects what you can do.</p> <p>Researcher Yes. So, think about like in the classroom with your teachers, when you're playing sports, how does it influence you? Are there any negative, any positive things, any average things?</p> <p>Child-participant 1 It's not bad because I have friends that support me, but it's also like sometimes if you're playing sports, sometimes kits will just look different and some kits will look similar. And then the cricket ball, when it's gone into long grass, whenever somebody hits the ball far and then it goes into the big, long grass then I struggle so much to find the cricket ball. Like they hit it, we play cricket in the nets, they hit it out into the long grass, it's so hard to find the ball. I stand for like five to ten minutes just looking. And people would be like it's there. I'm like where? And then I look down and like oh, there's it there, because I've probably looked at that spot like ten times but couldn't see it.</p>	<p>Negative effect on daily living</p> <p>Support from friends</p> <p>Negative effect on daily living and school performance</p>
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<p>Researcher You just can't see it. Well, it will be interesting to see what you see with the glasses on.</p>	
<p>Child-participant 1 And also, the artificial cricket pitches because I'm not sure, they look so dull and like...</p>	<p>Negative effect on daily living</p>
<p>Researcher Yes, like astro?</p>	
<p>Child-participant 1 Yes, so I'm not sure what it actually looks like. So that's one thing I want to see.</p>	
<p>Researcher It's going to be interesting.</p>	
<p>Child-participant 1 Yes, because...</p>	
<p>Researcher Well, when you go back to school, I'm going to phone you and you're going to tell me all about the things that you see.</p>	
<p>Child-participant 1 Yes, because some things just look so dull, like trees and all that, it looks like, oh this has no colour, it's just like bleh. It doesn't even look pink anymore, it looks...</p>	<p>Negative effect on daily living</p>
<p>Researcher You see, your eyes have adjusted now.</p>	
<p>Child-participant 1 Yes.</p>	
<p>Researcher Does it look normal now?</p>	
<p>Child-participant 1 Yes, it looks better, but it makes it look so much darker, but you can determine the colours better.</p>	<p>Glasses cause change in perspective</p>
<p>Researcher Yes, you see, your eyes just need to adjust, so just remember that.</p>	
<p>Child-participant 1 Yes. Okay. Now I can see... Yes, it looks for me like... Yes, I told you like kind of yellowish greenish, but then now it actually looks like</p>	<p>Glasses cause change in perspective</p>

<p>the colour that you said it is. This is so weird because it was so bright before and I always thought it was that colour. I never knew it was like an orange yellow colour.</p> <p>Researcher Well, that's very exciting.</p> <p>Child-participant 1 Yes, it's just...</p> <p>Researcher Anything in your classroom? Yes, sorry, what were you going to say?</p> <p>Child-participant 1 No, I wanted to say I can't think of anything else [overtalking].</p> <p>Researcher Classrooms, any issues in the classrooms, books?</p> <p>Child-participant 1 Only determining them between two things.</p> <p>Researcher Okay and especially like the red and the green board. That's like the worst.</p> <p>Child-participant 1 Yes. Like when you... So that's why the teacher never draws in red on the chalkboard because they know...</p> <p>Researcher You can't see it.</p> <p>Child-participant 1 Yes, so they always draw in white or different colour.</p> <p>Researcher Write that down. I'm going to write that down. Done.</p> <p>Child-participant 1 Yes.</p> <p>Researcher Can I quickly use this? Okay, my last one. Okay, so you have the glasses on. Now, do you think that they're going to have any influence on your life, on you, on how you feel?</p>	<p>Difficulty perceiving colour</p> <p>Negative effect on school performance</p> <p>Accommodation from teachers</p>
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<p>Child-participant 1 I'm probably going to be like used to having glasses on. And it's just because whenever I take them off though it looks so bright but also just weird. Like I... When I take them off, I know what I'm looking at because I've been looking at that my whole life. But then when I put this on, it's so foreign because it makes everything look like how it's supposed to be. And I'm not used to seeing the world normally, I'm only used to seeing it in my own perspective and saying no, this is that colour. And this is the same as this, but then they're actually different.</p> <p>Researcher Yes, like you say they're different. You're seeing the world in a different way.</p> <p>Child-participant 1 Yes.</p> <p>Researcher So, do you think it's going to take some adjusting?</p> <p>Child-participant 1 I'm pretty... Yes, it probably is going to take some adjustment, but I've got the glasses on, and they don't feel uncomfortable to wear. They feel fine. And I also think they actually look pretty stylish.</p> <p>Researcher They look very stylish.</p> <p>Child-participant 1 Yes, especially the outdoor ones, those look very nice.</p> <p>Researcher Yes, there are very stylish frames.</p> <p>Child-participant 1 Yes [overtalking].</p> <p>Researcher These are like the new... You know, like everyone likes these kinds of frames.</p> <p>Child-participant 1 Big frames.</p> <p>Researcher Yes. And yes, the outside, they're called wayfarers. They're very fashionable. You get ray-bans.</p>	<p>Positive effect on daily living</p> <p>Benefits of glasses</p>
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<p>Child-participant 1 Yes.</p> <p>Researcher That are in that one. So how else do you think they'll influence you? Do you think...</p> <p>Child-participant 1 I'll be able to see what everyone else sees, and like, you know, maybe look more normal.</p> <p>Researcher Okay.</p> <p>Child-participant 1 So, I get to see the world in a new perspective and not in my old perspective, but also in the perspective of other people.</p> <p>Researcher Okay.</p> <p>Child-participant 1 Why does it look so like... This looks kind of like more gold, but then when I put this on more like dull. It's more silver than gold.</p> <p>Researcher I suppose it is like a... It's not like yellow gold, it's a bronze gold.</p> <p>Child-participant 1 I can see [overtalking]. This does look more bronze than gold.</p> <p>Researcher Does it? Can I steal this page? Or no, I'll just take a photo of it. Okay, do you have anything else you want to tell me?</p> <p>Child-participant 1 No.</p> <p>Researcher Then we are good.</p> <p>Child-participant 1 Yes.</p> <p>Researcher Awesome, thank you so much. It was so cool to meet you.</p> <p>Child-participant 1 Hey, what's this little bag?</p>	<p>Hopeful change will occur</p>
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Researcher

That...So, okay, so I wanted to tell you. So, let me fold this quickly, hold on.

Child-participant 1

Can I open it?

Researcher

Yes, open it. So, when you... Oh, it should have like a... Where is it? Oh there. Okay, so this is for cleaning your glasses.

Child-participant 1

Oh, I thought as much.

Researcher

Right, I forgot this is an important rule. When you are cleaning your glasses, do not use, try not use your clothes. So, you know your school shirts are like that cotton material?

Child-participant 1

Yes.

Researcher

You can use that, but preferably only use this thing or tissue, like toilet paper, but you know the soft two-ply toilet paper, so that toilet paper. If this is dirty, wash it. Don't use like... Be careful to use like towels or like your shorts because you'll scratch them. So, try only use this and like tissues. If you use other things you'll scratch them, but other than that, like... And also, like if say your glasses, like say you've put cream on your hands and you touch your eye, you touch your glasses and there's like a grease smudge. You can put them under the tap, so put them under the tap. Like you know that liquid soap? Put a bit of soap, wipe the lenses, wipe it with some tissue paper, toilet paper, and then they're clean.

Child-participant 1

Okay.

Researcher

But don't like... Don't use jean material or like if you can see your shirt is dirty, don't wipe them on there. Try do it on that. So, what you can do with this is you fold this nicely and you can keep it in your box the whole time. So, you can put it in your box like that.

Child-participant 1

Oh, so you just... Oh you can put them on top here.

Researcher

Yes, so you can just put them... Yes, so like with your school ones.  
So maybe leave it in there.

Child-participant 1

I'll probably put them in the indoor ones.

Researcher

Yes, so keep them with the indoor ones so that you've always got it  
with you and literally you just pop them on top. Give them a wipe,  
because yes, they get very dirty, you know, just like from everything.  
Yes, then you just pop them in there and bob's your uncle. Any other  
questions about the glasses?

Child-participant 1

No. I just want to see what this says. [unclear] avoid touching the  
lenses. Do not use a [unclear] store glasses in a cool, dry area. So,  
I'll keep them somewhere in my room like [overtalking]...

Researcher

So basically, don't leave them in the sun, like on the windowsill,  
because the sun can damage the lenses. Don't leave them... Try not  
leave them... Like you know in XXXXXX it gets to like 40 degrees.

Child-participant 1

Yes, it's hot here.

Researcher

Don't leave them in the car for the whole day, so rather bring them  
inside or keep them in your schoolbag and take them into school.  
So, it's mostly stuff like that, but if you keep them in your room, you  
can keep them anywhere in your room. Yes, try not touch the lenses  
too much because then you're just going to smudge them.

Child-participant 1

Yes, take it like that. Fold it and try and grab them like...

Researcher

Yes, and just remember don't lay them flat on the lens.

Child-participant 1

Yes.

Researcher

Because they'll scratch.

Child-participant 1

So lay them like.

<p>Researcher Yes, like that or close them fully.</p> <p>Child-participant 1 Yes, close them.</p> <p>Researcher And you can do that. Or best, put them inside your case.</p> <p>Child-participant 1 Yes.</p> <p>Researcher So, try take your case everywhere. I know it's a mission, but like when you got your schoolbag, just put it in your schoolbag.</p> <p>Child-participant 1 Yes.</p> <p>Researcher Soon as you want to take them off, if you don't wear them during break, pop them in there. Make sure, like I said, make sure no one wears them. If you are playing rough games, like if you're wrestling, don't wear them. If you're playing rugby...</p> <p>Child-participant 1 Anything rough.</p> <p>Researcher Yes, anything where someone can hit your head and...</p> <p>Child-participant 1 I wouldn't want to run with them on because [overtalking].</p> <p>Researcher Fall off. So, I'll chat, I'll send your mum the name for the optometrist, but I don't.... She can also take you to her optometrist, but don't, yes.</p> <p>Child-participant 1 But they're not really feel loose.</p> <p>Researcher They feel fine.</p> <p>Child-participant 1 Yes.</p>	
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Researcher

Okay, cool. Try not... If you're playing rugby don't... Any sport that people are going to touch your head, like that can bash them.

Child-participant 1

Yes.

Researcher

Hockey could be dangerous.

Child-participant 1

Yes. To imagine the ball... But just take it by ear.

Child-participant 1

And I want to play hockey goalkeeper, so I wear the...

Researcher

Oh, the helmet. Okay.

Child-participant 1

Yes.

Researcher

Yes, so don't do anything that's going to interfere with safety. Okay? Other than that, I don't... I think that's all with the glasses, enjoy them. That's basically it.

Child-participant 1

[inaudible] flipping the glasses so your eyes can adjust to the new lenses. This is [inaudible] over the course of one to two weeks. So basically, wear them as much as you can and then you get more used to it.

Researcher

Yes, exactly. So, now, going forward, for the next six months, I would like it if you could try wear them every day. If there's any issues...

Child-participant 1

[overtalking] wear them all the time.

Researcher

Well, you can. That's what they're there for. Like I said my supervisor's son, he wears them literally... The only time I've seen them off is just when he's around the house like he'll take them off, but he generally wears them all the time. So, these really are, you can wear them all the time. Wear them anywhere. They look fashionable. They're not too dark. They look nice. If people ask you about them, tell them what they are.

<p>Child-participant 1 I know people, I know my friends will be curious about it and I've been telling them guys I'm getting my glasses and getting them been excited. And I'm excited. <u>And they've been excited for me.</u></p> <p>Researcher Oh, I'm glad.</p> <p>Child-participant 1 Yes, they're happy for me.</p> <p>Researcher I'm very glad that they are.</p> <p>Child-participant 1 So, I'm going to tell them that I finally got them today.</p> <p>Researcher Yes, you can show them now when you go to school.</p> <p>Child-participant 1 Yes.</p> <p>Researcher So yes. So just literally keep try wear them as much as possible. The whole aim of the intervention that we're doing with you is to see if you get support. And if you wear the glasses, do they help? Do they make your life better? Do they not really make it anything? Do they not affect you at all? How does it make you feel. Okay? So, for the best results, wear them as much as you can. If there are any problems, tell your mom and then she can WhatsApp me, okay? And then I'm going to organise to have a meeting with you, I think, a week after school starts. And then you can tell me what's going on and how you're feeling. And if you can see things differently, how school is what your friends are like, what teachers are saying. Okay, but if anyone gives you any trouble you... Because I know all the teachers at xxxx, okay, I'll sort them out for you. Okay, but I don't think there will be any problems.</p> <p>Child-participant 1 No.</p> <p>Researcher Okay?</p> <p>Researcher But what they do is it just helps you see colour better or differently. So, like you say, you can see the red a bit richer, so it's going to help you. And what will happen is your brain is going to... Yes, so there's</p>	<p>Support from friends</p>
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more red there. I should have brought more things with colours on it. We can, we'll go outside though just not as well, but even there, that's a red umbrella. Can you see the... Do you see it differently?

Child-participant 1

It actually does look [inaudible].

Researcher

And even with your... Okay, there's no green inside there, we'll have to go outside where there's green bits. Okay? So, these are your sunnies. So, these, primarily wear these outside because you see how much darker the tint is? So, like if you go to a sports event or, I don't know, you are... Even... So, I know you play soccer, hey, what other sports do you play?

Child-participant 1

[unclear] we do soccer then swimming and then rugby and soccer and then hockey and athletics.

Researcher

Okay and cricket?

Child-participant 1

And then cricket.

Researcher

Do you play cricket?

Child-participant 1

Yes.

Researcher

These might help with cricket, because I know that pesky ball is red. And then amongst the green grass is it sometimes hard to see it?

Child-participant 1

Sometimes, it depends on the length of the grass.

Researcher

Okay, so this might help. So, these will be cool... And even if you go on holiday and they're quite a cool frame. So, do you want to put them on and see if you like them? Oh, those actually suit your face really well. Check.

Child-participant 1

Yes, these are more thin than these ones. This is like a thicker frame.

Researcher  
Yes, those are like... So, I had glasses like that that I would like wear to sea.

Child-participant 1  
It looks so red, it just looks pink.

Researcher  
Does it?

Child-participant 1  
It just looks pink.

Researcher  
So, to me, it looks like slightly pink, but not a lot.

Child-participant 1  
For me it's very pink with these also.

Researcher  
Okay.

Child-participant 1  
Also, with these it's very pink.

Researcher  
Pink. Well, put these ones on. Let's leave them on, let your eyes adjust. Like I said, it takes 10 to 15 minutes. And then so what is going to happen now is your brain needs to adjust to the glasses, but then after your brain has adjusted, every time you put the glasses on your eyes should adjust a bit quicker because your brain knows what to do. Okay, so you need to look after these glasses because they're from overseas.

Child-participant 1  
I will definitely.

Researcher  
They're not even from south Africa. If you google this place EnChroma, they're from America. So, the lady that, so the lady who like... What would I call her? She's like my teacher. So, she's called my supervisor. So, the reason why we're actually doing this was because her son has colour blindness as well. And she got a pair of these glasses, and they helped him so much. So, she went to America and brought these back from America. So, look after them very carefully. Don't let other people wear them.

Child-participant 1  
No, I definitely won't. I know people are definitely going to ask that.

Researcher

They're going to ask, and you can just say to them like these are from America, they're very expensive and they help me see better, they're not going to help you see better. So, unfortunately, you're not allowed to wear them. And I'm going to send Mr XXXX an email. So, he sent me a very nice email saying how excited he is for you. So, I'm going to send him an email now saying that you have the glasses, please can they just explain to all the boys that no one's allowed to take the glasses or else I'm come down here and sort them out. Okay?

So, yes, you've got two nice boxes. So, you can take off these labels if you want. Try keep them in the case all the time. So, glasses etiquette. So, when I got my glasses, this was... So, never put glasses... So don't ever put your glasses like that because they'll scratch. And these lenses... So, this, these ones have got... Can you see they're kind of blue?

Child-participant 1

Yes.

Researcher

So, these have got like a... And these ones actually also, you can take those off when you tilt them, they've also got like a slightly coloured.

Child-participant 1

Yes.

Researcher

So, these are really nice because when you... Do you work on tablets at school yet?

Child-participant 1

We're going to next year.

Researcher

Great. So, you can use this when you're working on your tablet and on your laptop. And it actually helps with the light. So, don't ever put your glasses like that. Try not leave them... So, this is something I have to learn, because I always do this, I leave them... I leave my glasses like this in my bedroom and stuff and then one day I came back, and I had a big scratch. So always try put them in your box is empty. And always make sure your box is empty, okay? I've had a stone in here once, don't ask me how it got here, and it scratched my glasses. So always make sure your case is empty. Also, you can stand on this. Yes, you probably could try, don't do it, but you could jump on this, stand on this, and it doesn't squash. So, feel it. Can you feel it's hard?

Child-participant 1

Yes.

Researcher

So, you can put this like if you want to put this in your schoolbag, you can put this in your schoolbag, make sure your glasses are in their nicely, put it in your schoolbag, it's safe in there. Okay?

So, these cases are nice. Try always keep them in your cases.

Child-participant 1

Can you like wear them if you're going to school and when you're at school you can just wear them?

Researcher

You can... So, these ones... So, you must just see what you're comfortable with. These ones are called outdoor ones just because they're more like sunglasses. So, they're darker, so they filter the sun out a bit more. Those ones, you can wear anywhere. Inside, outside. So, one of the other boys, he only likes wearing these ones. He just doesn't really like sunglasses. But you must just decide what's happy for you. So, you can literally wear these night and day, when you're watching tv, when you're on your computer, when you're on your tablets now in grade 7, when you are making food, when you are doing your laundry, when you're buying clothes because you need to see which clothes are a bit redder than the other clothes. These are your everyday glasses. Okay? So, these are the ones you wear all the time. Does that answer your question?

Child-participant 1

Yes.

Researcher

Yes, so from the time you wake up, if you like wearing them all the time, you put them on as soon as you wake up and off you go. So, my supervisor's son, let me see if I can show you a photo of him, he wears his glasses all the time. So, when he wakes up in the morning, he pops them on and off he... Oh he hasn't... Oh yes, here we go, here he's put his glasses on a skeleton. But he literally wears his glasses all the time. So, he carries his two boxes with him in his schoolbag. As soon as he... And like he'll take them off sometimes, but generally... And he wears them a lot when he games and when he watches TV. So, I think especially with soccer, it could be helpful with the jerseys, because I know those pesky MAN U guys still are very red and I don't know who's green. Is anybody green?

Child-participant 1

No, one team is yellow and green but not that much.

Researcher

Not that much. It's more the rugby, hey? Wales and like South Africa, when they play it's not great.

Child-participant 1

Yes.

Researcher

Also, I know your dad might try to steal these from you, these are for you, okay? So, the aim of these glasses is I do want you to try wear them as much as you can, okay, because we need to see if they help you, if they make a difference. And it could be like the tiniest difference, but I mean I suppose it's... What do you see?

Child-participant 1

It's kind of different. Some things just look pretty different to what they were.

Researcher

So, I think the more you wear them, the more differences you'll start to see. And I think even small differences. But you must tell me, you might think that oh my word, a small difference is a big difference, or you might be like meh, whatever. But you must just see what you think is best. Okay? So, outdoor glasses, wear them when you want, when you're outside. If you go to the beach, if you guys are playing sport like cricket. Cricket's a good game to wear these because no one's going to tackle you, so they won't break. Or even tennis, if it helps you see the ball better. Especially with cricket, I think, will be very helpful. But yes, like I said, these are just for you, no one else, and these are for you because you're in my study. You're very important in general anyway, but also because now we are doing the study, all the information I get from you is going to help us with other kids as well. And it will help us with you. That's the whole point of this, to see if these help you, if they don't help you, if you like them, if you don't like them. Okay? Right, protect them with your life. Okay, but I'm very excited. Is it helping?

Child-participant 1

Yes, it just looks darker [unclear].

Researcher

So, like the one... So, I think you'll find it interesting, you'll probably find some things are like wow that looks really different and other things you'll be like meh. Like the one boy... Did I tell you about the green dog?

Child-participant 1

Oh yes.

Researcher

Yes, so he put the glasses on, and he was like oh my gosh, my dog isn't green, it's brown. So, he could see that, like his dog he could see very brightly and then the grass he says looked a bit different. But for somethings he saw big difference, other things he didn't. So, we just have... we now basically have to see what you, how your eyes adjust. Okay, but I will say they look very good on you.

Child-participant 1

Thank you.

Researcher

So, they suit your face. And they also have adult glasses, so they should... They won't get too small for your face, they'll probably [overtalking]...

Child-participant 1

[overtalking] feel a bit big.

Researcher

Yes, if you look, your face... You're going to grow into them. They don't look funny though.

Child-participant 1

[overtalking].

Researcher

They don't look funny.

Child-participant 1

Yes, they don't, they're just big.

Researcher

Yes, so just make sure they don't slide off.  
But like this might be good when you start doing geography with maps. So, these are just... You can give one of these to your mom, but this is just the pamphlet for the glasses. So, basically...

Child-participant 1

Yes [overtalking].

Researcher

[overtalking].

Child-participant 1

E o s m n l.

Researcher

Yes. So do you see how your cones is... So here, this actually shows this nicely.

Child-participant 1

Yes, so you have a blue, a green and a red. And your red green intersects.

Researcher

Yes, exactly.

Child-participant 1

And then a blue green, it's the other way around.

Researcher

Exactly, then you can't see blue and yellow nicely. So, what these glasses do is they are supposed to separate, they remove the light that overlaps. So that's why you can see red a bit sharper because they're now, the glasses remove that light so that you can now try see the separate colours a little bit differently, okay? So, yes, this is just basically showing us on what glasses you've got. So, you've got these ones.

Child-participant 1

This one here?

Researcher

Yes, I think those ones there. Okay, so those are for... Actually, I think you might have those ones.

Child-participant 1

I think these two here.

Researcher

Yes. I think it's that one, you're right. So those are those ones. Bright sunlight and then those indoor ones. Okay? So, literally, you can wear those all the time. When you're reading at night, when you're... I don't know, what do you like to do?

Child-participant 1

Playing games.

Researcher

Play games. Okay. So, and yes, but you know how these... So, I don't know if I told you. Do you know how these are made?

Child-participant 1

No.

Researcher

So, this scientist was fiddling around, basically, he was like making other glasses and he accidentally made them, so didn't do it on purpose, it was an accident. Okay? So, yes, so basically, they enhance colours so that you can see them better. And then, yes, just like I said, these are your glasses, don't feel like you have to let other people wear them. If someone else comes and says to you: child-participant 1, I'm also colour blind. Please, can I borrow them? You say: I'm really sorry but these are mine. It's the same like... You know like... Do either of your parents wear glasses?

Child-participant 1

My mother does wear glasses all the time.

Researcher

Do you try wear them?

Child-participant 1

Oh, it looks wonky.

Researcher

Yes, so they're not for you.

Child-participant 1

Yes.

Researcher

The same way with these. These are not for anybody else, they're just for you. So, you can literally say: no, I'm really sorry, these are specially made for my eyes. Okay? Those are yours. And if you do find that people are being a bit pushy or if kids are teasing, I don't think anyone will tease you because they look cool, and XXXXXX is also supposed to be...

Child-participant 1

Yes, they don't like that.

Researcher

No. If they do though, please tell your mom so she can tell me because the whole thing of this as well is that we need people to start understanding that you see the world differently.

Child-participant 1

Different.

Researcher

Yes, and that you need different things to be able to see the world in a better way. So, if they're going to tease you or if they're going to

make comments, then you tell me because then I'm going address it with Mr XXXX. And I'm not going to be like child-participant 1 told me that and we now must go find all five boys that were mean to you or whatever. I'm going to deal with it in a very good way, just that we can make sure that you're happy and that no one is causing trouble. Okay?

Child-participant 1  
Yes.

Researcher  
But I don't... Yes, I know boys are teasing, but I highly doubt they'll... But if anything happens that makes you feel uncomfortable, please just let me know. Okay.

Child-participant 1  
Okay.

Researcher  
Okay, do you have any questions?

Child-participant 1  
Not really.

Researcher  
Okay, right. So, these are just for you. You can also take some of these to school. Give them to, one to your teacher and you can give one to Mr XXXX, okay? Because I'm always... I'm sending him an email, I'll send it to him next week, just explaining that you've got the glasses. I've made a booklet for him, and I made... I sent it to your mom as well. I've already sent him a booklet, but I'm just going to send it again to remind him of what the glasses do, how they work, what they are and all of that, okay? Right. Now...

Child-participant 1  
So, it's all explained here.

Researcher  
Yes, it just basically says this is what they are, it's grounded in science, how they work because I think that's... And you explain it so nicely, you already know about the cones, so you can also tell people. Okay. I'm just trying to think if there's anything else with school. Yes, just don't lose them.

Child-participant 1  
So, you can also wear this outside?

Researcher  
Yes, no you can wear them outside...

<p>Child-participant 1 But if it's bright outside then...</p> <p>Researcher It's just your... I think it's more like your preference. So, if you prefer those ones outside and you're happy with those ones, then wear those, but if say for example you're outside and it's very bright or, you know, I don't know like... So, my dad always wears sunglasses in the sun, we go outside, he puts sunglasses on. His eyes are just very sensitive. So, it just depends on what you prefer.</p> <p>Child-participant 1 Yes.</p> <p>Researcher Okay, but just yes, if you find that... Try them now. Do you wear sunglasses? Not yet.</p> <p>Child-participant 1 Sometimes, because I have... They don't do sunglasses that fit my...</p> <p>Researcher Your face? Okay, well these ones look super cool and so if you're struggling with them fitting your face, I will chat to your mom though, but you can go to an optometrist, there's one in town, and he'll make the ear-things narrower for you, so they fit you a bit better. So, I'll tell you mom, and make a reminder of that, because maybe she can take you to do that just so that they fit you. And then as you get bigger, they'll be able to move the stuff. How do they feel now?</p> <p>Child-participant 1 They don't... They fit but they... It just it doesn't move too much, it fits fine.</p> <p>Researcher Okay.</p> <p>Child-participant 1 It still looks pink there, but I haven't looked at everything [overtalking]...</p> <p>Researcher Well, do you want, should we go outside and then come back and start doing the posters?</p> <p>Child-participant 1 That just looks very bright and then very dark.</p>	
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<p>Researcher Okay. So, these are... Let me quickly show you. So, we're just literally doing that poster, this one, not long, not difficult, okay? And this one. Okay, that's all we do. And then do you still have the drawings and stuff you did for me last time?</p> <p>Child-participant 1 Yes.</p> <p>Researcher Great, can you get that for me because I just want to take photos of it? And then we can go outside. Okeydokey. Okay, let's leave this here. Let's go for exploration time. Okay, let's go see what you see.</p> <p>Child-participant 1 Everything is dull without the glasses.</p> <p>Researcher Oh yes.</p> <p>Child-participant 1 Everything is just more like red and pink.</p> <p>Researcher Like brighter. Okay, so let's let your eyes adjust.</p> <p>Child-participant 1 [inaudible]. There's a massive difference.</p> <p>Researcher What did that look like before?</p> <p>Child-participant 1 That was like a brownish type of thing, but now it looks like red.</p> <p>Researcher Yes, so this is like an orangey red colour.</p> <p>Child-participant 1 But whenever I took it off it never ever looked like orange, it always looked brown and black.</p> <p>Researcher Really? And now it looks different.</p> <p>Child-participant 1 That's a big difference now.</p>	<p>Positive effect of glasses</p>
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Researcher  
Oh, that's exciting.

Child-participant 1  
It's so colourful.

Researcher  
And what about this? Because you... This colour here, so what colour do you see here where I'm standing, what colour is this here?

Child-participant 1  
It's like a dark green brown.

Researcher  
And this?

Child-participant 1  
That just looks like green.

Researcher  
Okay. And now put your glasses on. What colour is here?

Child-participant 1  
It's like it looks more red, it looks more bright.

Researcher  
So, this is actually an orange red colour. You know, like red sand.

Child-participant 1  
But it looks kind of like green but like it's a brown [overtalking].

Researcher  
No, this is... Do you know red sand?

Child-participant 1  
Yes, now it looks red.

Researcher  
Yes. Okay, so you're noticing that you can definitely see the red tones more.

Child-participant 1  
Yes.

Researcher  
Brighter?

Child-participant 1  
And the floor, all the floor and stuff, some of the floor places look red.

<p>Researcher Well, look at my toes. What can you see them?</p> <p>Child-participant 1 Yes, those look red.</p> <p>Researcher What colour... No, they're... What colour are they?</p> <p>Child-participant 1 They're like orange but like darker.</p> <p>Researcher And when you put the glasses on?</p> <p>Child-participant 1 They're a very clear red.</p> <p>Researcher Yes, they're a red colour.</p> <p>Child-participant 1 This is so much more vibrant.</p> <p>Researcher Okay, so the red tones are popping more.</p> <p>Child-participant 1 Yes.</p> <p>Researcher What about the roof and stuff?</p> <p>Child-participant 1 Yes, Joh, that one looks so pale but now it looks so [inaudible]. That one across and that one over there.</p> <p>Researcher Okay. Do you want to try the sunglasses?</p> <p>Child-participant 1 Yes. Definitely the reds pops much more. This makes the red pop even more.</p> <p>Researcher You look very, those look very nice on you, hey.</p> <p>Child-participant 1 Yes, thank you.</p>	
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<p>Researcher You look very fashionable.</p> <p>Child-participant 1 Those look so much... Those look like so pink (looking at bricks) more colourful than just greys. This just make it... Those... These (sunglasses) are like those but like times two.</p> <p>Researcher Okay, so the sunglasses are like on steroids?</p> <p>Child-participant 1 Yes, it makes it look more red.</p> <p>Researcher Okay and the greens, are you noticing any changes in the greens?</p> <p>Child-participant 1 That tree there is so... It's actually such a deep green.</p> <p>Researcher Yes.</p> <p>Child-participant 1 It looks pale for me, but then it looks deep green. Oh, and the grass looks so much greener. A deep green. It looked pale and then now it looks...</p> <p>Researcher So, what colours do you normally have the biggest problem with? Red and green?</p> <p>Child-participant 1 Yes, the reds and greens mainly look more pale than they actually are. And sometimes red and green next to each other, I can't spot the difference. Or if there's any two colours, I can't notice the difference.</p> <p>Researcher And blues, do you have trouble with blues?</p> <p>Child-participant 1 Some blues.</p> <p>Researcher Okay.</p>	<p>Positive effect of glasses</p> <p>Positive effect of glasses</p> <p>Difficulty distinguishing colours</p>
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<p>Child-participant 1 Especially when I was in younger grades, like I was struggling and my teacher thought in grade R that I didn't know my colours, so then I went, and we actually found out I was colour blind. That's... I struggled with blues a lot then but...</p> <p>Researcher When you were little.</p> <p>Child-participant 1 I still... Some blues troubled me, not as much as red and green but...</p> <p>Researcher Okay.</p> <p>Child-participant 1 Okay and the rope over there, that blue rope there.</p> <p>Researcher Is it blue, blue, blue? Child-participant 1 Yes. It looks blue.</p> <p>Researcher And the house, what does the house look like now? This house.</p> <p>Child-participant 1 No, that one looks...</p> <p>Researcher Your house is brown.</p> <p>Child-participant 1 This looks like proper orange now it's...</p> <p>Researcher Yes, it's like a terracotta. It's like an orange red mix.</p> <p>Child-participant 1 Yes, it doesn't look too bright, but it looks very dull.</p> <p>Researcher Okay.</p> <p>Child-participant 1 And the grass pops more.</p>	<p>Lack of awareness by teacher of CVD</p> <p>Difficulty perceiving certain colours</p>
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<p>Researcher That is...</p> <p>Child-participant 1 And the tiles are so pale but now they're so bright (child-participant 1 puts EnChroma glasses on). Mainly the grass and like the red floor.</p> <p>Researcher Okay.</p> <p>Child-participant 1 It looks like peach. Without the glasses it looks peach, now it looks red.</p> <p>Researcher And how are you feeling about all of this? Is this...</p> <p>Child-participant 1 Yes [overtalking].</p> <p>Researcher What kind of feelings?</p> <p>Child-participant 1 I know what other people see, so I don't have to try and figure out what it looks like.</p> <p>Researcher Try imagine?</p> <p>Child-participant 1 Yes.</p> <p>Researcher And emotions wise?</p> <p>Child-participant 1 It's very exciting.</p> <p>Researcher Is it exciting?</p> <p>Child-participant 1 Yes.</p> <p>Researcher So, you basically now need to go for a walkabout in nature to see all the things that will look different.</p>	<p>Positive effect on psycho-social functioning</p> <p>Positive effect on psycho-social functioning</p>
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<p>Child-participant 1 Yes, and even places that I have already been before.</p> <p>Researcher Yes, and school. Imagine what school's going to be like now.</p> <p>Child-participant 1 Sho.</p> <p>Researcher Because xxxx actually has all the red brick buildings.</p> <p>Child-participant 1 Yes, and they look pale.</p> <p>Researcher And all the green trees. Yes.</p> <p>Child-participant 1 And that like furry tree over there, behind the pole...</p> <p>Researcher And the...</p> <p>Child-participant 1 All the way there. Yes, it just pops more.</p> <p>Researcher Okay, so it's like everything is a little bit more distinguished?</p> <p>Child-participant 1 It's very distinguished. I can tell the difference, and the road is so red like the sand on it.</p> <p>Researcher Yes, it is.</p> <p>Child-participant 1 The sand on it just from here without the glasses on it looks like not that much. It kind of blends in, but now you can see the difference between the road and the sand.</p> <p>Researcher Yes, that's exciting. What else do you need to look at? Is there anything that you've always wanted to look at but...</p> <p>Child-participant 1 I can't think of anything right now.</p>	<p>Positive effect on psycho-social functioning</p>
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<p>Researcher So, which... do you like the outdoor glasses for outside?</p> <p>Child-participant 1 Yes, they make everything like trees and floors and buildings pop. So, I can see buildings and stuff like that. So, I can distinguish stuff, but then for inside I'm not sure.</p> <p>Researcher Yes, I don't...</p> <p>Child-participant 1 It just doesn't...</p> <p>Researcher Let's have a look.</p> <p>Child-participant 1 It just looks dark.</p> <p>Researcher Yes, so it's obviously the lens tint, so I think, yes, when you're inside, put your indoor ones on.</p> <p>Child-participant 1 Yes, it just looks dark.</p> <p>Researcher There you go. You can see your colours better now.</p> <p>Child-participant 1 Your dress looks so much more pink the ones before (talking to little sister). Here it looks like peach again but now I can see it's pink.</p> <p>Researcher Oh, so you can see it's pink now.</p> <p>Child-participant 1 This is pink, and I can see that's pink. I always thought it was a peach dress.</p> <p>Researcher Oh, wow.</p> <p>Child-participant 1 I never... She even said it's pink and I said no, it's peach. And I had a debate about baskets and [inaudible] stuff in and she said hers was pink and I said no its grey, and now like it's pink.</p>	<p>Positive effect of glasses</p> <p>Positive effect of glasses</p> <p>Positive effect of glasses</p> <p>Positive effect of glasses</p> <p>Negative effect on daily living</p>
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<p>Researcher So, you can see the tone a bit differently?</p> <p>Child-participant 1 Yes.</p> <p>Researcher Oh my gosh. Right. Now, basically, so I know this whole process has been drawn out, it's taken a while, but from this year what's going to be happening from about February is I'm going to be seeing you every two weeks for probably about two months. So, February and march I'll see you every two weeks online. And then hopefully I'll be able to come down to XXXX, or I will, when I come visit my parents and then I'll come see you in-person as well, okay? Then we'll take like a two-week break. Then I'll see you again for another little bit. And we're going to be doing stuff like looking at what support do you want, skills that you want to learn. Things that can help you cope better, things that can help you just really do well in life and help you feel better. Okay? So, what we're doing now and what we did with this stuff is this was an initial thing... You can look as much as you want. (child-participant 1 looking around with the glasses). Is an initial thing just to see... What colour are my nails?</p> <p>Child-participant 1 They're like pale... They're like a pink.</p> <p>Researcher Yes.</p> <p>Child-participant 1 They look so pale like just a peach almost. Now they look like more pink.</p> <p>Researcher Can you see the difference when it's on my green top?</p> <p>Child-participant 1 Joh, it just makes it so much darker.</p> <p>Researcher So, you can see...</p> <p>Child-participant 1 I can see it's green now. It looks like, I'm not sure, but now it looks proper green.</p> <p>Researcher That's exciting.</p>	<p>Positive effect of glasses</p> <p>Positive effect of glasses</p>
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<p>Child-participant 1 It makes everything that was pale, brighter, like distinguishes it better.</p> <p>Researcher Okay, that's amazing. Yay, so we're starting 2022 on an exciting note.</p> <p>Child-participant 1 Yes.</p> <p>Researcher Grade 7 on a cool note. You're going to be the coolest grade 7 there, I'm pretty sure. Right, so these are just questions now. So, one of the other boys didn't want to write on here. So, if you really want me to, I can do the writing, and you can just chat. So, what would you prefer? Do you want me to write?</p> <p>Child-participant 1 I'm not sure.</p> <p>Researcher What would you prefer?</p> <p>Child-participant 1 Maybe I'd prefer you to write.</p> <p>Researcher Okay, so you can just talk to me. So, we're going to start with this one. The reason these are so big is because in a perfect world we would have met with all the boys in person. You would have all sat like around the table and you all would have like chatted about your answers, written stuff. Yes, but now we just have to improvise. Okay, so I'm writing for you. Okay, so my first question to you is what is colour vision deficiency or colour blindness? What do you define it as?</p> <p>Child-participant 1 I define it as not being able to see colours as vibrant or like as distinguished as other people.</p> <p>Researcher Okay, you just have to wait because I have to write it. My writing is not fast. And I need to write so I can read this later. Not being able to see colours as vibrantly or distinguished as other people.</p> <p>Child-participant 1 Yes.</p>	<p>Positive effect of glasses</p>
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<p>Researcher What else?</p> <p>Child-participant 1 And also, the... I want to say like crossing over, interception of the two of your colour cones [unclear].</p> <p>Researcher Okay, so not able to see... How did you say it? The interception of colours.</p> <p>Child-participant 1 Yes.</p> <p>Researcher Because of your cones, what did you say?</p> <p>Child-participant 1 Because two of your cones intercept and don't let the light through as well, something like that.</p> <p>Researcher Yes, that's brilliant. Great. What did you say let the light through?</p> <p>Child-participant 1 Yes.</p> <p>Researcher Boom. Okay, so now you just need to write these ones because I want you to just think carefully. So, what are the disadvantages of having it? So, what are the bad things that you perceive? What isn't great about having it?</p> <p>Child-participant 1 I can't really see things that other people see. So, they see something and then I can't see it. Sometimes you feel like left out, but I don't really feel like that. It just feels like I wish I could see what they see.</p> <p>Researcher Okay.</p> <p>Child-participant 1 Also, sometimes people tease you. Some people don't. People don't tend to really do it, but people used to do it a bit like tease you about it or like make you feel bad about it.</p>	<p>Negative effect on psycho-social functioning</p> <p>Negative effect on psycho-social functioning</p>
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<p>Researcher Okay. So sometimes people tease you. And make you feel bad about it.</p> <p>Child-participant 1 Yes.</p> <p>Researcher Okay.</p> <p>Child-participant 1 I can't really think of anything else.</p> <p>Researcher Okay. So, I can't see what other people see. You said I sometimes feel left out.</p> <p>Child-participant 1 Sometimes people tease you and make you feel bad about it.</p> <p>Researcher Okay, so that covers that. Okay, what are the advantages?</p> <p>Child-participant 1 I am special.</p> <p>Researcher You are special.</p> <p>Child-participant 1 Because not a lot of people have it, so it's rare.</p> <p>Researcher Yes, you are rare, hey.</p> <p>Child-participant 1 Yes, and it doesn't affect me. It doesn't... I don't let it affect me.</p> <p>Researcher Okay, so you've made a choice to not...</p> <p>Child-participant 1 Yes.</p> <p>Researcher Let it negatively affect you. So how... Like now you say I don't, you don't let it, you choose not to let it negatively affect you.</p>	<p>Negative effect on psycho-social functioning</p> <p>Positive mindset</p> <p>Positive mindset</p>
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<p>Child-participant 1 Yes.</p> <p>Researcher So, what kind of things do you do, what...</p> <p>Child-participant 1 I just live life. I don't think about it in the back of my head even, I just live life. If I can't see something, I'm like oh, I can't see that. People are like look at this and then I'm like I can't even see a difference or sometimes I ask people to help me. Sometimes I'd be using khokis or something and I'd be like oh, I can't really see the difference here, please help me. Then some people help me. Some people want to know what I see just to like, you know, learn about it. Especially my friends they're curious and they want to know what I see and what's different.</p> <p>Researcher How you see the world.</p> <p>Child-participant 1 Yes.</p> <p>Researcher Okay. So, I like that. So, when you... You don't let it affect you and you also ask for help.</p> <p>Child-participant 1 Yes.</p> <p>Researcher You're able to ask people for help see and you're not afraid to be yourself. Yes, that's awesome. Have your parents been very like with it? I know because your dad has it. So, are your parents like have they been the ones to make you feel very comfortable with it or do you just...</p> <p>Child-participant 1 They... Yes, back when I was younger grades, like before grade 3 or whatever because I... They tried to help me, I think, with the colours because the teacher was like does, he not know his colours or whatever? They said oh, I was colour blind. And my father didn't like... I got tested so young and my father never knew until when my parents were married, so they never had the opportunity to distinguish.</p> <p>Researcher Okay, so they attitude helped you as well.</p>	<p>Positive mindset</p> <p>Support received</p> <p>Lack of awareness of CVD</p>
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<p>Child-participant 1 Yes.</p> <p>Researcher Okay. That's awesome. Anything else you want to add to this poster?</p> <p>Child-participant 1 No.</p> <p>Researcher Good. Okay, the next one. So, this one is about the support. What support do you get at with your friends, at home, at school? Do you need more? Is it bad support? Do you not get enough support? Any changes that you would like? And then what good support do you get? And then also on a scale out of one to ten, I want you to rate. Like if you think about the best support, like the optimal support that you would want, that's ten. Number one being like you don't get any support and you feel like you really struggle. What do you feel like with your friends? Do they really help you? Do they not?</p> <p>Child-participant 1 They really help me.</p> <p>Researcher Do they?</p> <p>Child-participant 1 They don't say anything about it because they know and if some... Most of them have known me for so long. And then some people they like only find it out so late. They're like oh, you're colour blind. And I'm like oh, did you never know that? And then yes, people don't really say anything, but some people are just generally curious about it.</p> <p>Researcher Okay, so your friends are very supportive.</p> <p>Child-participant 1 Yes.</p> <p>Researcher Okay, that's great.</p> <p>Child-participant 1 And they don't treat me different to anybody else.</p> <p>Researcher Do you want me to write? You talk.</p>	<p>Support from friends</p>
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<p>Researcher Okay, so that's at school.</p> <p>Child-participant 1 Yes.</p> <p>Researcher So how would you say it? So, teachers...</p> <p>Child-participant 1 Teachers support me. They don't [unclear].</p> <p>Researcher So, teachers support me. So, like he, he actually changed...</p> <p>Child-participant 1 Yes, even he came to help me because he knew about it.</p> <p>Researcher Okay.</p> <p>Child-participant 1 And he could tell that I couldn't see it because he knew it was red and green.</p> <p>Researcher So, he changed the way he teaches to suit you.</p> <p>Child-participant 1 Yes, he came to my desk to actually help me and tell me what's what.</p> <p>Researcher Okay.</p> <p>Child-participant 1 Because he drew it in red on a green board and I couldn't see it. And he knew that he drew it like that because... And then he came to my desk.</p> <p>Researcher Okay, so he changed the diagram so that you could see it better.</p> <p>Child-participant 1 No, no, no. He came to my desk.</p> <p>Researcher Oh, so did he draw it for you again?</p>	<p>Support from teachers</p> <p>Support from teacher</p> <p>Negative effect on school performance</p> <p>Accommodation in school by teacher</p> <p>Support from teacher</p>
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<p>Child-participant 1 He drew it on the board and then it was on the page, so then he just came to my desk and drew lines and told me what's what.</p> <p>Researcher Okay. So, teachers support me. My teacher came to help me. Oh no, no I've... And he changed... So, I'll rub that out. What did he do? And he...</p> <p>Child-participant 1 Helped me to understand. Yes, so he drew the diagram on the board and then I couldn't see that, so he came to my desk and then we had the diagram on our page, so he just told me what he drew on the board.</p> <p>Researcher Okay. When you think of teachers, what other good support do they give you specifically for your colour blindness?</p> <p>Child-participant 1 I don't... It doesn't really affect me sometimes. So, I don't really have anything else for that.</p> <p>Researcher Okay. Do teachers... So, like now, this teacher, he knows you couldn't see it, so he came to you and helped you.</p> <p>Child-participant 1 Yes.</p> <p>Researcher Do other teachers do that as well like if they know or like...</p>	<p>Support from teacher</p> <p>Support from teacher</p>
<p>Child-participant 1 Some teachers know. I don't think all teachers know about it, but it does... Most of the stuff they do, doesn't affect it at all, so i...</p> <p>Researcher Okay, we're going to do your... Hold on. Right more support. Is there anything you wish your friends would do more? Is there more things that you would like?</p> <p>Child-participant 1 No.</p> <p>Researcher Any changes to the support that they give you?</p>	<p>Lack of awareness by teachers</p>

<p>Child-participant 1 No, they give me enough support. And I'm grateful that they don't tease me about it or make fun of me and that they actually support me about it.</p> <p>Researcher Okay.</p> <p>Child-participant 1 And are curious.</p> <p>Researcher So, I think it's pretty cool that they're curious because it shows that they're interested to see how, to understand how you see the world.</p> <p>Child-participant 1 Yes. One thing I'm going to look at is my clothes, to see the difference.</p> <p>Researcher That doesn't match?</p> <p>Child-participant 1 Yes, to see if I...</p> <p>Researcher We'll be done soon. If I can just write faster. So, what would you give then out of ten?</p>	<p>Support from school</p>
<p>Child-participant 1 Ten.</p> <p>Researcher Okay, so they get a ten. Right, teachers. Is there stuff that's like more support that you would like at school?</p> <p>Child-participant 1 For more teachers to know about it maybe because I don't think all the teachers know, but some of, but most of their lessons don't affect me.</p> <p>Researcher Okay.</p>	<p>Support from friends</p>
<p>Child-participant 1 And generally, my friends will help me. If I need help, I'll ask the person next to me, behind me, whoever, and they're always willing to help.</p>	<p>Support from friends</p>

<p>Researcher Okay, so it's great you've got friends that will help, but would it also be good if your teachers just [overtalking] so they could help?</p> <p>Child-participant 1 Yes, if more teachers knew about it, because I don't think all of them know.</p> <p>Researcher So, it would be good if more teachers knew. And if they knew how to help you.</p> <p>Child-participant 1 Yes.</p> <p>Researcher Anything else?</p> <p>Child-participant 1 No.</p> <p>Researcher Right, what score would you give your teachers?</p> <p>Child-participant 1 Eight.</p> <p>Researcher An eight. So is the only thing wrong with the teachers is you just wish more of them knew so they...</p> <p>Child-participant 1 And how to help me.</p> <p>Researcher Okay.</p> <p>Child-participant 1 Because I mean, I don't... Nobody else in my class, has it. There's not anybody else I know of that has it.</p> <p>Researcher Okay.</p> <p>Child-participant 1 So, I'm pretty much like almost the only one. I'm not the only one. I know there's probably more people but [overtalking]...</p> <p>Researcher There's no one in you school that you know of.</p>	<p>Limited understanding by teachers</p> <p>Support from school Teachers need to be aware</p> <p>Only one with CVD</p>
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<p>Researcher You'll put your point across, that's what you're saying?</p> <p>Child-participant 1 Yes.</p> <p>Researcher Why do you do that?</p> <p>Child-participant 1 Just because I just enjoy doing it and I hope that at least I'm right at least once. I just hope that I can be right. And then I go ask my mother and then I'd ask my father because I know we both have colour blindness, so I'd say... I'd ask him like isn't this this? And then he'll be like... And then my mother will also like... I don't know she'll also say... But I generally go my father to ask him like hey, isn't this this?</p> <p>Researcher He'll agree with you.</p> <p>Child-participant 1 Like wouldn't you agree with me on this?</p> <p>Researcher Okay, so you find a friend in your dad.</p> <p>Child-participant 1 Yes. Like partners in crime.</p> <p>Researcher Yes. Okay, right, anything you wish they would do more?</p> <p>Child-participant 1 No.</p> <p>Researcher So, you happy with the support you get?</p> <p>Child-participant 1 Yes.</p> <p>Researcher Can I just quickly answer this? Sorry, my brother's trying to phone me.</p> <p>Child-participant 1 Even with like this top, it brings out the blue more.</p>	<p>Support from someone with CVD</p> <p>Support from someone with CVD</p>
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<p>Researcher Does it? Does it look bluer?</p> <p>Child-participant 1 Yes. All the things that I think were more dim are actually...</p> <p>Researcher Brighter.</p> <p>Child-participant 1 Yes.</p> <p>Researcher So, you've been walking around this whole time with a neon wardrobe.</p> <p>Child-participant 1 And there's also this cool feature for [unclear] called colour correction, which... I don't know what it does, but it just switches the colours completely and I'd confused it with what it actually does.</p> <p>Researcher Okay, and now when you...</p> <p>Child-participant 1 I don't know. I just put it on and then it just changes the whole...</p> <p>Researcher Colour.</p> <p>Child-participant 1 Yes, just changes everything that's red to almost black.</p> <p>Researcher Let's see?</p> <p>Child-participant 1 Just changed everything to black.</p> <p>Researcher Oh.</p> <p>Child-participant 1 This is normally green.</p> <p>Researcher So, do you know what this looks like to me? So, I have pictures of what colour blind people see where it's like browns and greens. This is what it looks like. It looks like they've made the tones more, I don't know, truer to what you see. They're quite dull.</p>	<p>Support from assistive devices</p>
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<p>Child-participant 1 Oh, so it makes it like...</p> <p>Researcher Yes, so like those colours to me are yellow and brown.</p> <p>Child-participant 1 Oh, it looks normal to me. Except for that looks black. All the red looks too black to me, but...</p> <p>Researcher Well, now maybe you can change it back.</p> <p>Child-participant 1 Yes.</p> <p>Researcher To see how that look with your glasses on.</p> <p>Child-participant 1 But I never actually ever put it back on. I put it on once and I said this is too weird, so I've never ever put it on again.</p> <p>Researcher Never put it back. I have a question for you, so when you, like you say you always want to use... you argue with your sister, so you can be right. Do you get frustrated when people are always telling you what colours are?</p> <p>Child-participant 1 No. I don't, just because sometimes I want people to... I want to know what it is and then sometimes I'll say this and then people say no, it's just. I'd be like oh, okay. Because I know that at the end of the day, they have normal colour vision and I don't, so I know that they're right.</p> <p>Researcher Okay, so it doesn't make you upset or like annoyed?</p> <p>Child-participant 1 No.</p> <p>Researcher Okay. Out of ten, what do you think your family will be?</p> <p>Child-participant 1 Ten.</p>	<p>Negative effect on daily living</p> <p>Support from family</p>
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<p>Researcher Ten. Great. Okay, one more to go. Two... Oh, where's my other one? I had one... Oh. I'll have to quickly... The other one that I... Oh, it's [inaudible]. What's this? No, that was a letter I wrote you that just said about the glasses. Okay, we'll do the other one on this piece of paper. Right, last but not second least. Okay, our next poster. So, this is just how does your colour vision deficiency, colour blindness, influence you socially with friends, in my everyday life, at school and emotionally? So, when you think about your colour, and you're going to write this one, when you think about your colour blindness, how does it affect you with your friends?</p> <p>Child-participant 1 I can't really see everything that they see, so I struggle sometimes to make out what's what.</p> <p>Researcher Okay. So, yes, I can't... Oh, that's a very good sentence. Do you want to move it closer to you?</p> <p>Child-participant 1 It can be kind of annoying.</p> <p>Researcher What can be annoying?</p> <p>Child-participant 1 Like not being able to see everything. So, it's just harder to see everything.</p> <p>Researcher That's frustrating.</p> <p>Child-participant 1 Sometimes it just makes you feel like oh I can't see this or... It's hard to explain, but sometimes it's just like I kind of get annoyed and I can't see this and like I wish I could see this.</p> <p>Researcher Write that over here by emotionally. How does it make you feel emotionally? How does it influence you emotionally?</p> <p>Child-participant 1 I generally always just feel good about it, because I'm rare, not a lot of people have it, so I feel kind of special about it, but then only sometimes it's just like emotionally...</p> <p>Researcher Every now and then.</p>	<p>Negative effect on psycho-social functioning</p> <p>Focusing on uniqueness Negative effect on psycho-social functioning</p>
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Child-participant 1 You just emotionally just get annoyed.	Negative effect on psycho-social functioning
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<b>Event:</b>	Semi-structured interview with parent-participant 4
<b>Place:</b>	Zoom
<b>Date</b>	8 September 2022
<b>Speakers</b>	Researcher Co-researcher Parent-participant 4
<p>Researcher: Hi Participant 4, thank you for joining us this afternoon. I'd like to introduce you to my Co-researcher she is the master's student working on the study with me and helped to co-develop the parent guidance intervention.</p> <p>Co-researcher: Hi Participant 4, its lovely to meet you!</p> <p>Participant 4: Hello there.</p> <p>Researcher: Okay Co-researcher, you can start.</p> <p>Co-researcher: Thank you, Tegan. So, Participant 4 thank you for being available for this interview. We really appreciate your time and input. As indicated in the invitation, the purpose of this discussion is for you to share your experiences about the parent guidance intervention with us. We will really appreciate your open and honest feedback, for us to be able to improve the intervention for future use. As with the previous sessions we conducted, the information shared here will be dealt with in a confidential and anonymous way, and you may withdraw from the interview at any time if you wish to do so.</p> <p>Parent-participant 4: Okay great.</p> <p>Co-researcher: Just before we start, are you comfortable with the discussion being recorded?</p> <p>Parent-participant 4: Yes, sure go for it.</p> <p>Co-researcher: Thank you. So, over the past three months, we have been sharing ideas twice per week via WhatsApp Group on how you as a parent may support your child. We focused on holistic child development and attempted to provide guidelines in terms of various areas or functioning. So, on the next slide, you will see an overview of all the topics that we have covered over the 14-week period.</p>	

<p>Parent-participant 4: Yes.</p> <p>Co-researcher: So, my first question for you this afternoon is can you please start by sharing your general experiences and ideas about the intervention you participated in?</p> <p>Parent-participant 4: OK, you know what I found it very interesting. It was really interesting. I enjoyed the videos and the information as well. My child is 13 at the moment, so he was diagnosed when he was 6. So, we really walked a long way with him already and with his teachers, and you know what, if I had this information 13 years or 6 years ago in the past, it would have helped me a lot to deal with the teachers and to deal with everything. So, it really helped me.</p> <p>(SILENCE)</p> <p>Parent-participant 4: Umm, some of the stuff we did do on our own already, but I think other parents would benefit more, because of the work I am in I am already more focused on focusing on yourself, self-esteem and resilience and everything of the child, but especially other people and other parents would definitely benefit from this. I did, I really did. My youngest one is 7 and is also colour blind. So, I can use this with him now. So, I used it for both boys.</p> <p>Researcher: That's amazing.</p> <p>Parent-participant 4: Yes.</p> <p>Co-researcher: That's fantastic to hear P4. I think with the other interviews we did as well, a few of the parents did mention that it would have been great to have this kind of intervention a lot earlier. It would have assisted so much more. So hopefully we can do that for future parents.</p> <p>Parent-participant 4: Yes, definitely.</p> <p>Co-researcher: OK, great thank you for that positive feedback. And then just to follow up question on that, to what extent, did you gain any new knowledge and ideas from the intervention?</p>	<p>Positive effect of the holistic intervention</p> <p>Role players positively affected by the holistic intervention</p> <p>Role players positively affected by the holistic intervention</p>
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<p>Researcher: Right.</p> <p>Parent-participant 4: Yeah, that was great, but how it works is really what our parents need to understand, to be able to explain it to the kids, but to explain it to the teachers as well, I think that is really important.</p> <p>Parent-participant 4: And I had this full interest like I had an incident with my child this afternoon. He was crying a lot because he had an art project that he had to do at school and there were colours involved, and he used the wrong colours. So, I have to say it was a beautiful project he created, and I was like, wow, look what you did it's amazing, but he got 50% and he got zero for the colours part. So, there's a new teacher that is only there for this term, in the other teachers place and she doesn't know he's colour blind.</p> <p>Parent-participant 4: So then we had this whole self-image conversation this afternoon just before I came here, and we spoke about resilience as well. I told him okay what are we going to do now? How do you want me to deal with this? Or are you going to go to the teacher and explain to her this is what happened. So, he's in a space that he said he is going to on Monday go to talk about this with the teacher and he's going to explain this to her. So, it's really empowered him to understand this is where I come from, this is who I am and this is how I'm going to deal with this instead of just crying and moping he has a plan in mind, in place to deal with this, and this is really what I am saying, this had helped him a lot.</p> <p>Researcher: Amazing. I'm so happy to hear that because the thing is like, you cannot expect him to do an art project the same as a child that has typical vision.</p> <p>Parent-participant 4: No, no, definitely not.</p> <p>Researcher: So, one of the things I actually wanted to tell you and I'll tell you now quickly. So, one of the other mums actually informed us that, so you can get a concession for colour blindness in the IEB, and I think it's the same now in the government schools and this boy's concession was granted last week.</p> <p>Parent-participant 4: Wow, okay.</p>	<p>Value of being informed for children living with CVD</p> <p>Becoming confident to voice needs and experiences</p>
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Researcher:

So, I wanted to tell you so that you can possibly see if you can apply for it for your child as well and now he is in junior school and when he goes to high school and the teachers have to make sure everything is appropriate even the projects everything, the colour concession applies, and he cannot be marked down for it.

Parent-participant 4:

That will help a lot.

Researcher:

Yes.

Parent-participant 4:

Do I apply at the department or where do I apply then?

Researcher:

You would apply through the department, but as far as I know, the teachers should know, there should be someone at the school who will do it or who will assist you in doing it.

Parent-participant 4:

Okay. I'll just go and find out and then we'll do that.

Researcher:

But that was also like, because we had an interview with the parent last week, and she was like oh yes did you know this got approved? And I was like, wow that's amazing. So, we've actually been getting some really cool information from the interviews.

Parent-participant 4:

Yes, that's wonderful.

Co-researcher:

Yes, that really is great. It is nice to know that colour vision deficiency is getting acknowledged and more awareness is available out there.

Researcher:

Yes.

Parent-participant 4:

Definitely.

Co-researcher:

Okay so, the next question is to what extent did you apply the knowledge that you got in the 14-week intervention?

<p>Parent-participant 4: Like I said, I've spoken to my child, but not as much because we did some of it already, but I applied it to my little one. I know he wasn't a part of this whole programme, but I spoke to him about it a lot because he had a very low self-esteem and he's repeating Grade X at the moment because of emotional issues.</p> <p>Parent-participant 4: Two years ago, he couldn't distinguish between colours and so his teacher told him he's stupid and he believed that and then we tested him, and we saw that there is something wrong and by then the damage was done already. So, I could use this knowledge to help him. My older son required quite a bit less because we did the whole road with him previously, but with the little one it really helped a lot. It really helped self-image wise to help him to be a voice for himself, to go to the teacher and say this is my problem I am having or to put his hand up and say I can't see the colours could anyone please help me. So, with this process, the teacher immediately gave him a colour buddy, so he has his own colour buddy, and he feels very proud about it. (PAUSE)</p> <p>Parent-participant 4: He is looking at his challenge in a very different way than he did previously and that is the stuff that I used from the group.</p> <p>Co-researcher: That's amazing.</p> <p>Researcher: So, he has a colour buddy that will then help him figure out what colour things are?</p> <p>Parent-participant 4: I beg your pardon.</p> <p>Researcher: His colour buddy, is that like a friend who will help him. He'll go and say what colour is this?</p> <p>Parent-participant 4: Yes, and it's, it's awesome. He has got his own colour buddy and he's very proud of it and if he struggles and the teacher isn't nearby to help, he will say I need a red colour pencil and then the colour buddy will say that is a red, so that is how it works.</p> <p>Researcher: That so incredible.</p>	<p>Other children with CVD positively affected by the holistic intervention</p> <p>Limited understanding of CVD by teachers</p> <p>Positive effect on psycho-social functioning</p> <p>Value of being informed for teachers and peers</p> <p>Power of a changed mindset</p> <p><i>Relying on teacher and peer support at school</i></p>
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<p>Co-researcher: Wow, that is fantastic.</p> <p>Parent-participant 4: Yes, and empowering him and empowering for his friends. Well, I think it's such a beautiful thing to have them involved it's amazing so they're not laughing and teasing him anymore. They're helping with a whole focus shift of everything.</p> <p>Researcher: Yes, because kids are told that they must get on with life. We need to figure out how to accommodate them and I think a colour buddy is such a beautiful resource.</p> <p>Parent-participant 4: Yes, yes and it really helps him. It really helps a lot.</p> <p>Parent-participant 4: I know my child, we also spoke a lot about it, especially after the videos and stuff and his friends also now know he is colour blind. So, he explained to them how it works and what happens. So, everyone is like we are going to help you. How do you see this colour this is how we see this colour? So, this created an openness about it that was not there before. It is really an openness between the friends, and I see it with my younger one as well.</p> <p>Researcher: So, it's just what I think I am hearing from you, it's almost like once awareness is built, once there is awareness, it's almost like that compassion and that acceptance and respect is then given to these children.</p> <p>Parent-participant 4: Absolutely and just for example, again the videos and the information that you put on the group, I took it to the little one's teacher and explained to her that we need to seat him at a place where there is more sufficient light and stuff like that. She immediately moved him and so she is much more aware of the need to accommodate these children in a certain way in order for them to be part of the class. So, it really helped.</p> <p>Researcher: Well, that is amazing. I am so happy that you were able to share the information and that the teachers now are also becoming more informed that way and you know it's you, you are creating a better environment for future children with colour blindness.</p>	<p>Positive effect of a holistic intervention on children's coping with CVD Peers positively affected by the holistic intervention</p> <p>Positive effect of a holistic intervention on children's coping with CVD Value of being informed Becoming confident to voice needs and experiences</p> <p>Value of being informed for parents and significant others Value of being informed for teachers and peers</p>
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<p>Co-researcher: That's a very important aspect as well.</p> <p>Parent-participant 4: So, if I can go back to what happened to my little one 2 years ago and the teacher told him he is stupid because he can't distinguish between two colours and now there is this whole mind shift, like this is your disability well kind of a disability and we're going to accommodate you in this way instead of saying you are stupid. The thing is the damage is done to that child two years ago and the way that is empowered him now is two different scenarios at the moment.</p> <p>Researcher: I just find it so, like, insane how you know people just don't really understand it. So, they don't put a value on how difficult life can be for a child with colour blindness. Once you make them aware, they're like, oh of course this child struggles. Yeah, it's quite crazy.</p> <p>Parent-participant 4: Yes, yes, yes. It's like this teacher, so this afternoon, my child was really upset so I told him that what his teacher is expecting him to get good marks in an art project but thing is he can't see the colours clearly and it's like expecting me or expecting her to run the comrades with only one leg, it's not possible. So I've explained it to him like that and said this is how your world looks like, this is how it should look so she doesn't see the way that you do and maybe you should go and talk to and explain to her, go tell the teacher it's going to be difficult for you to run the comrades if you only have one leg or if you're in a wheelchair and that is how I felt when I did bad in this project, I did my best. I really saw he did his best and he was so proud of his work but then it took one mark to just tear everything down and so when I told him go to the teacher and speak to her and explain to her how you felt like, tell her this is my best, but this is my best with my disability. This is my best and it is quite positive at the moment, so before this whole intervention he wouldn't have even told me. He would just be like just leave it I am going to take the 50% and that is that, but now he is more like I am going to tell her.</p> <p>Parent-participant 4: He has much more self-confidence.</p> <p>Researcher: I think that's amazing that he's now actually able to come out from under a mask and seeing that this isn't right because I think that's one of the things that we've also noticed, especially me working with the boys. I've noticed that they all like, oh, it's not a problem. It's just how it is, and I must just deal with it myself or like I'm just over it and I think that you are encouraging them to talk is so important for them to acknowledged that this is something that they struggle with. It is a</p>	<p>Limited awareness of CVD by teachers</p> <p>Power of a changed mindset</p> <p>Power of a changed mindset</p> <p>Positive effect on psycho-social functioning</p> <p>Positive effect on psycho-social functioning</p>
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deficit, it's a barrier to them and they should speak up. They have a right to be accommodated and it's not something that can be brushed away. It's just as important as missing a leg and I can't run the comrades because he cannot do things the same way that others can and I think it's amazing that you are empowered to, you know, with all this information, with information you've given him, all the information that he's been given that he's actually like, no, I will go, and I have the right to, you know, be treated according to what I've struggled with.

Parent-participant 4:

Yes, because he told me also because he was crying, and he said this is unfair and this is the first time that he was realising this is unfair. All the other times he was like this is how it works, not anymore, he was like so it's unfair and we're going to do something about it.

Researcher:

Well, I'm very glad because one of the things I literally say all the time to these boys and I think these boys are getting very tired of me saying this, but I keep telling them that they have the right to see the world as they see it and no one should judge them or tell them that it's wrong and his way of seeing the world is not wrong and it he shouldn't be treated like it is. So, I'm very glad about that because of the information I've given them, the information you've given him that this whole intervention has given him. He now feels empowered by it and strong enough to stand up for himself and I'm so happy about that.

Parent-participant 4:

Definitely and honestly I was like so furious and I wanted to phone the teacher immediately and tell her what I think about this and he was just like, you know, let's calm down mum, I'll go and speak to her. So yes, he really impressed me.

Researcher:

I'm impressed too.

Co-researcher:

That's absolutely amazing.

Co-researcher:

Okay, so them in terms of how it benefited the kids, was there anything that you observed? I know we spoke about building their confidence. They are more open to speaking up and getting the help they need as well as their resilience also being bold, but was there anything else in the intervention that you observe that you know as a positive experience for them?

Becoming confident to voice needs and experiences

Becoming confident to voice needs and experiences

<p>Parent-participant 4: What I saw was, he was much more open about the fact that he has a barrier so in the past, he would have had it and just be over it. Now it's like, this is who I am, and this is how I see things so, he would come and explain to us how he sees the world.</p> <p>Parent-participant 4: The glasses helped him a lot, but it was a bit too big, so sometimes it fell off, it was much more of a nuisance thing I say, but he was quite focused on the glasses because he said he could see the colours much more clearly and distinguished from other colours than before the glasses, so that really helped. It really helped a lot.</p> <p>Co-researcher: Alright.</p> <p>Researcher: Just a comment on the glasses. If you take them to an optometrist, they'll be able to bend the frame with heat, so it'll fit on him better.</p> <p>Parent-participant 4: Can I do that?</p> <p>Researcher: Yes, you'll just have to go to them, and they'll just readjust them as he grows and bend it out slightly as he grows.</p> <p>Parent-participant 4: OK, I'll do that thank you.</p> <p>Co-researcher: OK, great and then on the other side of things, was there anything in the intervention that you felt wasn't really helpful that we maybe could have left out of the intervention?</p> <p>Parent-participant 4: No, not really.</p> <p>(PAUSE)</p> <p>Parent-participant 4: As I said, some of the information I did know because of my profession, so we use it a lot, self-image and self-resilience and everything, but I think for other parents that would be quite helpful. So no, I really think everything was helpful and I also feel you can't get too much information and because what doesn't help me will help another mum or dad. All of us, we on the same boat, but our ocean is different. So, we all see things differently and experience things</p>	<p>Becoming confident to voice needs and experiences</p> <p>Supportive devices</p> <p>The holistic intervention positively affected parents and significant others of children with CVD</p>
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differently but what will help me won't definitely help the next one but to me it was helpful, it was really helpful.

Co-researcher:

OK, great. Thank you for that, that was positive and you put it in such a lovely way.

Co-researcher:

And then in terms of any topics that maybe we could have added to the intervention? To provide more information on.

Parent-participant 4:

No, not really. I think you've covered everything we've experienced with what you've covered, really everything. As I said, the way you started with this is how it works and that really explained it more beautifully and the interaction between parents and kids and the teacher. I think everything was covered beautifully. The focus was really on self-image and how does the child cope and build resilience and how does he adapt to this world, and yes, it helped and covered everything.

Co-researcher:

I am happy to hear that, lovely. Thank you for that. So, the next thing is I would like you to share your ideas on the platform we used and the length, format and extent of the parent guidance intervention. So how suitable did you find the platform of WhatsApp?

Parent-participant 4:

Very suitable. We only had one problem, we were in the Kruger National Park for three weeks during the July holidays. I couldn't see the videos there and because we didn't have any suitable signal and stuff so I could read the messages, but the videos were gone. I couldn't see the videos and that was all. So maybe in future just maybe find out from the parents if everyone was able to see it, because we didn't have any internet there, we were camping, so afterwards some of the videos I just couldn't find it again.

Parent-participant 4:

Umm, but WhatsApp worked for me. It really worked for me.

Co-researcher:

Okay, thank you for that participant 4. I think one of the other parents also mentioned that in terms of the videos, when they did go back to look at them, they want available and that was something we were not aware of.

Parent-participant 4:

Yes, that's what I was trying to say, they were not available.

Co-researcher:

So that's definitely something we need to consider for the future. So, thank you for that and then in terms of the frequency of the messages, we sent them twice per week on a Monday and Wednesday. How was that for you?

Parent-participant 4:

Yeah, that was fine. It was not a problem.

(PAUSE)

Co-researcher:

Okay, and then in terms of the length of the messages that were sent to you, was it OK, were they able to long or short?

Parent-participant 4:

No, they were fine. I think what helped was we knew when the messages are coming to us in the week. So, you were prepared for that you know, it's not like all of a sudden there's a lot of messages coming through your phone, and you like what's going on, you were prepared for. This is coming, so yes for me there was no problem.

Co-researcher:

Great, and then in terms of the format that we use, so the return and the infographics, was that okay for you?

Parent-participant 4:

Uh, definitely.

Co-researcher:

OK, awesome and in terms of well, we've spoken about the videos, but in terms of the videos and the quotes and stuff that we sent along with the infographics and the information, did you find that nice?

Co-researcher:

You know something that worked well with the intervention.

Parent-participant 4:

Yes, the videos were a challenge because you can't go back to all the videos, but the quotes I enjoyed the quotes a lot, so it was like an empowering quote. So yes, I enjoyed that.

Co-researcher:

I'm glad you liked the quotes.

Parent-participant 4:

Yes.

Co-researcher:

Alright then we just have a few more questions before we done with this interview. So, I'm in terms of taking the intervention forward in your view, which of the contents should be shared with the children's teachers?

Parent-participant 4:

I think that the content that they can use in the classroom, so for them to understand how it works, maybe, yes, in an easy way, in the most understandable way on how it works and how to accommodate these children in the classroom. I think that's very important and the other thing that I feel maybe we need is for the teachers to know how to identify a child that is colourblind, because I think there's a lot of children sitting in the classes, but they don't know that the child is colour blind. Maybe to look out for signs or just to empower the teachers you know, that's my thought, yes.

Co-researcher:

Okay, great. I think that's also maybe a topic that we didn't really cover so much in the intervention, so maybe that's something we can also add in.

Parent-participant 4:

Yes, exactly.

Co-researcher:

OK, lovely thank you. And then...

Parent-participant 4:

Sorry, just to add in therapy the other day, I saw a boy and he's in grade 7 and he was colouring in and immediately when I saw the drawing, I thought he is colour blind. I can see this, and I've asked him a few questions just small things you know and immediately I realised that this child is colour blind and nobody knows, not even his parents. So, he wasn't tested, but you can see in his drawing because I was aware of that and if the teacher is much more aware, if they look for maybe signs or colours or whatever they use, then they can identify this child earlier, especially preschool.

Co-researcher:

Yes, definitely. Thank you for that, and then finally, how can we improve the parent guidance intervention, maybe what we can do differently in the future?

Parent-participant 4:

I really can't think of anything else because I think you've covered all the topics beautifully.

Value of being informed

<p>Parent-participant 4: As I said, if there were some info that I didn't use, then another parent can use it. So really, I think you have covered everything. Uhm ...and for me as a parent it empowered my child. Just to read everything and listen to everything and as I said, to feel that empowerment, but to know that there's other parents as well that feels the same even though parents didn't respond on the group and the information was such that you know another parent will benefit from this. So, I'm not the only parent in this group and I'm not the only parent like this afternoon struggling with a teacher who got my child into tears. So yeah, I think that helped, maybe if I know it's not possible to have communication with the other parents, but I don't know maybe parents, can share their views on how they experience or if there's a problem, maybe put it on a group and more support from parents to support each other. Umm, I don't know if that makes sense, but uh, and I don't know if that's workable. I think it's very difficult to do that, especially on the WhatsApp group, but umm yeah, maybe a support group for the parents instead of just information.</p> <p>Parent-participant 4: So maybe if like this afternoon, I was furious and if I knew there was another mum on the group experiencing the same, I think I could really connect with that mum and just get a perspective or if another mom reaches out and says to you, this is what happened and you can respond, but it happened to me as well. So yeah, I think maybe I don't know how logistical it is, but I think that is a need for me.</p> <p>Co-researcher: Alright, thank you for that. I think a lot of the parents that we have spoken to have brought up the fact that having a group knowing that there's other parents going through what you're going through and having someone experience something even though you may have not spoken that much really helped in the process.</p> <p>Parent-participant 4: Yes.</p> <p>Researcher: And I think I can see someone to be in contact with is Parent-participant 3A, she was in the group. I am sure she will love to talk and connect. I know she would like to talk to someone about these things as well because she's also had a few incidences with the school.</p> <p>Parent-participant 4: Okay.</p>	<p>Parents and significant others of children with CVD positively affected by the holistic intervention</p> <p>Positive effect on psycho-social functioning</p>
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<p>Researcher: Yes, so her son I mean, he's a year younger than your child. I think like parents are willing, I just think it was like, what another participant said to us, it's just the fact that it's this big WhatsApp group and you don't want to send irritating messages. So, I mean, I think if you had to reach out to her, I think she would be very happy to chat with you about, you know, questions and stuff.</p> <p>Parent-participant 4: Oh yes, definitely I will really do that.</p> <p>Researcher: No, thank you. Honestly, being a part of this in and allowing me to work with your son and just all the information you've given us now is just so incredibly helpful in helping us build awareness and improving our study. We have so many resources after chatting to you, it's like a bank of resources going forward now for people with colour blindness, for teachers, for parents and I think, yeah, this is just such an incredible thing. So, thank you for just helping us with this. I'm getting so excited about everything. I'm, like, so excited about it because I just think it's going to make such a difference.</p> <p>Parent-participant 4: Yeah, definitely.</p> <p>Co-researcher: Umm and then the last question, is there anything else you would like to add that maybe we did not ask, anything you'd like to add before we end of the interview today?</p> <p>Parent-participant 4: No, I'm just really very thankful that my child and I were given the opportunity to participate. Really, it means a lot to him, and it meant a lot to me, and it meant a lot to my younger son as well. I will definitely contact this other lady as well just because we need support. We really need support as parents of these children. It's one thing to get the information, but you need support as well just to tell another parent this is what I'm experiencing today and just to hear, it's okay.</p> <p>Researcher: Yes, just to know its normal.</p> <p>Parent-participant 4: Yes, definitely because It's normal, yeah.</p> <p>Researcher: I think we actually spoke with Participant 3 about it, you know, colour blindness is so discredited as a problem that parents don't feel they</p>	<p>Positive effect on psycho-social functioning Positively affected children with CVD, their parents and siblings</p>
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have the right to go to a school and be like, you know, my child experiences life differently and you need to help him because teachers are like, they just don't care and it makes a parents feel very disempowered in that moment because no one is actually acknowledging that this is a difficulty. It is a disability, a deficit that you know, your child has medically, it's not like you know they are making it up, they've been diagnosed with it, you know, a condition that can't be proven like they have a legitimate condition and just parents feel so disempowered to stand up for their children because, you know, no one actually feels like this is a real thing and I think hopefully one of the things that this study is going to prove to people and to the world hopefully, that this is a legitimate difference, and it needs to be accommodated and these children who do experience distress and they shouldn't, they should be accommodated.

Parent-participant 4:

I think if your child sees you as a mom, is empowered to do something and you know this is legit, you can do something. Then your little one is more empowered.

Researcher:

Well, exactly how you said it to your child, like what do you want me to do about it? You know that sentence made him say I will do something. I think, you know, possibly he is thinking like, I can also do something. You know, it does if he sees you standing up for him, then for him to stand up for himself is not a foreign concept, because I definitely like your child, he's such a sweet young man and he's so like, he does not want to cause a hassle. He doesn't want to make a fuss, but you know he should be allowed to if he wants to and that's the thing.

Parent-participant 4:

Definitely.

Researcher:

Which I think is amazing that you are teaching him and hopefully this intervention and hearing about this intervention is kind of showing everybody that he has just as much rights as somebody without a leg or somebody that's been diagnosed with dyslexia to stand up for himself and defend himself.

Parent-participant 4:

Yes, definitely. So, yes, I think the support is good.

Researcher:

Yes, thank you.

Becoming confident to voice needs and experiences

Co-researcher:

I also just want to say thank you so much for your time and being part of this project as a whole. I mean, it would not be possible without you and all the other parents. So, we really appreciate and thank you so much also for the positive feedback and your honest opinion of the whole intervention. It's really going to help us. I just wanted to let you know that we will be printing out the intervention. So, all the topics will be put in it.

Parent-participant 4:

Oh. Wonderful that's brilliant.

Co-researcher:

Yes. So, we will put everything into a little booklet which we will and then that will be...uhmm maybe Tegan will give it to you, or we will get your address to send it to you but that will be made available to you as soon as it's ready.

Parent-participant 4:

Wonderful. Thank you so much that would help.

Co-researcher:

Awesome, no problem but yes thank you so much for joining us this afternoon and for all the valuable information.

Parent-participant 4:

It's honestly my pleasure.



# APPENDIX L: INFORMATION BOOKLET FOR THE STUDY

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## INFORMATION BOOKLET

This booklet was prepared by Tegan van der Westhuizen as part a PhD (doctoral) study in Educational Psychology at the University of Pretoria on the following topic: “The effect of a holistic intervention for children with colour vision deficiency”. This study is conducted under the supervision of Prof Ronél Ferreira.

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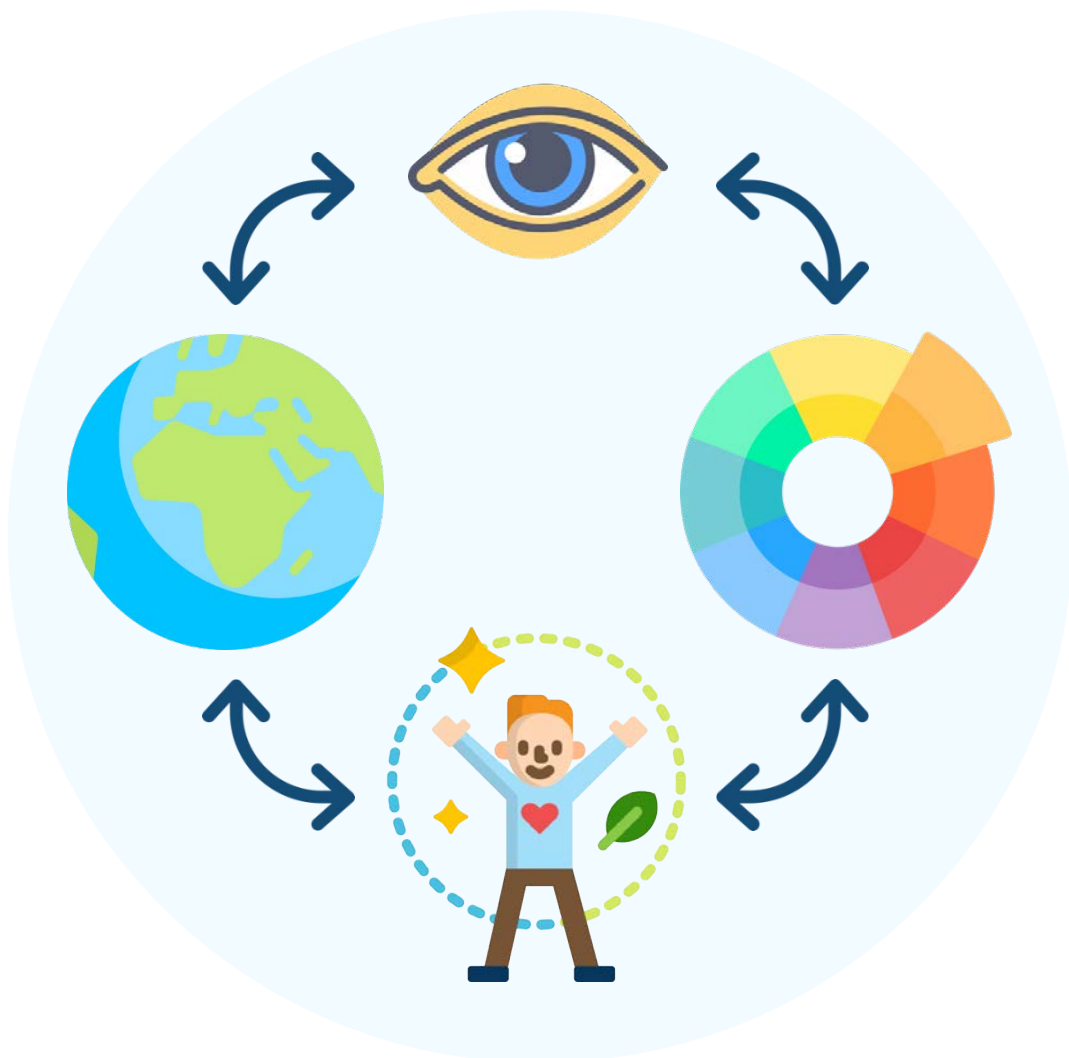
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# Colour vision deficiency

## What is it and what do I need to know?



Intervention guide

Introduction to colour vision deficiency

## What is colour vision deficiency?

- **Colour vision deficiency**, also known as **colour blindness**, influences a person's ability to see colour.
- It is a genetic inherited condition which is linked to the X chromosome, and therefore more likely to affect males. It is estimated that approximately one in 12 (8%) of all males and one in 200 of all females are affected by a colour vision deficiency. This means that statistically, there should be one child with colour vision deficiency in every average sized class of 30 learners.
- Everyone has retinal cones in their eyes which absorb light, of which there are three main types (red, green, and blue). Someone with colour vision deficiency has a defect in one or more of these cones, which causes them to see colour differently.
- The most common forms of colour vision deficiency are protanopia (red-cone deficient) and deuteranopia (green-cone deficient), called *red-green colour vision deficiencies*.
- People with colour vision deficiency see colour differently. Refer to the below pictures for examples.



Typical (normal) vision

Protanopia (red deficient)

Deuteranopia (green deficient)

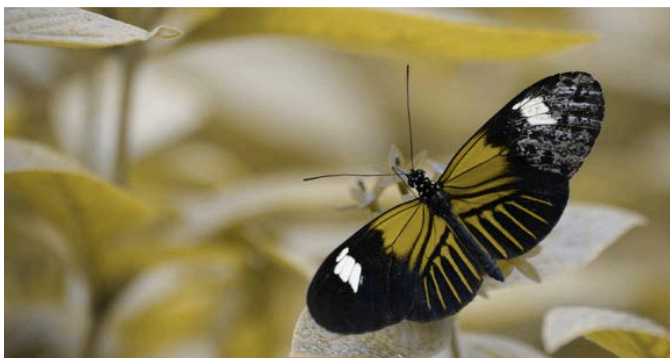
## What do I need to take note of?

- A person with a colour vision deficiency does not see the world the same as a typically sighted person.
- Colour is everywhere, but those with colour vision deficiency's interpretation and view of the world is different to typically sighted people. This needs to be taken into consideration in classroom environments.
- Typically sighted people need to be sensitive to how people with colour vision deficiency view the world. They cannot change how they see colour.
- Careful consideration should be taken to not discriminate or exclude people with colour vision deficiency from everyday activities.

Normal colour vision



Deutan colour vision



Protan colour vision

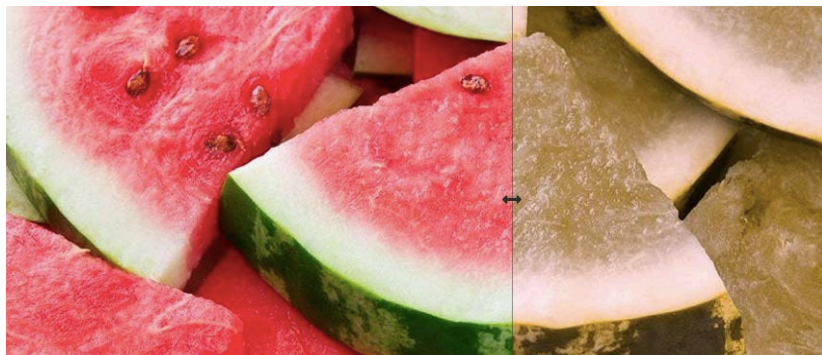


# What do colour vision deficient people see?

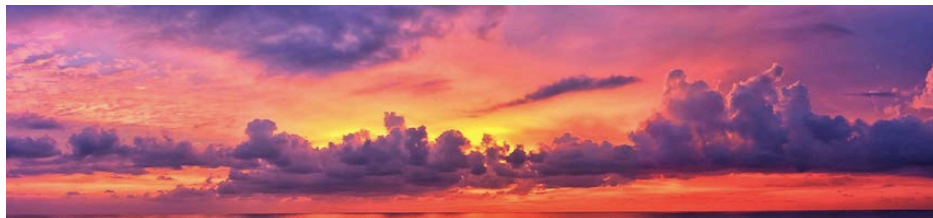
Normal colour vision



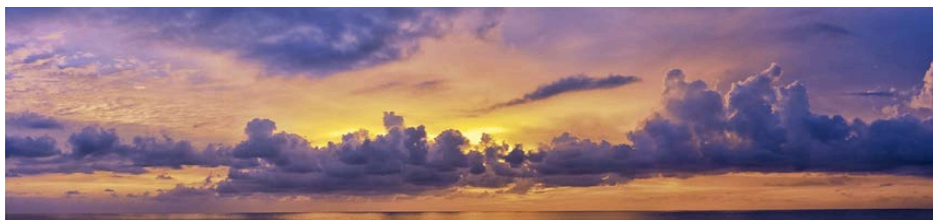
Colour vision deficient view



Normal colour vision



Colour vision deficient view



## Which coping strategies can be implemented?

There is no cure or treatment for inherited colour vision deficiency. There are however things which people with colour vision deficiency can do to cope with their condition.

- Accommodations in the classroom of the specific learning needs of learners with colour vision deficiency.
- Awareness of the condition by parents, teachers and children affected by the condition, so that a conducive learning environment can be achieved.
- Using assistive glasses such as EnChroma glasses which can help people with colour vision deficiency to see colour differently. EnChroma glasses increase the contrast between red and green colour signals, which may help a person to see red and green shades better. They are specialised glasses, which can lessen colour vision deficiency-related difficulties and barriers.
- EnChroma glasses can give people with colour vision deficiency the ability to see a broader variety of colour brightness.



# Holistic intervention

I, Tegan van der Westhuizen, am currently completing a PhD study in Educational Psychology at the University of Pretoria on the following topic: “The effect of a holistic intervention for children with colour vision deficiency”. In my study I will aim to gain insight into how children experience colour vision deficiency and then determine the effect of a holistic intervention on the participants’ academic, emotional, and social functioning. Insight into this issue may provide valuable knowledge on how children with colour vision deficiency can be assisted and better supported by teachers, caregivers and parents in their everyday lives.

The intervention is aimed at providing holistic support and guidance to support the academic, emotional and social functioning of the child with colour vision deficiency. The holistic intervention will comprise of a resilience-enabling intervention, and parent guidance intervention.

## **PLEASE NOTE:**

As part of the intervention the child will be required to wear EnChroma glasses every day. The glasses have darker lenses and therefore may look a bit like sunglasses. Please be very aware of any discriminatory or judgemental comments made toward the child and the glasses. We do not want the child to feel shy or ashamed to wear the glasses. Please remember, that the glasses may help the child to see colour differently which may help him/her to learn better and be exposed to more colour in the world. The glasses should be viewed as a **supportive aid** which may support the child and encourage him/her to learn better.

Please use this booklet and examples of what people with colour vision deficiency see to explain colour vision deficiency to others.

**If you have any questions please feel free to contact me:**

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## Useful resources

### EnChroma

<https://enchroma.com/pages/what-is-color-blindness>

### Colour Blind Awareness

<https://www.colourblindawareness.org>

<https://www.colourblindawareness.org/wp-content/uploads/2010/08/AdviceForTeachers.pdf>

### National Eye Institute

<https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/color-blindness>

## Bibliography

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