Higher order emotion identification: Comparing children with blindness to typically developing peers

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DECLARATION

With this I, Inneke Greyvenstein, declare that the thesis with the title *'Higher order emotion identification: Comparing children with blindness to typically developing peers'*, is an original piece of work written by me under the supervision of Dr. K.T. Tönsing and Prof. J. Bornman.

Inneke Greyvenstein

31 Augustus 2017

DEDICATION

This work is dedicated to the children.

And since order is not necessarily equal to value for them, third can be first and first can be third:

Thirdly, it is dedicated to all the little bodies with wide minds and hurting hearts who have trusted me over the years to dwell in the darkest, most painful corners of their fragile brokenness. May the great Potter heal your cracks in the tradition of Kintsugi/Kintsukuroi where suffering is understood as not being damaged beyond repair but to emphasize beauty and increase worth. "The cracks are how the light gets in" – Rumi.

Secondly, I dedicate this work to the participating children of this study who so patiently and boldly taught me more than I ever expected to learn. "Grown-ups never understand anything by themselves, and it is tiresome for children to be always and forever explaining things to them" – Antoine de Saint-Exupéry (The Little Prince). I thank, and honour them, for tolerating and enlightening my inadequate adult mind.

But firstly, and most importantly, I dedicate this work to my own children. Two tiny bodies folded around each other waiting to wear the one pair of pink shoes and the other pair, blue, now gathering dust in the bottom of a heart wrenching drawer. Your absence is forever draped across the edge of my heart like a cold dark shadow, catching me unexpectedly and ripping the breath from my very soul. Tearing at my sanity day after day. I am so sorry…for what we have lost and ache for what we will never have.

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Yirmeyah 29:11 (OJB): "*For I know the machshavot (thoughts; plans) that I think toward you, saith Hashem, machshavot shalom (peace; prosperity), and not of ra'ah (evil; harm), to give you an acharit (future) and a tikvah (hope).*"

I thank God for remaining true to His promise given to me that Thursday afternoon so long ago which carried me to the end of this long journey. Suffering may not have been taken away, but I have always been given hope amidst it. I cling to Your promise for my hopeful future, for my heart's desires to be fulfilled and for granting the peace I seek so desperately. It is by Your grace alone that I am anything at all.

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Mamma – want jy rol my toe en hou my vas, jy staan tussen my en die donker wat my wil insluk en in jou klein krom handjies dra jy my elke nag op aan ons Here God. Jy tree vir my in die bres sonder 'n enkele gedagte aan jou eie swaarkry Jy troos my met jou sagte hande en jou soet tee. Jy spoel koel water van gebede oor my rou wonde. Al die jare sing jy vir my om te slaap en waak oor my drome. Ek eer jou.

Daddy - Jy het my naam op my eerste bruin skooltassie gestensil sodat ek altyd kon vind wat myne is en steeds lei jy my na myself toe terug wanneer ek myself wil verloor. Vir die wêreld sê jy my naam met trots. Want selfs wanneer ek moed verloor glo jy in my en

herinner jy my aan my drome. Toe ek klein was het jy my op jou nek gedra wanner my voete moeg geword het, my bene het jy herinner om te loop toe ek in ‘n rolstoel was, en nou, as vrou vou jy my steeds teen jou bors vas en hou my staande wanneer my knieë wankel op hierdie lewenspad. Jou hart is my woning. Ek eer jou.

My Liefste Aika - Op ‘n onverwagse Sondagoggend het ek aan die einde gekom van wat die begin van ONS sou word. Vir soveel jare het ons elk ons eie pad gestap. Donker woudpad. Ruwe bospad. Vlekkende modderpad. Ons weë het gekronkel en gekruis, uitmekaar en soms deurmekaar. My kop het nooit die naam verstaan wat my hart geprewel het telkens wanneer ek teen die bome leun en ek my wang nerf-af skaaf teen die growwe bas wat my trane drink nie. Maar ek het aanhou smag en soek sonder wete, sonder rede, selfs soms byna sonder hoop. En toe vind ek jou . . . . . Vir jou wil ek sag skulp in die palm van my hart om jou te troos en beskerm teen die lewe se kou. Teen die loeiende winde wat soms dreig om aan jou jaspunte te pluk, wil ek jou laat toevou in die arms van Engele. Geliefd, gekoester, veilig wil ek jou hou in die sonvanger glimlag van my siel met geen pretensie, geen beheer. Oneindig. Onvoorwaardelik. Ja, innig, het ek jou lief.

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Erna, my Liefblom. Prediker 4: 9 & 10 – “Twee vaar beter as een. Hulle inspanning kom tot iets (saam bereik hulle meer in hulle werk). As die een val kan die ander een hom ophelp. Maar as een val wat alleen is, is daar niemand om hom op te help nie. Geseënd is ek om jou langs my te gehad het elke tree. Dankie dat jy my rooi skoene se veters vasgebind het met stywe strikkies telke male wanneer ek wou struikel, maar dankie veral vir die voorreg om jou hand te mag vashou wanneer jou enkels soms wil swik. Ek sal jou optel en pêppa tot op die

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

ABSTRACT

Higher-order emotion identification: Comparing children with blindness to typically developing peers

Identifying higher-order emotional states of others is an important aspect of emotional development, as it is central to achieving emotional competence, which is a prerequisite for both immediate and long-term functional outcomes. The accurate identification of higher-order emotions allows for imputing the emotional and mental states of others. It presupposes the ability to put oneself in the place of another and to take the other person's psychological perspective, also known as Theory of Mind. Higher-order emotions are complex in nature, consisting of cognitive as well as affective components, and are often reliant on visual input. Lack of vision has a profound impact on a child's development. Amongst others, children with blindness have been shown to have difficulties in identifying primary emotions in others, and they are also delayed in developing Theory of Mind. However, they have also been shown to overcome the latter (temporary) delay. The question now arises as to whether their ability to identify higher-order emotions differs from that of peers with typical development, and, if so, whether these differences vary with age. The purpose of this study was therefore to compare the levels of accuracy with which children with blindness across the age range of 8;0 to 11;11 (years; months) identify higher-order emotions in others from voice recordings, as compared to peers with typical development. Upon passing a screening procedure, the emotion identification skills of 20 participants with blindness (Cohort 1) and 20 participants without disabilities (Cohort 2) were tested using the voice task of the Cambridge Mindreading Face-Voice Battery for Children. Participants were matched on age, gender, and race. In addition, cognitive and English language skills were comparable. The higher-order emotions tested were as follows: unfriendly, disappointed, amused, nervous, undecided, loving, bothered, jealous, and embarrassed. Overall, children with blindness identified higher-order emotions with significantly less accuracy than peers with typical development (8;0-11;11 years; months of age) at a 5% significance level. When age subgroups were compared within in each cohort, older children (10;0-11;11 years; months) identified higher-order emotions with significantly greater levels of accuracy than younger children (8;0-9;11 years; months). Age subgroup comparisons across cohorts showed no significant difference in the levels of accuracy with which younger children identified higher-order emotions, while older children with blindness

showed significantly lower levels of higher-order emotion identification accuracy than peers with typical development.

Key Terms: Blindness; Children; Emotional competence; Emotional development; Emotion identification; Higher-order emotions; Primary emotions; Theory of Mind

OPSOMMING

Hoër orde emosie identifikasie: Vergelyking van kinders met blindheid met hul tipies ontwikkelende eweknieë

Die identifisering van die hoër orde emosionele toestande in ander is 'n belangrike aspek van emosionele ontwikkeling, aangesien dit sentraal is in die bereiking van emosionele bevoegdheid wat 'n voorvereiste vir beide onmiddellike, en langtermyn, funksionele uitkomste is. Die akkurate identifikasie van hoër orde emosies maak die begrip van emosionele en geestelike toestande van ander moontlik. Dit veronderstel die vermoë om jouself in die plek van 'n ander te plaas en die ander persoon se sielkundige perspektief, ook bekend as ‘Theory of Mind’, te neem. Hoër orde emosies is kompleks van aard wat kognitiewe sowel as affektiewe komponente insluit en is dikwels afhanklik van visuele insette. Die gebrek aan visie het 'n beduidende invloed op die ontwikkeling van 'n kind. Dit is bevind dat blinde kinders onder meer probleme ondervind met die identifisering van primêre emosies in ander, en word ook vertraag in die ontwikkeling van ‘Theory of Mind’. Hulle toon egter ook die vermoë om die laasgenoemde (tydelike) vertraging te oorkom. Die vraag ontstaan nou of hul vermoë om hoër orde emosies te identifiseer, verskil van dié van eweknieë met tipiese ontwikkeling, en indien wel, of hierdie verskille met ouderdom verskil. Die doel van die huidige studie was dus om die vlakke van akkuraatheid te vergelyk waarmee kinders met blindheid oor die ouderdom van 8;0 tot 11;11 (jare; maande) hoër orde emosies in ander vanuit stemopnames identifiseer, in vergelyking met hul tipies ontwikkelende eweknieë. By die verloop van 'n siftingsprosedure is die emosie-identifikasievaardighede van 20 deelnemers met blindheid (Kohort 1) en 20 deelnemers met tipiese ontwikkeling (Kohort 2) getoets met behulp van die stemtaak van die ‘Cambridge Mindreading Face-Voice Battery for Children (CAM-C)’. Deelnemers moes ooreenstem in ouderdom, geslag en ras. Daarbenewens was kognitiewe en Engelse taalvaardighede vergelykbaar. Die hoër orde emosies wat getoets is, was: onvriendelik, teleurgesteld, geamuseerd, senuweeagtig, onbeslis, liefdevol, gepla, jaloers, verleë. In die geheel het kinders met blindheid hoër orde emosies met aansienlik minder akkuraatheid as eweknieë met tipiese ontwikkeling (8;0-11;11 jare; maande oud) op 'n 5% betekenisvlak geïdentifiseer. Wanneer ouderdomsgroepe binne elke kohort vergelyk is, het ouer kinders (10;0-11;11 jare; maande) hoër orde emosies met aansienlik groter vlakke van akkuraatheid as jonger kinders (8;0-9;11 jare; maande) geïdentifiseer. Ouderdom sub-groep vergelykings

tussen kohorte het geen betekenisvolle verskil in die vlakke van akkuraatheid gehad waarmee jonger kinders hoër orde emosies geïdentifiseer het nie, terwyl ouer kinders met blindheid aansienlik laer vlakke van hoër orde emosie-identifikasie-akkuraatheid toon as eweknieë met tipiese ontwikkling.

Sleutelterme: Blindheid; kinders; Emosionele bevoegdheid; Emosionele ontwikkeling; Emosie-identifikasie; Hoër orde emosies; Primêre emosies; ‘Theory of Mind’.

CHAPTER 1
INTRODUCTION

1.1 Introduction

This chapter presents the problem statement that led to the study. This is followed by definitions of important terms used and a list of abbreviations included in the study. The chapter concludes with a brief outline of each chapter.

1.2 Problem Statement

Forming an integrated picture of the world, and their place within it, is a formidable task for children with blindness, as none of their other senses can adequately replace the lasting, comprehensive, and distinguishing details offered by vision (Sandler & Hobson, 2001). Children with blindness are at risk of various developmental delays, including a delay in emotional development, and specifically, emotional competence (Bracher & Matta, 2017).

Emotional competence refers to the ability to identify, respond to, and manage one's own emotions (Na, Wilkinson, Karny, Blackstone, & Stifter, 2016) as well as utilising this capacity for the purpose of accurately identifying and understanding the emotions of others. Emotional competence is a necessary prerequisite for both immediate and long-term functional outcomes, including establishing and maintaining friendships, academic success, managing independent functioning, as well as larger-scale integration of the child into his/her community. The three overarching components of emotional competence are that of emotion identification, emotion response, and emotion regulation, and these components encompass a set of eight skills a child needs to achieve across different stages of the emotional developmental pathway (Saarni, 1999, 2011).

The emotional development of infants and young children with blindness takes place differently from children with typical development. A central difficulty in achieving emotional competence by children with blindness is inferring the emotional states of others. Children with blindness are not able to read the facial expressions and visual non-verbal cues of their communication partners (Chen, 1999), which makes them vulnerable regarding

numerous risk factors such as insecure bonding with significant others and peers, deficits in adaptive functioning, academic difficulties, and emotional incompetence.

The ability to accurately identify the emotions of others is central to achieving emotional competence. Accurately identifying the content of the emotional states of others requires more than the basic understanding of primary emotions such as happiness, anger, or sadness. It is through the understanding and identification of higher-order emotions (HOEs) that the social world becomes coherent and intelligible to the child. Higher-order emotions, such as nervousness, embarrassment, and disappointment, amongst others, are the outcomes of the cognitive processing of the reactions to the primary emotional response. It contains both an emotional component as well as a cognitive appraisal component rather than the pure physiological and behavioural components of primary emotions.

Children with blindness may not necessarily exhibit deficits in emotion understanding but have been shown to have specific delays in primary emotion identification (Dyck, Farrugia, Shochet, & Holmes-Brown, 2004; Minter, Hobson & Pring, 1991). Investigating primary emotion identification in emotion studies is not sufficient, as this conventional oversimplification is not representative of children's actual emotional reality (Cowie, Douglas-Cowie, & Cox, 2005).

HOE functioning, and the role of accurately identifying these emotions in others, has been studied very little in general (Hobson & Bishop, 2003) and not at all in children with blindness. Furthermore, no evidence of any related studies in the South African setting could be located either. Considering that this is a fundamental skill to achieve in order to obtain emotional competence, it is of paramount importance to know whether children with blindness differ from typically developing peers so that any delay can be timeously addressed. Studying higher-order emotion identification in children with blindness may make it possible to re-examine some of the concepts that have been employed in characterising and explaining emotional development of children with blindness. This is imperative if an understanding is to be gained regarding their unique emotional needs in order to improve clinical practice with children with blindness and designing effective interventions. Therefore, this study explores the role of higher-order emotion identification in others by children with blindness in the attainment of emotional competence. The purpose of this study was therefore to compare the levels of accuracy with which children with blindness across

the age range of 8;0 to 11;11 (years; months) identify higher-order emotions in others from voice recordings, as compared to peers with typical development.

1.3 Definition of Terms

1.3.1 Blindness

In this study, blindness refers to legal blindness, which categorises individuals who are unable to use sight and must rely on their other senses to negotiate their environment (Hardman, Drew, & Egan, 2005). Legal blindness is quantitatively defined as visual acuity of less than 6/60 or a visual field of 20 degrees or less in both eyes (Beukelman & Mirenda, 2013; Hardman et al., 2005). For the purpose of this study, children with blindness which had been present from birth or diagnosed before the age of one were considered for sample inclusion.

1.3.2 Emotion(s)

The common conception of emotion is more like a prototype rather than a formal definition because of its complex nature (Fehr & Russell, 1984). Burum and Goldfried (2007, p. 407) provide a multidimensional description of emotions as being "holistic constructs comprising of facets such as behavioural expression, physiological substrates, phenomenological experience, cognitive processes, and a social context". In this study, emotions refer to ongoing states of mind that are marked by mental, bodily, and/or behavioural characteristics with emphasis on the affective or feeling component (Burum & Goldfried, 2007).

1.3.3 Emotional competence

The construct 'emotional competence' (Saarni, 1999, 2011) refers to a set of behavioural, cognitive, and regulatory skills, all with an underlying affect-laden component that emerges over time as a person develops within a social context. This personal competency is a necessary prerequisite for both immediate and long-term functional outcomes (Na et al., 2016). In essence, emotional competence refers to the ability to identify, respond to, and manage one's own emotions (Na et al., 2016; Saarni, 1999) as well as utilising this capacity

for the purpose of accurately identifying and understanding the emotions of others – the latter being the focus of this study.

1.3.4 Emotion identification

Emotion identification denotes the ability to accurately perceive, discern, and interpret the emotional states of others during interpersonal interactions (Bänziger, Grandjean, & Scherer, 2009; Scherer, 2009a; 2009b). It comprises one of the two major domains of emotional competence, the other being emotion expression.

1.3.5 False belief tasks

According to Milligan, Astington, and Dack (2007, p. 622), "*the false-belief task assesses a child's ability to reason about the behavioral consequences of holding a mistaken belief*". Bloom and German (2000) explain the standard version of the false belief task as being the presentation of a scenario where the first character, Sally, leaves a desirable object, such as a bar of chocolate in her basket, before leaving the room. In her absence, another character, Anne, removes the bar of chocolate and places it in a box that stands in a different place in the room. Children are asked to predict, on Sally's return to the room, where Sally will look for the object (or, sometimes, where she thinks the object is). Based on this premise, failure at a false task reflects some serious deficit in a child's understanding of the mental lives of themselves and others, in other words, a deficit in Theory of Mind (ToM).

1.3.6 Higher-order emotions

These entail the synchronisation of several chains of thought pertaining to the cognitive appraisals of situational stimuli, and these emotional responses can be viewed as the outcome of a sequence of feelings and thoughts (i.e. cognitive processing) (Becker & Wachsmuth, 2006; Greenberg, 2006). They are social in nature, have important implications for interpersonal responses, and refer to learned emotions which require mentalising in both the self and in others (LaCava, Golan, Baron-Cohen, & Smith-Myles, 2007). In this study, the following higher-order emotions, are investigated: unfriendly, disappointed, amused, nervous, undecided, loving, bothered, jealous, and embarrassed. These are based on the list of HOEs researched by Golan, Sinai-Gavrilov and Baron-Cohen (2015).

1.3.7 Mind-reading

A term used in direct association with Theory of Mind (ToM) denoting the understanding of, amongst other concepts, but with emphasis on, the emotional minds of others (Korkmaz, 2011). In this study, it has a specific orientation to higher-order emotion identification in others.

1.3.8 Primary emotions

These emotions happen as a direct result of an external cue that affects an individual emotionally and occurs in close proximity to the event that brought them. It is the individual's most elementary, direct initial reaction to a specific situation. These emotions are the evolutionary physical sensations people experience as immediate fundamental responses to stimuli (Greenberg & Pasqual-Leone, 2001). In this study, the following emotions are considered primary emotions: happiness, sadness, anger, fear, surprise, and disgust (Golan, Sinai-Gavrilov, & Baron-Cohen, 2015).

1.3.9 Social constructionism

Social constructionism is understood as the epistemological premise that examines the development of jointly constructed understandings of the world that form the basis for people's shared assumptions about reality (Leeds-Hurwitz, 2009). People actively order, and give meaning to, the reality to which they have to respond (Balbi, 2008) but do not do so in isolation. It is a process of shared meaning-making through joint construction of interpersonal understanding of the thoughts and emotions of others.

1.3.10 Theory of Mind

This term describes the ability to put oneself in the place of another and to see things from the other person's psychological perspective (Baron-Cohen, 1995, 2005; LaCava et al., 2007). This ability to comprehend the emotional and mental states of others underlies effective practice of social skills and is central to the process of emotional competence (Baron-Cohen, 2002; Golan et al., 2015).

1.4 List of Abbreviations and Acronyms

ASD	:	Autism Spectrum Disorder
BAS	:	British Ability Scales (Elliot, 1983)
CAM-C	:	Cambridge Mindreading Face-Voice Battery for Children (Golan et al., 2015)
DoH	:	Department of Health (South Africa)
ERS	:	Emotion Recognition Scale (Dyck, Ferguson, & Shochet, 2001)
GDE	:	Gauteng Department of Education
HOE(s)	:	Higher-order emotion(s)
HPCSA	:	Health Professions Council of South Africa
ICD-10	:	International Classification of Diseases and Related Health Problems (10^{th} Revision)
IQ	:	Intelligence Quotient
IQR	:	Inter-Quantile Rank
LDE	:	Limpopo Department of Education
LoLT	:	Language of Learning and Teaching
RMF-C	:	Reading the Mind in Films' Task – Children Version (Golan, Baron-Cohen, & Golan, 2008)
S-B 4^{th}	:	Stanford-Binet Intelligence Scales Fourth Edition (Thorndike, Hagen, & Sattler, 1986)
ToM	:	Theory of Mind
SVI	:	Severe visual impairment
WHO	:	World Health Organization
WISC-R	:	Wechsler Intelligence Scale for Children-Revised (Wechsler, 1974)
WIT	:	Williams Intelligence Test for Children with Defective Vision (Tobin & Hill, 2011; Williams, 1956)

1.5 Chapter Outline

Chapter 1 presents a brief outline of the study. It commences with a concise problem statement, followed by definitions of the important terms used throughout the study. Abbreviations and acronyms used in the study are explained. The chapter concludes with a brief outline of each chapter of the thesis.

Chapter 2 presents the conceptual framework for the study and reviews relevant literature by exploring the interrelatedness of concepts. Pillar contructs are contextualised within the overarching epistemological perspective of social constructionism. The concepts of blindness, HOE identification – which is embedded in ToM – and how these relate to accomplishing emotional competence in early to middle childhood are discussed. To identify risks in the emotional development of children with blindness, the emotional development of children with typical development is discussed with particular emphasis on the role of sight in attaining emotional competence. Studies pertaining to aspects of emotional development in children with blindness are reviewed. The development of ToM in children with blindness is also discussed. A hypothesis pertaining to the development of higher-order emotion identification in children with blindness compared to that of their peers without blindness is posed, based on the reviewed literature.

Chapter 3 discusses the research methodology employed. It commences by outlining the main aim and delineating the sub-aims that were investigated. The research design is then described, highlighting both its strengths and challenges. The participant selection criteria and recruitment procedures for each of the comparison cohorts (Cohort 1: children with blindness and Cohort 2: children with typical development) are presented, and a description of the participants is provided. The aims, procedures, and outcomes of the pilot studies follow. Next, the material and equipment required for data collection are discussed, followed by the main data collection procedures and the statistical strategies utilised to analyse the data. Finally, the procedural integrity of the data collection, as well as the reliability of the collected data, is reported, and the ethical considerations in conducting the study are described.

Chapter 4 presents the results of the study. It commences by presenting the proposed hypotheses to be tested and reiterates the procedural integrity of the data collection process as well as the reliability of the Cambridge Mindreading Face-Voice Battery for Children (CAM-C) Voice Task responses. The group equivalence of the two comparison cohorts (children with blindness and children with typical development) is again highlighted by discussing the matched as well as the non-matched variables. The results of the obtained data are then presented according to the sub-aims delineated in Chapter 3. Inferential statistics are examined, and the results of hypotheses testing for each of the sub-aims are reported.

Chapter 5 contemplates the research results and statistical inference as presented in Chapter 4. The chapter discusses the research findings by following the sequence of the outlined sub-aims. This discussion focuses on exploring factors that could have impacted on these results as tested by the hypotheses for each of the sub-aims. Possible reasons for statistically significant differences are discussed by making reference to theoretical models of emotional development and ToM presented in Chapter 2 as well as contextualising it in relation to previous research conducted in the field. Patterns of response errors are scrutinised and possible explanations for their occurrence are offered.

Chapter 6 integrates the results. The study findings are summarised, and the clinical implications of these findings are discussed. This is followed by a critical evaluation considering the strengths, contributions, and limitations of the study. Finally, recommendations for future research are offered.

1.6 Conclusion

The problem statement which served as motivation for undertaking this study was highlighted in this chapter. Definitions of relevant terms and an explanation of abbreviations and acronyms used were provided as well as a brief outline of the chapters.

The next chapter will expand on the problem statement as summarised here by reviewing literature relevant to the executed study.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

The previous chapter provided an introduction and background to the study. This chapter explores the interrelatedness of blindness and HOE identification – which is embedded in ToM – and how these concepts relate to accomplishing emotional competence in early to middle childhood. The discussion is framed within the overarching theoretical perspective of social constructivism. The concepts of blindness, emotion and emotional development categories, and HOE identification are defined and described. To identify risks in the emotional development of children with blindness, the emotional development of children with typical development are discussed with particular emphasis on the role of sight in attaining emotional competence. Studies about aspects of emotional development in children with blindness are reviewed. The development of ToM in children with blindness is also discussed. A hypothesis pertaining to the development of HOE identification in children with blindness compared to that of their peers with typical development is posed, based on the reviewed literature.

2.2 Overarching Theoretical Perspective

In this study, social constructionism serves as the overarching approach from which the emotional development of the child, and specifically that of the child with early onset blindness, can be understood. Social constructionism is the epistemological premise that examines the development of jointly constructed understandings of the world that form the basis for people's shared assumptions about reality (Leeds-Hurwitz, 2009). People actively order, and give meaning to, the reality that they have to respond to (Balbi, 2008) but do not do so in isolation. Social constructionism is a process of shared meaning-making through joint construction of interpersonal understanding of the thoughts and emotions of others. The interaction of emotion phenomena, and particularly the ability to accurately identify emotions in others, is pivotal in this process of joint psychosocial construction. Parkinson (2012) explored the complex interactions of emotions during the social construction of human reality. He pointed out that the task is not to determine whether, or even which, emotions are socially constructed, but rather to investigate how these mechanisms operate in the

socialisation process. Averill (2012) pointed out that the social construction of emotion is indistinguishably linked to emotional development, and what needs to be explained from a constructionist perspective is how these semi-independent elements are integrated into recognisable wholes called emotions. In the tradition of a constructionist approach then, this chapter leans towards synthesis, rather than analysis (Hibberd, 2006), of the various mechanisms that come into play during the emotional development of children with early onset blindness.

The mechanisms to be synthesised will be the role of sight in HOE identification as one of the central components in ToM. ToM, in turn, will be discussed as the vehicle through which emotional competence is obtained as the end point in the process of emotional development. As a starting point, it is helpful to describe and clarify the concept blindness in early childhood before expounding upon, and integrating, other elements into a sensible whole.

2.3 Early Childhood Blindness

A person's eyes, or more specifically, sight, is the door through which information from the outside world enters them. Sight is what connects individuals to their surroundings and allows them to interpret their environment in a meaningful manner. A person's sight is fundamental to his/her survival, for example, identifying an immediate threat. Sight also facilitates a sense of fulfilment when experiencing visual stimuli that are enriching to a person's quality of life – whether that is seeing the splendour of nature, the smile of a best friend, or a teacher's nod of encouragement in class. Sight can partially compensate for the loss of the other senses, but the inverse is not true; the mode of sight is irreplaceable in that the input obtained from it supersedes that of the other senses (De Gelder, Pourtois, & Weiskrantz, 2002; Kujala, Tanskanen, Parkkonen, & Hari, 2009; Sandler & Hobson, 2001). One cannot, for example, smell rainbows or taste affectionate smiles. Vision is superior to the other senses where gaining personal significance and value from one's functional context is concerned. During early childhood, sight is inimitable in the construction of these personal realities and optimising children's functioning.

Furthermore, during the early developmental stages, as much as 80% to 90% of learning depends on vision as a mode of input (Bornman, 2006). Accordingly, compared to sighted peers, children with blindness do not only miss out on opportunities of psychosocial

constructions but also on learning opportunities of many forms, thereby impeding their development on various levels. Bracher and Matta (2017) indicate that children with severe visual impairment and blindness experience a number of socio-emotional hindrances. Now that the importance of sight has been highlighted, it is also necessary to understand the absence thereof, that is, blindness. It is important to understand the general descriptive categories, as well as prevalence and incidence of blindness in the South African context.

2.3.1 Description and categories of blindness

Visual impairment is an umbrella term encompassing numerous deficits that all relate to vision and the loss thereof to some extent and by various aetiologies, such as refraction errors, trachoma, glaucoma, cataracts, macular degeneration, albinism, retinitis pigmentosa, and retinopathy of prematurity (Landsberg & Kruger, 2016). Visual impairment is described as the visual acuity of less than 6/6[1] obtained with the best refractive correction that is possible when modifying the deficit (Bornman & Rose, 2017; Landsberg, 2016) and also relates to a deficiency in one or more of the functions related to the visual system such as that of the visual field, light sensitivity, visual stability, visual perception, and colour perception (Bornman & Rose, 2017).

The International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10, World Health Organization, 2010) categorised four levels of visual function. The first level is normal vision, with the second (moderate visual impairment) and third (severe visual impairment) levels grouped to represent the category of low vision. The fourth level is that of blindness (Bornman & Rose, 2017). Previously, functional blindness was diagnosed when vision *"… cannot be corrected to better than 20/400[2] in the better eye or when the visual field is 20 degrees or less, even with a corrective lens"* (Hardman et al., 2005, p. 444). However, more updated indicators, and specifically those used in the South African context, prefer the term "legal blindness" and employ the metric rather than the

[1] Acuity ratio (e.g. 6/6; 6/18) refers to a comparison of sight at a specific distance in meters. The numerator (6) indicates the distance a person with a visual impairment has to be able to see what a person with standard vision would see at 18 feet (denominator).

[2] The imperial system measures distance in feet while the metric system, used in the South African context, measures distance in meters. Thus, 20/400 translates to 6/60.

imperial system regarding acuity (Beukelman & Mirenda, 2013; Bornman & Rose, 2017). This classification takes into consideration both the visual acuity and the field of vision (Corn & Koenig, as cited in Hardman et al., 2005).

Legal blindness refers to individuals who are unable to use sight and who must rely on their other senses to negotiate their environment (Hardman et al., 2005). The quantitative parameters for visual impairment can be summarised as follows (Beukelman & Mirenda, 2013):

(i) 6/6 – 6/21 (Normal or near normal vision);
(ii) 6/21 – 6/60 Low vision (which includes both moderate and severe visual impairment); and
(iii) <6/60 (Legal blindness).

"Congenital" is described by Reber and Reber (2001, p. 146) as *"present at birth"*. They indicate that the term is not necessarily synonymous with innate or hereditary factors, as a congenital condition may be due to factors other than hereditary ones. It can therefore be deduced that congenital blindness refers to blindness present at birth, which may be, but not necessarily, due to a hereditary factor. Since the focus of this study is on early childhood blindness, legal blindness (Beukelman & Mirenda, 2013) – diagnosed before the infant's first year of life – will be the central area of focus, rather than visual impairment acquired after the first birthday.

2.3.2 Prevalence and incidence of blindness

According to the report of the World Health Organization (WHO, 2014), the number of people with blindness is globally estimated to be 39 million, with 5.88 million residing in Africa. With specific reference to children, the findings by Wright (2008) indicate that approximately one in 10 000 children are born blind. There is an estimate of 1.4 million children with blindness worldwide, with 320 000 members of this population residing in sub-Saharan Africa (Kello & Gilbert, 2003). Amongst the many factors influencing the prevalence of visual impairment, socio-economic status and the under five mortality rate are indicated as the predominant factors. Prevalence ranges from approximately 0.3 per 1 000 children in high-income countries to 1.5 per 1 000 children in low-income countries (Kello &

Gilbert, 2003).

Many causes of blindness, as much as 80% (WHO, 2014), are either preventable or curable and are related to the under five mortality rate. The most predominant cause in the poorest countries in the world is corneal scarring, while the most important causal factor in high-income countries is lesions of the central nervous system. The causal presentation in middle-income countries is varied, but retinopathy of prematurity arises as an important avoidable cause of blindness. Globally, the most important causes of blindness in children are retinal diseases and congenital abnormalities. Frick and Foster (2003) indicated that if the Vision 20/20 programmes are successfully implemented, prevalence will decrease by the year 2020 to 0.3%. However, should it not be successful, prevalence will likely increase with 0.1%.

In South Africa, the prevalence of blindness (overall population including both adults and children, as differentiated statistics are not available) was estimated by the Statistics South Africa Community Survey in 2016 at approximately 1 per 1 000 individuals in the total South African population (Statistics South Africa, 2016). This shows a decrease from the 2011 South Africa Census, which established blindness for the overall population to be 2 per 1 000 individuals.

It is estimated that 0.47 per 1 000 children born in South Africa are affected by blindness. Therefore, due to the low incidence rate of blindness, this study focuses on, and includes, those children who have been diagnosed with either congenital blindness or severe visual impairment to the extent that it qualifies as legal blindness before the age of one year, as this is the age where the psychological ‘self’ begins to differentiate from ‘the other’ where emotions are concerned (Saarni, 2000; Sandler & Hobson, 2001).

Blindness has far-reaching implications for the developmental pathways of the child, including adverse effects on their psychomotor, social, and emotional development (Gilbert & Awan, 2003). A more detailed discussion in this regard can be found in Section 2.5.2.1. This study is concerned with the emotional development, and specifically the identification of HOE as a central aspect thereof, of children with early onset blindness. The concept of emotion must therefore be explored with the intent of discovering the impact that blindness will have on HOE identification.

2.4 The Construct of Emotion

A field of literature as vast and as complex as that of the construct of 'emotion' in the discipline of developmental psychology cannot be mapped, contextualised, evaluated, and discussed without being selective to some extent. Rather than an exhaustive review, an approach of purposive sampling of literature (Cooper, 1988) was taken. First, the most prominent schools of thought pertaining to the construct emotion are discussed, followed by highlighting the main encompassing components of emotion. An overview is given of what constitutes an emotional episode and how this differs from an emotion itself. The classification of emotions into categories will be discussed, denoting which and how these are relevant to this study. The model of emotion development and its related concepts proposed by Saarni (2000) is best suited to this study, and hence will be engaged with more extensively. Specific attention will be paid to the role that HOE identification plays in attaining emotional competence as the end goal of emotional development of young children.

2.4.1 Contextualisation of theories of emotion understanding

Some authors such as Parrott (2001) have suggested that the concept of emotion is explained better by broader notions of understanding, that is, paradigms (rather than a single formal definition) of ongoing states of mind marked by mental, bodily, and behavioural indicators. When considering theories of emotion, Scherer (2009b) groups the three most prominent schools of thought as the following:

(i) *Basic emotion theories*: These were developed by Ekman (1992, 2003) and Izard (1977, 1992) based on Tomkins' (1962) restructuring of Darwin's psycho-evolutionary view (Ekman, 1998) that emotions have evolved to organise physiological structures and to facilitate an adaptive response to events that are of significance to an individual. This significant event triggers a specific affect mode corresponding to one of the basic emotions which result in distinctive patterns of expression and physiological responses.

(ii) *Appraisal emotion theories*: The first was formulated by Arnold (1960) and Lazarus (1966, 1991) and stems from the ideas of the philosophers Aristotle, Descartes, Spinoza, and Hume. Active further development of these theories

transpired in the early 1980s, as seen in the historical reviews by Scherer (1984, 1999, 2001) and other researchers (Smith & Ellsworth, 1985; Roseman & Smith, 2001; Sander, Grandjean, & Scherer, 2005). These theories assume an emotion architecture that is based on an individual's subjective evaluation or appraisal of the significance of events for their well-being and goal achievement, postulating a specific set of appraisal criteria (e.g. novelty, intrinsic pleasantness, goal conduciveness or motive consistency, agency, responsibility, coping, legitimacy, and compatibility with self and societal standards). Detailed predictions are made about the emotional experiences generated by specific appraisal combinations. There are also a number of appraisal-related theories that differ in scope, focus, or the proposed underlying architecture of emotional experiences (Weiner, 1985; Ortony, Clore, & Collins, 1988).

(iii) *Constructivist emotion theories*: Historically, James (cited in Ekman, 1998) presented emotions as being the individual's physiological changes themselves. This view was expanded by Schachter and Singer (1962), who proposed that this bodily arousal leads to labelling feelings as an emotion based on contextual cues of the individual's environment. Russell (2003) modified this perception into emotion being seen as a 'continuous core affect' composed by valence and arousal and being construed in terms of situational cues. Barrett (2006) reviewed this notion and proposed that such a core affect is differentiated by a conceptual act that is motivated by symbolic representations and existing concepts within the individual's frame of reference. Furthermore, emotion is believed to serve an important social function, providing information to the individual about social dealings or conditions that need to be acted upon (as explained in Section 2.2). This view also serves as the overarching theoretical approach for this study.

In addition to the three major theoretical approaches portrayed above, there are several other psychological theories of emotion in existence that are not a seamless fit for these three traditions and which focus on a different characteristic or component of emotion, such as motivation or action. For example, the latter functionalist account views emotion as stimulating an individual to adapt to the environment. Although such additional approaches are noted, these will not be deliberated upon in this discussion, since they do not take into

account all the specific concepts related to this study, and hence fall outside the scope of this study.

2.4.2 Conceptualisation of the construct emotion

Conceptualisations of 'emotion' and its related constructs vary widely amongst researchers (Kang & Shaver, 2004). Ben-Ze'ev (2000) emphasises the vastly complex and subtle nature of emotion which requires cautious and systematic analysis of its multifarious characteristics and components when attempting to explain the construct. First, it is important to understand what is meant by an 'emotional episode' (Moors, 2009) and how 'emotions' operate within this episode. In essence, emotions arise when some event or significant change occurs in a person's milieu that impacts upon their well-being (Calvo & Marrero, 2009), and the purpose of emotions is to serve as regulators of intrapersonal and interpersonal behaviour (Denham, 1998) when this happens. The emotional episode is the process by which this takes place.

The emotional episode comprises a number of prototypical components and can range from the stimulus to the immediate consequences or the ultimate outcome of the emotion (Moors, 2009). Accordingly, the notion of an emotional episode is thus more comprehensive than the notion of an emotion. Emotion theorists disagree about the precise number and nature of the prototypical components (Frijda, 2007) that are included in the emotional episode (e.g. see Lazarus, 1982 versus Zajonc, 1980). Moors (2009) summarised the list of typical components and related these to the corresponding functions they serve: (i) a cognitive component which refers to stimulus evaluation and appraisal; (ii) a feeling component which refers to emotional experience; (iii) a motivational component, consisting of states of action readiness; (iv) a somatic component, consisting of central and peripheral physiological responses; and (v) a motor component, consisting of expressive behaviour. Figure 2.1 shows the components with their corresponding functions (Moors, 2009).

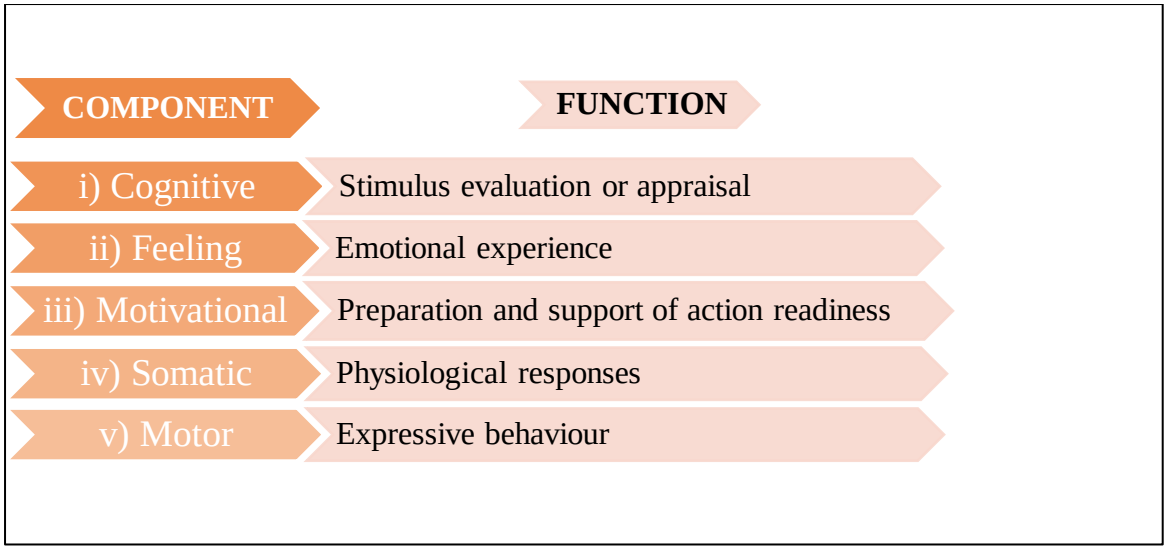


Figure 2.1. Prototypical emotional episode components and corresponding functions (Moors, 2009)

In the past, several theorists included either all, or the majority of, the emotional episode components in an attempted definition of emotion (Clore & Centerbar, 2004; Scherer, 2005). More recently, authors such as Frijda (2007), Frijda and Scherer (2009), and Moors (2009) reviewed the construct of emotion and proposed that 'emotion' has four specific features which are relatively universal and can be regarded as predominant in the understanding of the phenomenon.

The aforementioned features include first the premise that the elicitation of emotions takes place when something happens to a person that has a direct bearing on their needs, goals, values, and general well-being, and this relevance happens through subjective appraisal. Secondly, emotions are seen to have a strong motivational force, preparing the individual to handle important life events by producing states of action readiness. Thirdly, emotions engage the entire person by synchronising several functional subsystems such as somatovisceral and motor systems. Fourthly, emotions confer control of behaviour and experience over the states of action readiness. Frijda and Scherer (2009) also contend that it is these four central features that distinguish emotions from other affective states such as feelings, moods, or attitudes. Moors (2009) distinguishes emotions from feelings by postulating that the latter lack a cognitive component, for example, feeling cold or pain, and focuses more on the physiological substrate of an affective experience. Furthermore, moods differ from emotions in both duration and intensity in that moods last longer at a lower intensity than emotions.

Despite cautions in literature regarding a too stringently formulated singular definition of emotion (Rafaeli, 2004, there have been ongoing attempts by researchers in the field to develop working definitions of the concept. Such definitions have evolved from deliberations of the more classical theories pertaining to the structure of emotion itself (Greenberg & Safran, 1987) to the function of emotion as an instrument of adaptation, motivation, and regulation as evident in the work of researchers such as Sander et al. (2005) and Campos, Frankel, and Camras (2004). In a more contemporary manner of understanding emotion, the concept is defined as one of the instruments with which individuals construct their personal and interpersonal realities within a social context (Parkinson, 2012).

For this study, emotion will be understood and investigated based on the multidimensional perspective as presented by Burum and Goldfried (2007, p. 407), who defined emotions as holistic constructs comprising facets such as *"behavioural expression, physiological substrates, phenomenological experience, cognitive processes, and a social context"*. This definition thus allows one to explore the concept of emotion as a phenomenological experience that is the result of the synergy between physiological substrates and cognitive processing that leads to behavioural expression, all within a social context (Solomon, 2002).

2.4.3 Classification of emotion

As with understanding and defining the construct of 'emotion', a great deal of controversy exists regarding the classification of the different types of emotions, where such boundaries should be positioned, as well as what the internal organisation of these classification categories should be (Moors, 2009). The notion of 'basic emotions', also termed 'primary emotions' by some (Greenberg & Safran, 1998), are perceived by most theorists as a limited set of emotions constituting the building blocks of emotional life. These authentic primary emotions can be combined or expanded to form non-basic or learned emotions, frequently referred to as 'complex emotions' in older literature (Damasio, 1999; Greenberg & Pascual-Leone, 2001). In this study, this group of emotions will be referred to as HOEs, with 'higher order' referring to the emphasis on the cognitive component taking the form of meta-emotion (Bateman & Fonagy, 2010; LaCava et al., 2007). These emotion categories, as well as the specific terminology and reference to this study, are now explicated in more detail in the following sections. Figure 2.2 summarises the emotion categorisation as applied to this study.

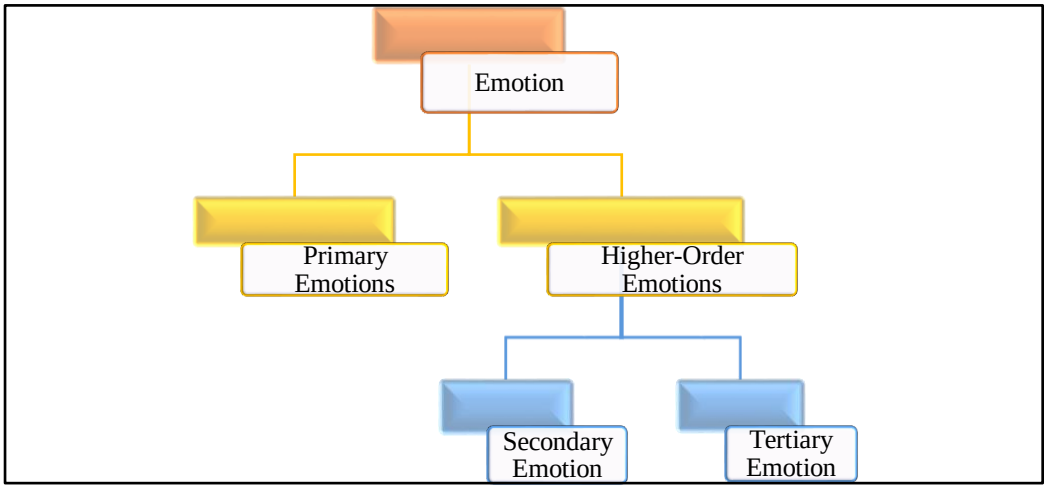


Figure 2.2. Emotion classification

2.4.3.1 Primary emotions

Primary emotions are in-the-moment emotional responses to a pleasant or unpleasant stimulus or situation (Greenberg, 2010). They happen as a direct result of an external cue that affects one emotionally, that is, they occur in close proximity to the event that brought them, for example, 'anger'. It is the individual's most elementary, direct initial reaction to a specific situation. These emotions are the evolutionary physical sensations experienced as immediate fundamental responses to stimuli (Greenberg & Pascual-Leone, 2001).

Furthermore, Damasio (1994, 1999) considers primary emotions as the initial impression one has of what an emotion is. These include happiness, sadness, fear, anger, surprise, or disgust. The amygdala is believed to be the fundamental contributing unit in this type of emotion. The author also refers to primary emotions as being universal. Gray, Schaefer, Braver, and Most (2005) further support this universality of primary emotions by describing them as being innate and pre-organised.

The notion of primary emotions is widely accepted, although theorists vary with regard to the number and denotation of the emotions they enumerate as primary (Moors, 2009). The main reason for this is that different theorists apply different sets of criteria for inclusion and discrimination within these respective sets (Ekman, 2007; Ekman, Levenson, & Friesen, 1983; Frijda, 1986; Izard, 1977; Lazarus, 1991; Oatley & Johnson-Laird, 1987; Panksepp, 1982, 1998, 2000; Roseman, 1991; Roseman & Smith, 2001; Russell, 2003; Scherer, 1984, 1994). Different listings of primary emotions have been proposed. In their collation of the

work of various researchers, Ortony and Turner (1990) note that primary emotion categories vary from sets of 4 up to 11 primary emotions. More recently, between four to six primary emotion sets seem to have become the norm. In this study, primary emotions are regarded as those included in the set proposed by Golan et al. (2015). This set consists of the following six primary emotions: happiness, sadness, anger, fear, surprise, and disgust.

2.4.3.2 Higher-order emotions

Moving beyond primary emotions, researchers proceed to further refine emotion categories. Greenberg (2010) distinguishes between primary or 'authentic' emotions and secondary and tertiary or 'learned' emotions which require mentalising in both the self and in others (LaCava et al., 2007). Mentalisation is a social construct and refers to the process by which individuals make sense of themselves and others by being attentive to the mental states and emotions of those they interact with (Bateman & Fonagy, 2010). This notion of processing is strongly linked with ToM (Baron-Cohen, 2005) as will later be explained in Section 2.5.1.2. Accordingly, the categories of secondary and tertiary emotions are collectively referred to as higher-order emotions (LaCava et al., 2007) for the purpose of this study.

To clarify the categories of emotion, as with primary emotions discussed above (see Section 2.4.3.1), brief attention will be given to secondary and tertiary emotions, and reference will be made to Parrott's (2001) categorisation. Parrott's (2001) model of the categorisation of emotions depicts these three categories on his tree structure of emotions as demonstrated in Table 2.1.

Table 2.1

Categorisation of Emotions Based on Parrott (2001, 2007)

	Emotion category	**Examples of emotions**					
	Primary	Love	Happiness	Surprise	Anger	Sadness	Fear
HOE	Secondary	Affection	Enthrallment	Exasperation	Rage	Disappointment	Nervousness
	Tertiary	Adoration	Rapture	Frustration	Loathing	Melancholy	Apprehension

2.4.3.2.1 Secondary emotion

Secondary emotions are reactions to primary cognitive appraisals and emotional responses and can be viewed as the outcome of a sequence of feelings and thoughts (i.e. cognitive processing) and are also referred to as affect-event links (Becker & Wachsmuth, 2006; Greenberg, 2006; Lemerise & Arsenio, 2000). For example, 'rage' follows as the end-product of cognitively processing the original immediate response of 'anger' as clearly illustrated in Table 2.1. It is thus a response to how people think about (i.e. appraise) the situation rather than directly physiologically reacting to the situation itself as is the case with primary emotions (Greenberg, 2010). Secondary emotions have important implications for interpersonal responses to events which take place within a specific context (Hess et al., 2000). Accordingly, secondary emotions can be understood as social emotions (Damasio, 1999) which enable people to deal with their role as social beings. Gray et al. (2005) explain that the experience of secondary emotions occurs when the individual begins to establish systematic connections between categories of objects and situations as well as between the primary emotions themselves.

2.4.3.2.2 Tertiary emotion

Tertiary emotions include secondary emotions and, in most cases, offer an expansion thereof. They are complex combinations of secondary emotions and are the most difficult to identify. An example is 'loathing' (Parrott, 2001), which stems from the primary emotion 'anger' and secondary emotion 'rage', as shown in Table 2.1. They are the synchronisation of several chains of thought pertaining to the cognitive appraisals of situational stimuli. On the other hand, secondary emotions can be understood as meaning-making of the situational emotional responses (i.e. combining the original primary emotions), whereas tertiary emotions can be viewed almost as meta-emotion, that is, making sense of emotions through symbolisation of physiological sensations which come into an individual's awareness and then reconceptualising them into language, thereby construing novel meanings and generating new experiences.

Greenberg and Pascual-Leone (2001) refer to this ongoing circular process as a dialectical constructivist view of the creation of personal meaning. In addition to language being used to symbolise emotion, this circular process of contemplation assists the person to establish

narrative sagacity of their experiences, and so constructs their emotional frame of reference and assists them in negotiating future experiences and social interactions. There is thus a frequent overlap between the categories of secondary and tertiary emotion (Parrott, 2001), which makes a definite distinction not only extremely complicated but redundant to some extent when discussing emotional development. This collective grouping of secondary and tertiary emotions as HOEs for the purpose of this study not only articulates with ToM but also ties in strongly with the overarching epistemological approach of social constructionism. The discussion will now highlight how the development of emotion takes place in children and what role ToM plays in this developmental process.

2.5 Emotional Development in Children

To understand how the emotional development of children with blindness unfolds and the implications thereof for the child's functioning, it is necessary to consider the typical development of sighted children. This provides a benchmark as to what constitutes expected developmental milestones and comparisons can then be made with what is known of the emotional development of children with, and without, blindness.

As children develop, their encounters with their environment take the form of ever-changing relations that involve multiple emotion-related components such as physiological prefiguring, goals and motives, physical and social contexts, emotive evaluations and experiences, as well as expressive actions. These components change over time as a result of the child's personal maturation and dynamic interaction with environmental changes of the system within which they function. Accordingly, emotional development is seen as reflecting social experience. This is elaborated on in Section 2.5.1. Figure 2.3 provides a diagrammatical overview of the various prominent elements and their interplay that constitutes the line of argument set out in this study.

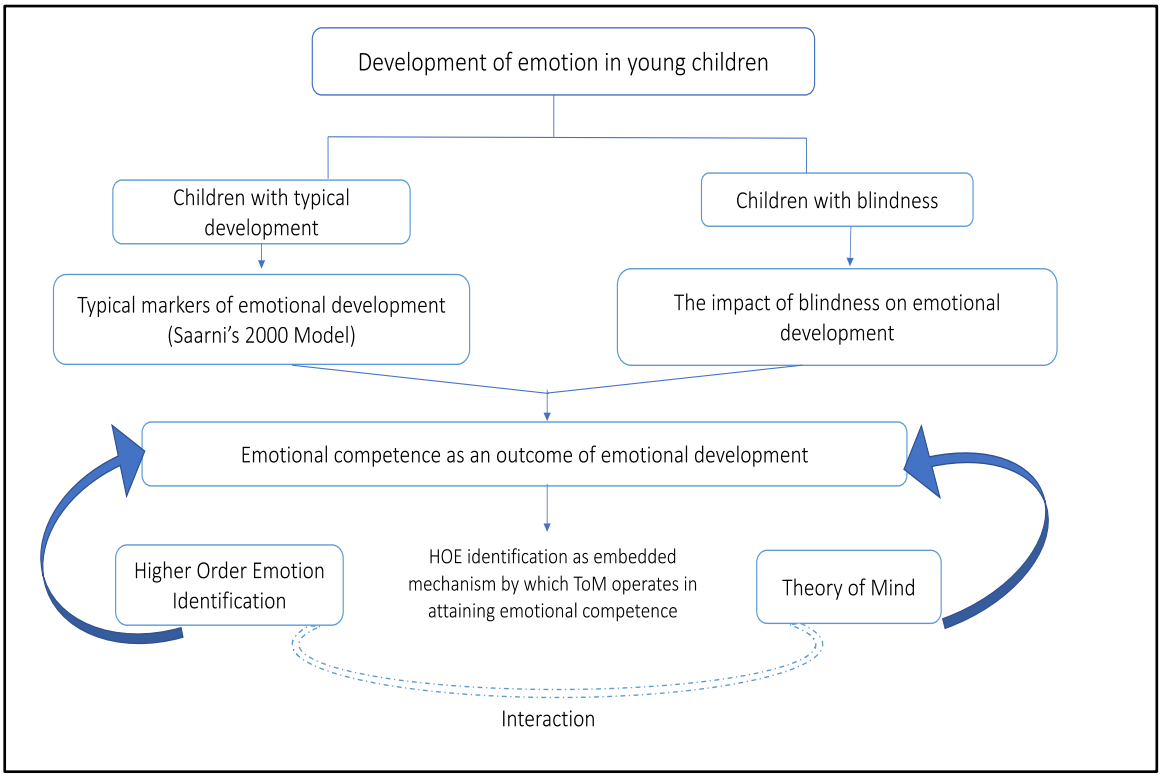


Figure 2.3. Diagram of literature review constructs

2.5.1 Emotional development of children with typical development

Saarni (2000) presents a set of chronological descriptive markers of emotional development in relation to social interaction divided into age groups as developmental phases. As these markers are directly related to social development, it follows that people actively participate in the creation of their own emotional experience, through the combined influence of their cognitive developmental structures and their social exposure to emotional discourse. This social constructionist perspective was described in earlier literature by Saarni, Campos, Camras, and Witherington (1998) as complementing and moving beyond the mere functionalist previously underwritten by many authors. This further reiterates the suitability of this study, assuming a social constructionist perspective as its epistemological premise. This approach to emotion development represents the learning process whereby the child comes to understand what it means to feel something and to act upon it. Based on this principle, Saarni (2000, 2011) summarises significant descriptive markers of typical emotion development in relation to personal, interpersonal, and social functioning as shown in Table 2.2.

Table 2.2

Emotional Development of Typically Developing Children Adapted from Saarni (2000)

Developmental stage and chronological age	**Regulation and coping**	**Expressive behaviour**	**Relationship building**
Early Childhood (5-7 years)	Self-conscious emotions (e.g. embarrassment) are the focus of regulation. Seeking support from caregivers is still a prominent coping strategy, but increasing reliance on situational problem-solving becomes evident.	Adoption of aloof emotional front with peers.	Increasing coordination of social skills with one's own and others' emotions. Early understanding of consensually agreed upon emotion "scripts".
Middle Childhood (7-10 years)	Problem-solving is the preferred coping strategy if control is at least moderate. Distancing strategies are used if control is appraised as minimal.	Appreciation of norms for expressive behaviour, whether genuine or feigned. Use of expressive behaviour to modulate relationship dynamics (e.g. smiling while reproaching a friend to 'soften the blow').	Awareness of multiple emotions toward the same person. Use of multiple time frames and unique personal information about another as aids in the development of close friendships.
Pre-adolescence (10-13 years)	Increasing accuracy in appraisal of realistic control in stressful circumstances. Capable of generating multiple solutions and differentiated strategies for dealing with stress.	Distinction made between genuine emotional expression with close friends and managed displays with others.	Increasing social sensitivity and awareness of emotion "scripts" in conjunction with social roles.

Table 2.2 reflects the developmental stages as postulated by Saarni (2000) that are of specific relevance to this study and covers the chronological age range of 5 to 13 years. The developmental markers of each stage of development are summarised and will later be discussed by relating these to the developmental stages of ToM (see Section 2.5.1.2). A growing body of literature pertaining to research on emotion-related phenomena has

identified the importance of emotionally competent functioning to children's psychosocial adaptation (Burum & Goldfried, 2007). Saarni's (2011) theory of emotion development focuses on the social aspect of development of emotion. This model proposes that optimal competence ultimately equips the child with skills to function adequately in their socially constructed realities. The attainment of emotional competence is now explored as the outcome or intended end goal of successful emotional development.

2.5.1.1 Emotional competence: The outcome of successful emotional development

The construct 'emotional competence' (Saarni, 2011; Saarni, 1999) has been postulated as a set of behavioural, cognitive, and regulatory skills, all with an underlying affect-laden component that emerges over time as a person develops within a social context. The development of such competence is a necessary prerequisite for both immediate and long-term functional outcomes, including establishing and maintaining friendships, academic success, independent functioning, as well as larger-scale integration of the child into his/her community (Na et al., 2016). In essence, emotional competence refers to the ability to identify, respond to, and manage one's own emotions (Na et al., 2016; Saarni, 1999) as well as utilising this capacity for the purpose of accurately identifying and understanding the emotions of others. This personal competency is required for successful interaction with others, who, in turn, are guided by their own emotional states. The construct of emotional competence, with its related skill set, is thus intrinsically embedded within the broad concept of emotional development. The development of emotional competence (which includes emotion identification) can therefore be understood as the manifestation of successful emotional development.

In literature, a set of eight skills formulate the construct of emotional competence (Beck, Kumschick, Eid, & Klann-Delius, 2011; Saarni, 2011), which includes (i) awareness of one's own emotional state through the ability to perceive and express one's own emotions, that is, internal emotion identification; (ii) being perceptive of the emotions of others, that is, external emotion identification in others; (iii) employing emotion-related vocabulary and expression in terms of language concepts familiar and/or acceptable to the receiver of the communication; (iv) the capacity to empathise with others' emotional experiences; (v) acknowledging that an inner emotional state may not necessarily correspond with the outer expression thereof; (vi) a capacity for adaptive coping with antagonistic or distressing

emotions; (vii) awareness of the role of emotions in the structure and nature of interpersonal relationships; and (viii) capacity for emotional self-efficacy whereby one is accepting of one's own emotions as conforming to what one views as being the norm in the functional context. The proficiency of 'emotion identification' from the set of Saarni's eight emotional competence skills (see [ii] above) is central to the discussion in this literature review and is also the main focus of investigation in this study.

2.5.1.2 Higher-order emotion identification and Theory of Mind

Emotion production and emotion perception are two fundamental skill areas that underly the development of emotional competence (Scherer & Ellgring, 2007). Competence in emotion production refers to the adaptation and appropriate execution of the total pattern of bodily and behavioural changes when responding to a relevant event, allowing the individual to successfully cope with its consequences. Emotion perception competence, in turn, refers to the ability to accurately perceive and interpret the emotional states of others during interpersonal interactions. Emotion identification is acknowledged as forming part of this second domain, that is, emotion perception (Adolphs, 2002; Bänziger et al., 2009). Suveg, Southern-Gerow, Goodman, and Kendall (2007) reiterate the significance of emotional competent functioning in children's psychosocial adaptation. Pao, Chen, Yeh, and Li (2006) affirm the ability to accurately identify the emotional states of others as the most important emotional competency for executing successful interpersonal interaction.

The ability to discriminate emotions in others begins during the first year of life (Mash & Wolfe, 2012). As early as 10 weeks of age, infants start to respond differently to facial and vocal expression of their caregiver's emotional states. From the age of seven months, infants are capable of detecting discrepancies between facial and vocal expression of emotional states (Caron, Caron, & MacLean, 1988). It is during the second and third years of life that a child starts employing vocabulary expressing mental states during speech (Golan et al., 2015; Izard & Harris, 1995). This emotion vocabulary expands throughout childhood.

The speed and accuracy of emotion identification (De Sonneville, Vershoor, Njiokiktjien, Veld, & Toorenaar, 2002), as well as the ability to increasingly detect subtler mental states (Vicari, Reilly, Pasqualetti, Vizzotto, & Caltagirone, 2000), improves during the entire developmental course of childhood. Emotion processing, including emotion identification,

and mental state recognition skills become progressively more advanced during adolescence and into adulthood (Golan et al., 2015).

Identification of HOEs requires additional knowledge that could not be obtained solely from the interpretation of the sensory characteristics of the stimulus but also an understanding of the life-world of the individual (Adolphs, 2002; Bänziger et al., 2009). The accurate identification of HOEs allows for imputing the emotional and mental states of others (Golan et al., 2015; LaCava et al., 2007). It presupposes the ability to put oneself in the place of another and to take the other person's psychological perspective, also known as ToM (Baron-Cohen, 1995, 2005; LaCava et al., 2007; McGuire & Michalko, 2011), into account. The ability to comprehend the emotional and mental states of others underlies the effective practice of social skills and is central to the process of emotional competence (Baron-Cohen, 2002; Golan et al., 2015).

Rieffe, Terwogt, and Cowan (2005) indicated that children start to display a sophisticated understanding of emotions from the age of five to six years as they begin to understand that HOEs are based on people's beliefs, that is, their cognitive appraisals of a situation, rather than measures of objective reality (Korkmaz, 2011). Accordingly, based on this development of a more sophisticated understanding of emotion, authors such as Bensalah (2011) and Garfield, Peterson, and Perry (2001) have highlighted that ToM develops from around the same age (i.e. five years) as shown in Table 2.3.

Typically developing children should be able to recognise emotion from spoken words and sight by age seven (Baron-Cohen, Golan, Wheelwright, Grenader, & Hill, 2010). According to the sequential development of ToM (as indicated in Table 2.3), it is during the early childhood, middle childhood and pre-adolescent stages of the developmental process, explained earlier in Table 2.2, that HOE understanding and identification begin to take place (Astington & Dack, 2008).

More specifically, it is during the middle childhood stage (Saarni, 2000 – see Table 2.2) that the child begins to understand belief-based emotions, and in the pre-adolescent stage the understanding of higher-order mental states emerges through the inferential and interpretive abilities of more complex emotional states (e.g. HOE identification of emotions such as embarrassment, nervousness, disappointment, and amusement, amongst others).

Table 2.3

Theory of Mind Development in Typically Developing Children as summarised from Bensallah (2011) and Garfield, Peterson, & Perry (2001)

Developmental stage and chronological age	Main developmental marker	Characteristic behaviours and abilities
Infancy (Birth – 1;6 years; months)	Social perception	• Imitation • Dyadic smiling and vocalising • Joint attention: Follow others' pointing and gaze & direct others' attention with point & gaze • Social referencing • Discriminate animates form inanimates • Discriminate goals from movements • Sensitive to agent's knowledge states
Toddlerhood and early pre-school stage (1;7 months-3;11 years; months)	Mental state awareness	• Distinguish between the concepts of mental & real • Pretend play • Aware of intentions, desires, and emotions • Desire-based reasoning • Aware of perception and knowledge acquisition • Use mental state terms
Pre-school stage (4;00-5;11 years; months)	Meta-representation	• Distinguish between the concepts of mental & real • Pretend play • Aware of intentions, desires, and emotions • Desire-based reasoning • Aware of perception and knowledge acquisition • Use mental state terms
School stage (6;00 years onwards)	Recursion and interpretation	• Understand higher-order mental states • Recognise interpretive diversity • Understand indirect speech, e.g. irony & metaphors • Aware of white lies, faux pas, and persuasion • Use and comprehend complex mental state terms • Understand inference, ambiguity, and referential opacity • Aware of stream of consciousness – introspect

2.5.1.3 Measuring higher-order emotion identification

Over the last three decades, the majority of research regarding emotion identification has taken place with children without blindness, and emotion identification in others has typically been measured by using visual stimuli, rather than stimuli involving the other senses (MacDonald, Kirkpatrick, & Sullivan, 1996; Widen & Russell, 2004). Emotion labels being matched to stimuli such as schematic drawings (MacDonald, Kirkpatrick & Sullivan, 1996), pictures of facial expression of emotion, photographs of facial affect (Gross & Ballif, 1991), and vignettes of emotion-related scenarios (Camras & Allison, 1985; Cummings & Rennels,

2014; Ribordy, Camras, Stefani, & Spaccarelli, 1988) have been the most frequently used methods of emotion identification in others. Researchers such as Markham and Adams (1992), De Sonneville et al. (2002), and Gao and Maurer (2009) have used various forms of digitalised images and motion pictures for coding emotion identification. Combinations of these elements such as matching line drawings (Sullivan, Kirkpatrick, & MacDonald, 1995), photographs of adults expressing affect, to social stories (Boyatzis, Chazan, & Ting, 1993) have also been applied to emotion identification by children.

Furthermore, where emotion identification has been studied in children with disabilities, children with blindness were typically excluded and research focused on children with Autism Spectrum Disorders, Down Syndrome (Celani, Battacchi, & Arcidiacono, 1999), cognitive impairments or learning disabilities (Holder & Kirkpatrick, 1991), as well as psychiatric disorders (Manassis & Young, 2000). Studies have also typically focused on primary emotions such as anger, fear, happiness, sadness, and disgust (Cummings & Rennels, 2014; Manassis & Young, 2000), with researchers such as Shioiri, Someya, Helmeste, and Tang (1999) only investigating the HOE of 'contempt' apart from the primary emotions such as anger, fear, disgust, happiness, and sadness.

Cowie et al. (2005) denoted that the distinction between primary and HOE also proved problematic during assessment. Emotion studies focusing on the primary emotions alone are not adequate, as these are an oversimplification and not an authentic reflection of the veracity of human emotional experience. Emotion studies need to progress onto investigating what Cowie et al. (2005, p. 373) refer to as the *"pervasive emotions"* (i.e. HOEs). Prominent researchers in the field such as Ekman (2016) highlighted that HOEs have started to receive attention only more recently, yet insufficiently.

CAM-C (Golan et al., 2015) was developed to specifically assess not only primary but also HOEs. This instrument (which is discussed in more detail in Section 3.5.2) also makes use of both visual and auditory stimuli to test HOE identification. LaCava et al. (2007) published findings of a pilot study they conducted using the CAM-C to test the effectiveness of using the Mindreading emotions training library to teach emotion identification to children with Asperger syndrome by using an experimental pre- and post-test design. Golan, Baron-Cohen, and Golan (2008) correlated the performance of children on the Reading the Mind in Films Task (RMF-C) (and the CAM-C) to investigate the applicability of the context element when

assessing HOEs in children with Autism Spectrum Disorder. Golan et al. (2015) used the CAM-C as one of the instruments in a battery of tasks for testing HOE identification in children with, and without, Autism Spectrum Disorder (ASD). They also examined the applicability, validity, reliability, and psychometric properties of the CAM-C with this population.

2.5.2 Emotional development and Theory of Mind in children with blindness

2.5.2.1 The effect of blindness on the emotional development of the child

Blindness has far-reaching implications for the developmental pathways of the child and has adverse effects on their psychomotor, social, and emotional development (Gilbert & Awan, 2003). Vision plays a pitoval role in social and affective communication (Iversen, Ptito, Møller, & Kupers, 2015). Vision is regarded as being superior to most other modes of observation and the mode on which people rely most heavily in effectively perceiving what another person is attending to or acting upon (De Gelder et al., 2002; Kujala et al., 2009; Sandler & Hobson, 2001). Lack of vision blights the child's ability to engage in social referencing and constrains the ability to adopt multiple perspectives in creative and flexible symbolic play during later development. It also hampers the child's ability to learn a language, which depends strongly on the child and adult establishing joint attention for the teaching and learning of words.

Since emotional development is closely associated with and influenced by many other aspects of development as well as social experiences, the absence of sight is highly likely to have an effect on emotional development. According to Roch-Levecq (2006), sight is a necessary precondition in facilitating effective emotional interaction through utilisation of emotional competence. To identify studies that have particularly addressed the emotional development of children with blindness, a systematic literature search was conducted. Since the aim was to obtain a broad overview of the scope of work conducted regarding the emotional development of children with severe visual impairment or blindness, all aspects of emotional development were included in the review. The particular in- and exclusion criteria are summarised in Table 2.4.

Table 2.4

Selection Criteria Used in Literature Review

Component	Inclusion crieria	Exclusion criteria	Rationale
Population	Children and adolescents aged 0-17 years, 11 months with severe visual impairment acquired before the age of 2 years, without concomitant disabilities	Persons 18 years or older Children with concomitant disabilities (e.g. Deaf-blind) Children with mild or moderate visual impairment Children with visual impairment acquired after the age of 2 years	This age range was chosen to ensure that the full childhood developmental spectrum was covered.
Variable investigated	Emotion skills/abilities/repertoire/ development/processes defined according to the eight skills identified by Saarni, namely, emotional self-awareness; perceptiveness of others' emotions; employing emotion-related vocabulary; empathic abilities; differentiation between inner and outer emotional realities; adaptive coping with negative emotion(s).	Studies investigating only cognitive aspects of ToM	The focus of the study was on the affective component of ToM.
Study design	Empirical studies reporting on original data pertaining to emotion skills/abilities/repertoire/ development/processes Quantitative, qualitative,	Systematic reviews Theory papers not reporting empirical data	Empirical studies were given preference to ensure scientific rigour. Seeing that limited research is available

Component	Inclusion crieria	Exclusion criteria	Rationale
	and mixed methods designs.		in the specific field, all study designs were included to ensure all different methodologies used were considered.
Date	No limitations on date were set	None	To inform the reviewers on chronological developments in the field and to ensure scrupulousness in coverage.
Language of publication	English	Any language other than English	All of the reviewers were fluent in English.
Publication type	Peer-reviewed publications	Non-peer-reviewed publications	To ensure scientific rigour

A literature search was done using a combination of terms related to the three principal components related to this topic, namely, emotion, children, and visual impairment. The broader field of visual impairment, rather than only blindness, was approached in this search to ensure that no studies would be prematurely eliminated in the case that different forms of visual impairment were combined in some studies. The truncation symbol (*) was used in the individual databases to maximise the search results. The specific search terms employed in each of the three principal component categories are set out in Figure 2.4.

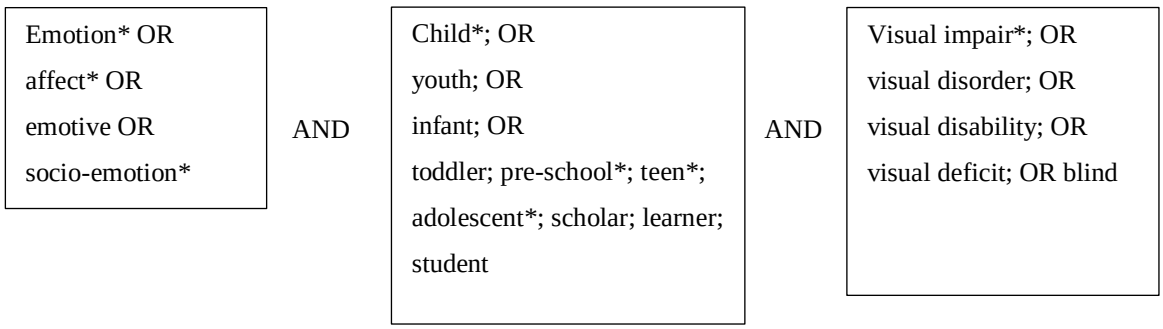


Figure 2.4. Search terms

The databases that were utilised included Educational Resources Information Clearing House (ERIC); CINAHL; MEDLINE; British Humanities Index; Applied Social Sciences Index and Abstracts (ASSI); PsychInfo; JSTOR; SCOPUS; and Taylor and Francis. In addition, hand searches were conducted based on the reference lists of retrieved documents, and three additional documents were identified.

Figure 2.5 depicts the results obtained from the search and the process of eliminating records that did not fulfil the selection criteria. The multiple search terms, albeit ensuring thoroughness, had the consequence of rendering a vast number of documents from database searches at the onset (10 691). An additional three records were identified by hand searches of reference lists. Title screening was undertaken, and 248 records remained, including the three hand-searched records.

Next, duplicates were removed, and the remaining 131 documents were screened at title level. After title screening was done, 75 records were identified to be eligible for abstract screening. Fifty-two of the seventy-five records screened on abstract level were eliminated, and twenty-three articles were assessed for full-text eligibility. Abstract and full-text reviews were conducted by two independent reviewers, and consensus was reached regarding the final inclusion and exclusion of full-text literature to be reviewed. One qualitative and eight quantitative records were included. Reasons for final exclusions of the last 14 studies are provided in Figure 2.5.

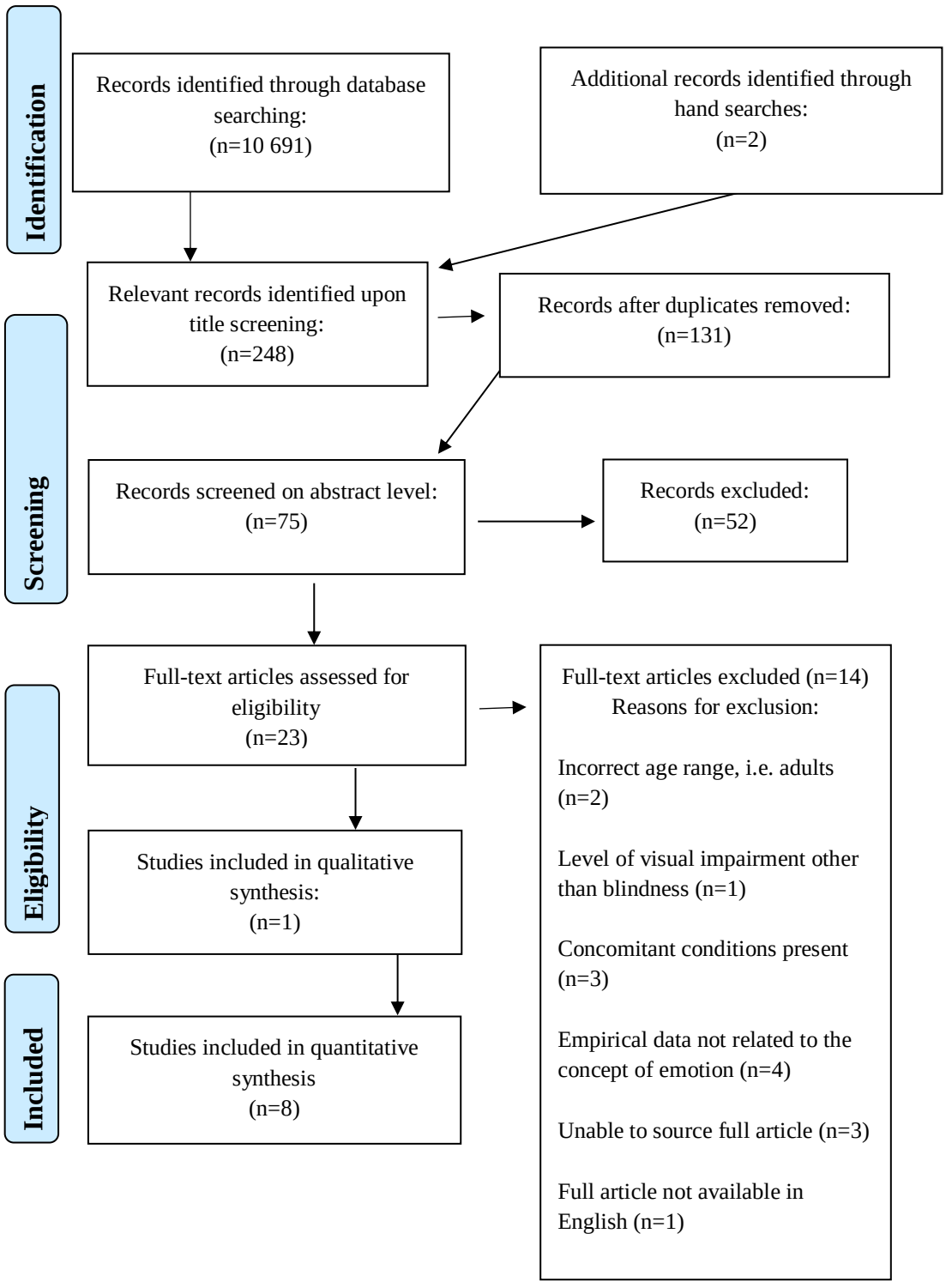


Figure 2.5. PRISMA diagram

The final eight studies identified from the systematic search following the PRISMA procedure adapted from the guidelines by Moher, Liberati, Tetzlaff, and Altman (2009) are summarised in detail in Table 2.5.

Table 2.5

Previous Studies on the Development of Children with Blindness (Ordered Alphabetically According to Authors)

Author(s) & Year of Publication	Publication Title	Sample Size	Age Range	Key Variable Investigated	Main Finding
Campbell and Johnston (2009)	Emotional availability in parent-child dyads where children are blind.	4 mother-child pairs	1;6-1;7 years; months	To identify the challenges in adapting to the (emotion) information needs of their children who are blind.	Without visual cues, children who are blind need explicit information about feelings and intentions of others.
Cole, Jenkins, and Shott (1989)	Spontaneous expressive control in blind and sighted children.	24 children: 12 sighted and 12 with blindness	6;0-13;11 years; months	The effect of blindness on the spontaneous expressive control of negative emotion was examined.	Blindness does not preclude the spontaneous expressive control of negative emotion.
Demir et al. (2014)	Attachment characteristics and behavioural problems in children and adolescents with congenital blindness.	40 children and adolescents with blindness	11;0-14;11 years; months	Study aimed to assess the behavioural problems and the attachment characteristics of children and adolescents with congenital blindness.	Children and adolescents with congenital blindness did not differ from the comparison group in terms of attachment, whereas they had lower scores on behavioural problems than the comparison group. However, previous studies indicate that children and adolescents with congenital blindness may be at the risk of insecure attachment. Adaptive mechanisms of their families together with professional help from specialised teachers and services provided by schools may play compensatory roles.

Author(s) & Year of Publication	Publication Title	Sample Size	Age Range	Key Variable Investigated	Main Finding
Dyck et al. (2004)	Emotion recognition/ understanding ability in hearing or vision-impaired children: Do sights, sounds, or words make a difference?	49 children with hearing loss; 42 children with visual impairment (from moderate loss to blindness); 72 children with no sensory impairment.	6;0-18;11 years; months	To determine whether children with sensory disabilities have consistent delays in acquiring emotion understanding and identification abilities.	Children with visual impairment do not necessarily show deficits in emotion understanding but have specific delays in emotion identification. However, they do surpass the comparison groups on emotion vocabulary. Children with hearing impairment exhibit a broad range of impairments pertaining to both emotion understanding and identification which are mainly related to language difficulties.
Galati, Miceli, and Sini (2001)	Judging and coding facial expression of emotions in congenitally blind children.	20 children: 10 sighted and 10 with blindness	6;0-4;11 years; months	Investigate the facial expression of emotions in very young sighted and congenitally blind children to find out whether these are objectively and subjectively recognisable. Study also tried to see whether the adequacy of the facial expression of emotions changes as the children get older.	All the participants (both the blind and sighted) were able to express their emotions facially, though not always according to the theoretically expected pattern. Recognition of the various expressions was fairly accurate, but some emotions were systematically confused with others. There was no decrease in the facial expressiveness of the blind children in the period of development considered.

Author(s) & Year of Publication	Publication Title	Sample Size	Age Range	Key Variable Investigated	Main Finding
Galati, Sini, Schmidt, and Tinti (2003)	Spontaneous facial expressions in children with congenital blindness and sighted peers aged 8-11 years.	20 children: 10 with blindness and 10 sighted	8;0-11;11 years; months	To verify if there is a critical period in the development of children who are blind in which the facial movements that express emotion begin to differ from those of sighted children due to the lack of visual learning.	The emotional facial expressions of congenitally blind and sighted children are similar. The frequency of certain facial movements were higher in blind children. Social influences were evident only in the expressions of the sighted children, who often masked their negative emotions.
Minter, Hobson, and Pring (1991)	Recognition of vocally expressed emotion by congenitally blind children.	16 children: 8 with blindness and 8 sighted	6;0-12;11 years; months	The ability to identify vocal expressions of primary emotion.	Children with congenital blindness were less able to identify emotions than non-emotional expressions from sound clips when compared to slightly younger sighted children.
Roch-Levecq (2006)	Production of basic emotions by children with congenital blindness: Evidence for the embodiment of Theory of Mind.	40 children: 20 sighted and 20 with blindness	4;0-12;11 years; months	Examined false belief as well as the understanding and production of basic emotions.	Children with blindness scored lower on false belief tasks, had lower understanding of emotion, and did not convey facial expression of emotion as accurately as sighted children.

Upon review of the previous research done in the field of emotion development of children with blindness (see Table 2.5), elements of emotion-related phenomena that have been studied focus on attachment (Campbell & Johnston, 2009; Demir et al., 2004) and expression (Cole et al., 1989; Galati et al., 2001; Galati et al., 2003) rather than on identification. Regarding attachment, it was found that in the parent-child dyad of a child with blindness, children need explicit cues about the emotions of others, in particular, their parents for effective attachment due to lack of visual cues (Campbell & Johnston, 2009). Although young children with blindness may have a higher risk of forming insecure attachments, adaptive mechanisms facilitated by teachers and family members may serve as compensatory factors and aid more typical attachment formation, as children with blindness show no differences in attachment formation during adolescence as compared to children without blindness (Demir et al., 2004).

Where emotion expression is concerned, Cole et al. (1989) found that blindness does not inhibit the spontaneous expressive control of negative emotion in children with blindness as compared to sighted peers. Galati et al. (2001) evaluated the coding of the facial expression of emotion by children with congenital blindness and determined that although coding can be a fairly accurate method, some emotions were systematically confused. It is possibly due to the subjective understanding of the coder, rather than the subjective expression of the child with blindness, that interferes with the judgement of the expressed emotion. There was no decrease in facial expression of emotion as compared to sighted peers during the developmental age investigated (0;6-4;0 years; months), but the emotion expression did not always follow the theoretically expected patterns.

Furthermore, Galati et al. (2003) determined that the facial expression of emotions of children with congenital blindness are similar to that of their sighted peers in the age group 8;0 to 11;11 years; months. Certain facial movements were more frequent in children with congenital blindness. Where expression is concerned, social influences only had an impact on the expressions of the sighted children, who often masked their negative emotions, but this was not the case with children having congenital blindness.

One study included emotion understanding (Roch-Levecq, 2006) based on vignettes relating to self, in other words, intrapersonal emotion identification, and focused on primary

emotions. This study found no significant differences between children with blindness and children with typical development.

Two studies investigated emotion identification in others. The study by Minter et al. (1991) was based on, and attempted to expand, the findings of a study by Blau (1964, cited in Minter et al., 1991). Blau applied a combination of three instruments, namely, the Affect-Attention test, the Accuracy-of-Feelings test, and the Sound Accuracy test and found that children with blindness were attentive to the affective quality of dialogue but were less able to correctly identify verbal expression of emotions. Blau (cited in Minter et al., 1991) highlighted this as an unexpected finding, as children with blindness were expected to perform better on vocal/audio tasks due to their general sound recognition abilities being more refined. The study of Minter et al. (1991) differed in two ways from that of Blau. First, they tested younger children (6;0-12;11 years; months) instead of adolescents, as tested by Blau. Secondly, where Blau's Accuracy-of-Feelings test was procedurally different from his control test for judgements of non-emotional sounds, Minter et al. (1991) attempted to use more closely comparable sets of emotion and non-emotion recognition tasks by utilising emotion and non-emotion audio tapes for both children with blindness and the control group.

In the study by Minter et al. (1991), children were asked to listen to audio tapes containing non-verbal and verbal emotional sounds as well as various non-emotional sound effects. The non-verbal emotional sounds consisted of, for example, angry snorts, happy humming, sad sighs and groans, while the verbal emotional sounds consisted of a neutral content prose reading in each of the six emotion expressive tones of voice. The non-emotional stimuli consisted of sound sequences of six vehicles, six birds, and six garden implements being used. The participants were asked to categorise the sounds they heard, and the researchers discovered that no significant differences were found between the groups as far as sound effect recognition from non-emotional expressions were concerned. However, children with congenital blindness had greater difficulties in the identification of emotions from verbal and non-verbal audio-recorded sounds when compared to sighted peers. The general ability to recognise sounds as well as differences in overall language ability were eliminated as possible contributory factors in the differences found in identifying and categorising the six emotions of anger, happiness, sadness, fear, surprise, and disgust.

The second study that tested emotion recognition, as summarised in Table 2.5, is that of Dyck et al. (2004). It assessed whether children (6;0-18;11 years; months) with sensory disabilities have consistent delays in acquiring emotion understanding and emotion recognition (i.e. identification). The researchers compared 49 children with hearing impairment, 42 children with visual impairment, and 72 children with no sensory impairment on their performance on the Emotion Recognition Scale (ERS). They also attempted to elaborate on the findings of the study by Minter et al. (1991) – as discussed above – who found that children 6;0-12;11 years; months, with visual impairment and blindness, were less able to understand and identify emotion sounds than were controls.

The main instrument of measurement employed by Dyck et al. (2004) was the ERS, which tested both the understanding and identification of emotions. The ERS consists of five different tests comprising nine scales in total. Some of these tests were reliant on visual, and some on auditory stimuli, and they tested the primary emotions of anger, happiness, sadness, fear, surprise, and disgust. Only one HOE, namely, contempt is tested by this scale. Dyck et al. (2004) administered different combinations of the ERS scales to the respective comparison groups, and the tests were presented in whatever format best-facilitated understanding for a specific child they were testing (i.e. depending on the nature, or absence, of the specific sensory impairment). The lack of consistent test stimuli across participants may have negatively compromised the test results as was the case with Blau's (1964) findings cited in Minter et al. (1991) and Dyck et al. (2004) indicated this as one of their limitations.

Dyck et al. (2004) concluded that children with visual impairment can understand emotion concepts, and their emotion vocabulary exceeds that of the comparison groups, but they do exhibit a significant emotion identification deficit. Dyck et al. (2004) further emphasised that apart from studies reporting that children with visual impairment and blindness have a general delay in ToM acquisition (McAlpine & Moore, 1995; Minter, Hobson & Bishop, 1998; Peterson, Peterson, & Webb, 2000), very little is known about the ToM 'mind-reading' ability of children with visual impairment and how this impacts on their emotion identification ability. ToM mind-reading refers to the ability to *"conceptualize other people's inner worlds and to reflect on their thoughts and feelings"* (Gilberg, 1992, p. 835); in other words, it subsists the child's ability to infer the emotional states of others and accurately identify these emotions.

From the literature review summarised in Table 2.5, it is evident that no study comparing HOE identification in children with blindness and typically developing children could be located. Since HOE identification is closely linked to the development of ToM mind-reading ability, literature pertaining to ToM in children with blindness is considered in the following section which illuminates the importance of HOE identification in the attainment of emotional competence.

2.5.2.2 Theory of Mind in children with blindness

Within the field of emotion research, authors such as Parkinson, Fischer, and Manstead (2005) support the idea that comprehending minds come through interaction because many emotions are interpersonal rather than purely intrapsychic. Thus, humans do not make an inferential leap to guess the minds of others, as they are actually part of that same shared emotion episode in a shared reality, that is, process of social constructionism. This is particularly applicable to HOEs such as social emotions (e.g. pride and arrogance) as well as moral emotions (e.g. contempt) (Morris, Doe, & Godsell, 2008). HOEs can accordingly be understood to be prevalent in the shared experience of a joint psychological reality and operate through the mechanism of ToM in which they are embedded. In a typically developing child, the process of developing ToM is facilitated through sight.

The lack of vision prevents the development of important ToM precursors such as shared experiences based on joint visual attention and visual observations of subjective emotion states (Bedny, Pascual-Leone, & Saxe, 2009; Begeer, Dik, Voor de Wind, Asbrock, Brambring, & Kef, 2014; Minter et al., 1998). The antecedents of ToM development include forms of non-verbal communication that begin to function at birth (Korkmaz, 2011). Perceiving faces and identifying facial expressions of emotions, specifically when identifying HOEs, are paramount for the perceptual components of ToM.

Several studies have recounted impairments in the ToM in children from this population (McAlpine & Moore, 1995; Minter et al., 1998; Wellman & Liu, 2004). Results of earlier studies (Baron-Cohen, 2003; McAlpine & Moore, 1995) conducted with children who are blind mutually supported the finding that a general ToM developmental delay of four to seven years can be expected in the majority of these children. The landmark study of McAlpine and Moore (1995) depicted a developmental trajectory of ToM in blind and

severely visually impaired children. The research results indicated that blind children, aged seven to eight years have the lowest results on all tested levels of ToM. At the age of nine to ten, blind children show much better results on ToM tasks. Baron-Cohen (2003) found that children with severe visual impairment and blindness do not achieve success on ToM tasks before the age of 11, whereas typically developing sighted children can solve simple false belief tasks by four or five years of age (Wellman & Liu, 2004) and pass more complex false belief tasks by age six to seven (Baron-Cohen, 2003).

In later research such as that of Brambring and Asbrock (2010), it was argued that such findings may be skewed by the fact that the false belief tasks employed as the main mode of measurement of ToM disadvantaged blind children, since the materials used as well as the expected actions to be performed were based on visual experience rather than tactile or auditory ones. Their data determined a more likely delay of one to two years. Glumbić, Jablan, and Hanak (2011) attempted to further address this measurement deficit by developing tasks employing objects and actions more sensitive to the experiential world of the blind child. The results obtained by means of their innovative procedures confirmed the approximate one to two-year delay as found by Brambring and Asbrock (2010), as their findings determined that before the age of 11, a delay of one-and-a-half years in ToM acquisition was indicated as being a more accurate reflection. Glumbić et al. (2011) did not only discount the aforementioned delay of four to seven years as earlier indicated by Baron-Cohen (2003) and McAlpine and Moore (1995) but also stated that this delay of ToM development is not unique and comparable to delays in other domains.

By 11 to 12 years of age, it was found that blind children showed no significant discrepancy in ToM tasks when compared to sighted peers or those with low vision (Glumbić et al., 2011). They are perceived to ‘catch up’ during this time. Data from a study by Koster-Hale, Bedny, and Saxe (2014) showed a common end point in adulthood where the development of ToM is concerned. Although blind adults appear to possess a typical ToM, it is not clear as to when, or how exactly, this ‘catching up’ takes place, as children are delayed on a variety of ToM tasks including both those primarily reliant on vision and those who are not.

If HOE identification in others is construed as an ability that requires perspective taking (i.e. ToM), it would follow that a delay in the development of ToM would likely be associated with a delay in HOE identification in others. One may even expect the ability of children with

blindness to identify HOEs to show the same developmental patterns of delay and catching up as shown by their development of ToM. To address these questions, this study set out to compare the HOE identification abilities in two cohorts of children, namely, children with blindness aged 8;0-11;11 years; months and typically developing peers. Results of a younger subgroup (8;0-9;11 years; months) versus an older subgroup (10;0-11;11 years; months) were also compared within and across age groups in order to understand the developmental progression of this skill in both groups.

2.6 Conclusion

The literature reviewed in this chapter indicated that studies investigating emotion identification and mental state recognition with blind and visually impaired children have found that prominent skill deficits exist in the domains of emotional and social information processing of ToM. Considering then that HOE identification is embedded in ToM as one of its central features, it is the hypothesis of this study that there will be a deficit in HOE identification by children with congenital blindness or a severe visual impairment as compared to this ability in typically developing children.

The next chapter will focus on the research methodology employed in this study.

CHAPTER 3
METHODOLOGY

3.1 Introduction

The preceding chapter reviewed literature relevant to this study. This chapter discusses the research methodology followed in obtaining and analysing the research data. It commences by outlining the main aim and delineating the sub-aims of the study. The research design is then described as well as the phases of the study. The participant selection criteria and recruitment procedures are given for both cohorts as well as a description of the research sites and participants. Next, the material and equipment required for screening and data collection are discussed, followed by a description of all procedures followed for the pilot studies and the main data collection. Data analysis of descriptive and inferential statistics, as well as the procedural integrity of the data collection process and the reliability of the collected data, is reported. Finally, ethical considerations in conducting the study are described.

3.2 Research Aims

This study aimed to achieve the main aim and sub-aims that follow.

3.2.1 Main aim

The main aim of this study was to describe and compare the ability of children 8;0-11;11 years; months old with blindness, in order to identify HOEs in others from voice recordings, with that of typically developing children.

3.2.2 Sub-aims

The following sub-aims were formulated to address the main aim:

(i) To measure and describe the accuracy with which the cohort of children with blindness aged 8;0-11;11 years; months can identify HOEs in others from voice recordings, and to compare the performance of two age subgroups (children aged

8;0-9;11 years; months and children aged 10;0-11;11 years; months) within this cohort

(ii) To measure and describe the accuracy with which a cohort of typically developing children aged 8;0-11;11 years; months can identify HOEs in others from voice recordings, and to compare the performance of two age subgroups (children aged 8;0-9;11 years; months and children aged 10;0-11;11 years; months) within this cohort

(iii) To compare the overall accuracy with which the two cohorts can identify HOEs in others from voice recordings

(iv) To compare the accuracy with which the age subgroups (children aged 8;0-9;11 years; months and children aged 10;0-11;11 years; months) across the two cohorts can identify HOEs in others from voice recordings

(v) To describe response patterns based on an error analysis of the incorrectly identified HOEs by both cohorts

3.3 Design and Phases of the Research Process

A quantitative, non-experimental comparative design was used to compare the accuracy with which the two cohorts identified HOEs in others from voice recordings. This design is especially applicable when exploring differences between two or more groups (in this case, children with blindness and typically developing children) on the phenomenon being studied (HOE identification) prior to delving into other complexities (McMillan & Schumacher, 2006). The study consisted of a planning phase and an experimental phase. A brief overview is given in Figure 3.1 of the chronology of the two phases.

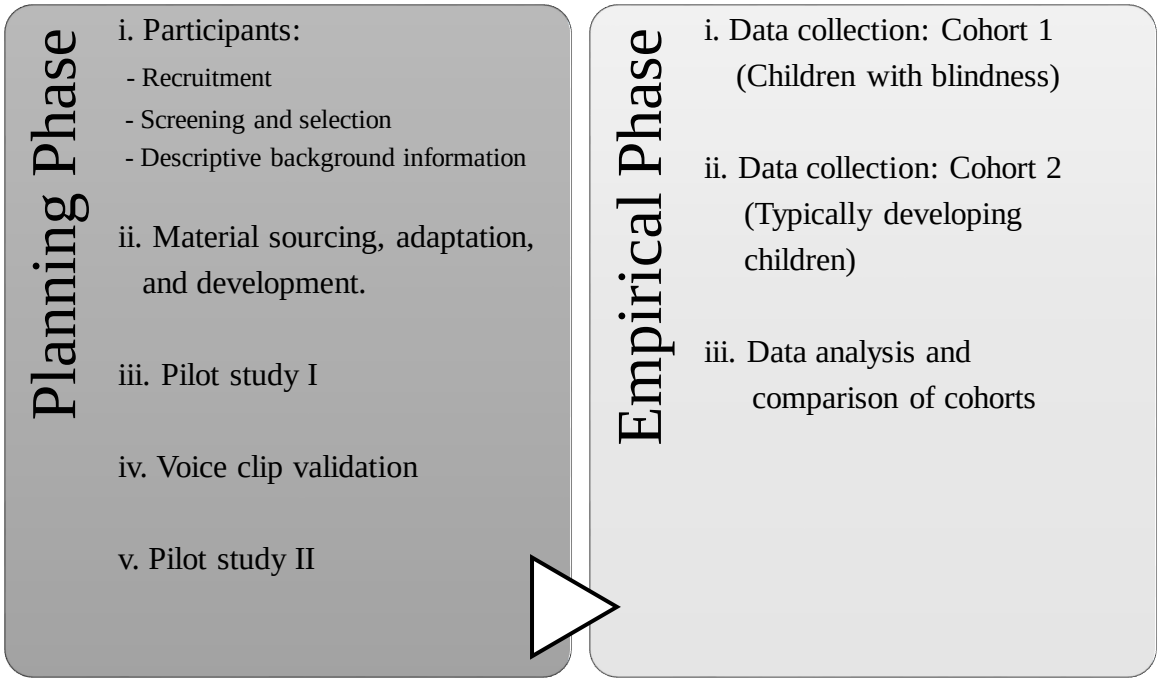


Figure 3.1. Overview of the research phases

3.4 Participant Selection and Recruitment

There were two participant cohorts in this study, namely, children with blindness (henceforth referred to as Cohort 1) and typically developing children (henceforth referred to as Cohort 2). Cohort 1 participants were recruited first, followed by Cohort 2 participants who were matched on age, gender, and race.

3.4.1 Cohort 1: Children with blindness

3.4.1.1 Selection criteria for Cohort 1

For participants to be included in the sample, they had to meet the selection criteria listed in Table 3.1.

Table 3.1

Selection Criteria for Cohort 1 Participants: Children with Blindness

Selection criteria	Justification for selection	Method of measurement
Children within the chronological age range of 8;0 to 11;11 years; months	Within this age range, children are not only able to identify emotional labels but also begin to exhibit a heightened understanding of the emotional states of others (Wenar & Kerig, 2000). The standardised instrument that was used (CAM-C Voice Task) was specifically designed for this age group (Golan et al., 2015).	Biographical information sheet (see Appendix A).
Blindness (including legal and functional blindness) or a severe visual impairment from birth or diagnosed before the age of 1 year	The ability to self-differentiate from others and the world through sight develops from the end of the first year of life onwards (Sandler & Hobson, 2001).	Documented information that the child had a visual acuity of less than 6/60 with the best optical correction, regardless of whether the field of vision loss is central or peripheral (Landsberg 2016, p. 416). This information was provided by the school teacher on the biographical information sheet (see Appendix A).
Age-equivalent language abilities in English	The CAM-C Voice Task (Golan et al., 2015) of HOE identification and the Williams Intelligence Test for Children with Defective Vision (WIT) (Williams, 1956) were administered in English for the following reasons: (i) The tests were developed in English and translation into multiple other languages would necessitate a process of establishing linguistic equivalence. Results from tests administered in different languages may not have been comparable; (ii) The researcher is fluent in English; and (iii) The researcher had access to schools for learners with blindness where the language of teaching and learning was English. In order not to disadvantage participants' performance in these tests, age-equivalent English skills were required.	Participants needed to have received at least three years of instruction in English. In addition, they had to achieve an age-equivalent score on The WIT Independent Vocabulary Test (Williams, 1956) (see Appendix B).

Selection criteria	Justification for selection	Method of measurement
Typical cognitive development	Cognitive ability influences children's ability to identify HOEs (Mayer, Salovey, Caruso, & Sitarenios, 2001). Cognitive ability outside of the typical range would therefore represent a confounding factor.	Participants had to obtain an Intelligence Quotient that falls above the intellectual disability range on the WIT (Williams, 1956). Teacher report indicated that the child had never repeated a year at school on the biographical information sheet (see Appendix A).
No hearing impairment	The data collection will rely solely on auditory input; therefore, adequate hearing capacity is required, as a hearing impairment, or the presence of an infection, will also influence the results.	Participants had to pass a hearing screening test consisting of a tympanogram and auditory reflex measures. Data was captured on the participant screening form (see Appendix C).
Primary emotion identification	Prior to administering tasks requiring higher-order skills, foundational skill mastery has to be established.	Children needed to correctly identify at least 5 out of the 6 primary emotions on the Primary Emotion Identification Screener (see Appendix D).

3.4.1.2 Recruitment of children with blindness

Prior to recruitment, the study was approved by the Research Ethics Committee of the Faculty of Humanities of University of Pretoria (see Appendix E). Permission was also obtained from the relevant provincial education departments from the provinces selected for the study, namely, Limpopo (Pilot study 1) and Gauteng (Pilot study 2 and main study) (see Appendices F[i] and F[ii]).

The study applied purposive sampling due to the specific nature of the children targeted for inclusion in Cohort 1, namely, children with a severe visual impairment or with blindness. Accordingly, a deliberate effort was made to recruit participants representative of the specific population (Daley & Onwuegbuzie, 2004; Kerlinger & Lee, 2000). McMillan and Schumacher (2006) state that this strategy is applicable when working with participants from small parameter populations (i.e. the low prevalence of children with severe visual impairment diagnosed before the age of one year) to provide in-depth information that will increase its usefulness.

Considering then that only 1 in 10 000 children are diagnosed with a congenital severe visual impairment, including blindness (Wright, 2008), a sampling procedure suitable for smaller samples is applicable to the intended study. McMillan and Schumacher (2006) further indicate that when purposive sampling is used, the researcher needs to identify an information-rich setting to conduct the study. It was therefore decided that participants for Cohort 1 would be recruited from special needs schools for learners with severe visual impairment in the Limpopo (for a pilot study) and Gauteng provinces (for main data collection).

One special needs school accommodating children from the population of interest, and which employs English as a main language of tuition was approached in both Limpopo and Gauteng provinces. After an introductory phone call, a personal meeting was scheduled with the principal of the targeted school during which the intended research project was introduced. The principal permission letter (Appendix G) was left with the school principal for discussion with the relevant stakeholders at their institution.

For the first pilot study, the principal granted permission, and four teachers as well as the school nurse were allocated to the researcher to provide assistance in potential participant identification. For the main data collection, the principal at the targeted school in Gauteng province granted permission and completed the required permission documentation. The principal then identified the relevant class teachers based on the age groups of the children serving as the population from which the participants would be recruited. A total of four teachers and four teaching assistants were identified across four grades within the school (Grade 1-4).

The aforementioned teachers and assistants were then approached individually to enquire about their interest in assisting in the research project. All eight teachers, as well as the school nurse, indicated their willingness to assist as did all four of the teaching assistants at the school where main data collection would take place. They were provided with an information letter (Appendix H). The relevant teachers assisted in nominating potential participants and distributing information letters and consent forms to them to pass onto their parents or guardians (Appendix I). For a description of the procedure followed regarding the pilot studies, please refer to Sections 3.6.4.1 and 3.6.4.2. Where the main data collection site is concerned, a total of 29 letters were distributed, and 22 parents consented, while one did not consent and six did not return the consent form. The children whose parents consented were asked for assent by reading an assent script (Appendix J). This procedure is described in more detail in Section 3.6.3. All 22 of the children assented and the screening procedure commenced (see Sections 3.6.3 and 3.6.5).

3.4.1.3 Participant screening and selection

Information regarding the selection criteria was obtained by means of (i) a biographical information sheet completed by the researcher during a teacher interview (see Section 3.6.3 and Appendix A), (ii) the Williams Intelligence Test for Children with Defective Vision (WIT) (Williams, 1956) (see Section 3.5.1.2), and (iii) a hearing screening test consisting of a tympanogram and an auditory reflexes test. The materials, equipment, and procedures used for screening are described in more detail in Sections 3.5 and 3.6.

A participant screening form (Appendix C) was developed for the purpose of recording participant screening outcomes and, ultimately, either the inclusion or exclusion of a specific potential participant. The form is, in essence, a user-friendly summary of the selection criteria, including the results of the required evaluations as specified by point (i) to (iii) in the previous paragraph.

All 22 potential participants with blindness who provided assent were screened. Twenty of them met all the selection criteria, while one had to be excluded due to a hearing difficulty and one due to having had repeated a grade at school. The age, gender, and race of the 20 participants included in Cohort 1 was noted in preparation for a matching group of typically developing children (Cohort 2).

3.4.2 Cohort 2: Typically developing children

3.4.2.1 Matching variables

Regarding matched variables, participants were matched on age (in years, measured as a categorical variable), since age has been shown to influence HOE identification (Gao & Maurer, 2009). Culture also plays a central role in emotion identification ability (Wang, 2003), but it is a difficult construct to measure. Accordingly, children were matched on race as a proxy for culture. Children were also matched on gender, as gender differences have been observed in children's emotion identification ability (Brackett, Rivers, Shiffman, Lerner, & Salovey, 2006; Durand, Gallay, Seigneuric, Robichon, & Baudouin, 2007; Elfenbein & Ambady, 2003).

3.4.2.2 Selection criteria for Cohort 2

Table 3.2 summarises the selection criteria, the justification for each criterion, as well as the measurement used for each criterion for participant selection for Cohort 2.

Table 3.2

Selection Criteria for Cohort 2 Participants: Typically Developing Children

Selection criteria	Justification for selection	Method of measurement
Matched to Cohort 1 participants for gender, age, and race	To eliminate any confounding variables that may be produced by a discrepancy in age, gender, or race between the two cohorts (see motivation given under Section 3.4.2.1).	Teachers were asked to provide this information in the course of the recruitment process for participants in Cohort 2 (see Section 3.6.3).
No uncorrected visual impairment present	The purpose of the study is to compare children with blindness to typically developing peers.	Biographical information sheet (see Appendix A).
Age-equivalent language abilities in English	The CAM-C Voice Task of HOE recognition and the WIT were administered in English for the following reasons: (i) The tests were developed in English and translation into multiple other languages would necessitate a process of establishing linguistic	Participants needed to have received at least three years of instruction in English. In addition, they had to achieve an

Selection criteria	Justification for selection	Method of measurement
	equivalence. Results from tests administered in different languages may not have been comparable; (ii) The researcher is fluent in English; and (iii) The researcher had access to schools for learners with blindness where the language of teaching and learning was English. In order not to disadvantage participants' performance in these tests, age-equivalent English skills were required.	age-equivalent score on The WIT Independent Vocabulary Test (Williams, 1956) (see Appendix B).
Typical Cognitive Development	Cognitive ability influences children's ability to identify HOEs (Mayer et al., 2001). Cognitive ability outside of the typical range would therefore represent a confounding factor.	Participants had to obtain an Intelligence Quotient that falls above the intellectual disability range on the WIT (Williams, 1956). Teacher report indicating that the child has never repeated a year at school on the biographical information sheet (see Appendix A).
No hearing impairment	The data collection will rely solely on auditory input; therefore, adequate hearing capacity is required, and a hearing impairment or the presence of an infection will also influence the results.	Participants had to pass a hearing screening test consisting of a tympanogram and auditory reflex measures, as captured on the participant screening form (see Appendix C).
Primary emotion identification	Prior to administering tasks requiring HOE skills, foundational skill mastery had to be established.	Children needed to correctly identify at least 5 out of the 6 primary emotions on the Primary Emotion Identification Screener (see Appendix D).

3.4.2.3 Recruitment of typically developing children

An aftercare centre in the same province with a comparable socio-economic context as a special needs school was approached. Children from mainstream government schools attend this centre for supervision and care during working hours of parents. After an introductory phone call, a personal meeting was scheduled with the manager of the centre during which the intended research project was introduced. The principal permission letter (Appendix G) was left with the aftercare centre manager for discussion with the relevant stakeholders at their institution. The manager at the intended aftercare centre granted permission and completed the required permission documentation. The manager then identified the relevant aftercare teachers based on the age groups of the children serving as the population from which the participants would be recruited. A total of seven aftercare teachers who were responsible for the specific age range were identified and approached to enquire about their interest in assisting in the research project. All seven teachers indicated their willingness to assist. They were provided with an information letter (see Appendix H).

The relevant aftercare teachers at the centre were provided with a list of the selection criteria as well as the matching variables (age, gender, and race) of Cohort 1 participants which they used to assist in nominating potential participants and distributing information letters and consent forms to the nominated children to pass onto their parents or guardians. Regarding the matching of age, a difference of no more than eight months in age was permitted. A total of 20 letters were distributed to the parents of the identified children who would match the Cohort 1 participants. A total of eighteen letters were returned, where seventeen parents consented, while one did not consent and two did not return the consent form. A further three letters were distributed to three more potential participants, and all three were returned, but only two consented. The aftercare teacher then contacted parents who had not previously returned the consent letters to enquire whether they had received it; one parent indicated that they had not and upon resending it, the parent returned it, granting consent for two siblings. The parents of these 21 children were requested to also provide the last school report's information to the aftercare teacher at the centre in order to conduct the screening for possible selection for participation.

3.4.2.4 Participant screening and selection

Assent was obtained for all 21 children whose parents consented. From the available 21 potential participants, one was excluded due to an ear infection at the time of evaluation. The remaining 20 children qualified for inclusion upon screening and were included in the study. Since age was a matching factor, this resulted in 10 participants in each age subgroup (8;0-9;11 years; months subgroup and 10;0-11;11 years; months subgroup) and a total of 20 matched participants in Cohort 2.

3.4.3 Description of the research sites

Participants in Cohort 1 were recruited from a school for learners with severe visual impairment or blindness in Gauteng province. Table 3.3 provides a summary of the school and classrooms from which learners were recruited.

Table 3.3

Description of the Site Utilised for Cohort 1 Participant Selection (Children with Blindness)

Grade	Language of Learning and Teaching (LoLT)	Total number of learners per classroom	Adult to child ratio in target classrooms	Number of children recruited from this classroom
1	English	9	1 : ±5	7
2	English	8	1 : 4	5
3	English	10	1 : 5	6
4	English	12	1 : 6	2

An aftercare centre providing supervision and care for children of parents who work shifts in the Gauteng province was identified as an ideal site, since it provided access to children without any interference with their academic schedule and was therefore more feasible. This centre provided this low-cost service to children from mainstream public schools in the surrounding areas. English was indicated by the participating institutions as the Language of Learning and Teaching (LoLT). Furthermore, the language of communication at the centre is English as well. Table 3.4 provides a description of the centre from where Cohort 2 participants were recruited.

Table 3.4

Description of the Site Utilised for Cohort 2 Participant Selection (Typically Developing Children)

Grade	Language of Learning and Teaching (LoLT)	Total number of learners per classroom	Adult to child ratio in target classrooms	Number of children recruited from this classroom
1	English	26	1 : ±9	1
2	English	21	1 : 11	7
3	English	19	1 : 10	2
4	English	20	1 : 10	5
5	English	20	1 : 10	5

3.4.4 Participant description

Descriptive criteria pertaining to age, gender, race, home language, number of years of English tuition, and level of cognitive functioning were gathered by means of (i) the biographical information sheet (refer to Appendix A) and (ii) the WIT.

3.4.4.1 Matched variables

Appendix K gives an overview of the age, gender, and race of each matched pair of participants from the two comparison cohorts. The age and race distributions of participants are shown in Figure 3.2 and Figure 3.3.

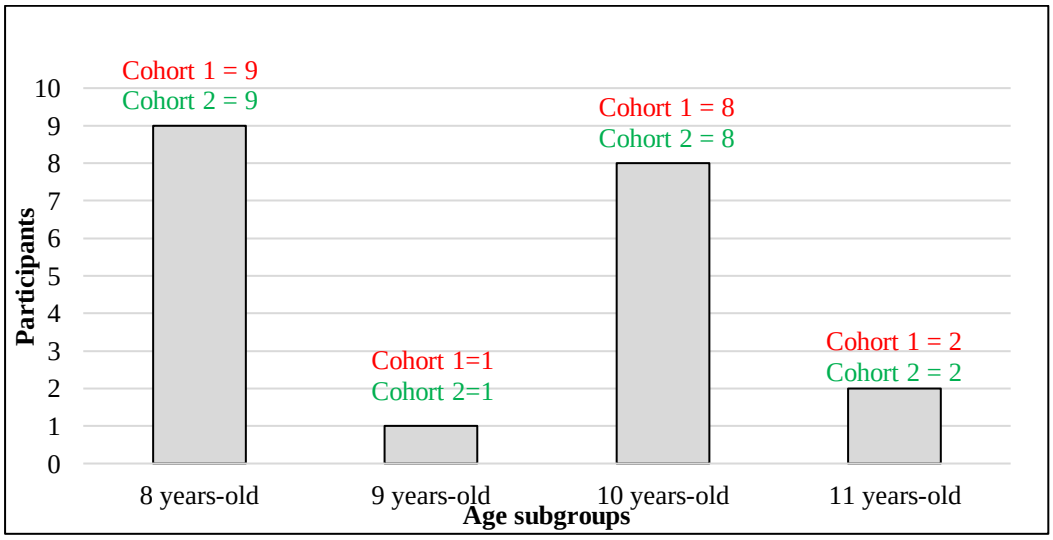


Figure 3.2. Chronological age distribution of participants of both cohorts (N=40)

The age distribution for both cohorts is set out in Figure 3.2. The two main age subgroups within both cohorts was equal, with 50% of participants in the 8;0-9;11 years; months age group and 50% of participants in the 10;0-11;11 years; months age group. As indicated Figure 3.2, in both the two main comparison cohorts, the largest numbers of participants fell within the lower parameters of the two age subgroups with nine participants aged 8;0 years (in the 8;0-9;11 years; months subgroup) and eight participants aged 10;11 years (in the 10;0-11;11 years; months subgroup) in each cohort. The upper parameters of the two age subgroups were in the minority, with only two participants aged 11;11 years and only one participant 9;0 years of age in each cohort. The mean age of the participants in each group was 9;5 years; months.

As far as the second descriptive variable that participants were matched on, namely, gender is concerned, distribution of participants was equal with 10 participants (50%) male and female in each of the comparison cohorts. The third matched participant descriptive variable, namely, race is shown in Figure 3.3. The choice of the race descriptive terminology, namely, 'black', 'coloured', and 'white' are the terms utilised by Statistics South Africa – the state-owned entity mandated to collect national demographic data – and these terms were therefore applied in this study as well (Statistics South Africa, 2016). The majority of the participants (*n*=12; 60%) were black, while the number and percentage of white and coloured participants were equal (*n*=4; 20% each).

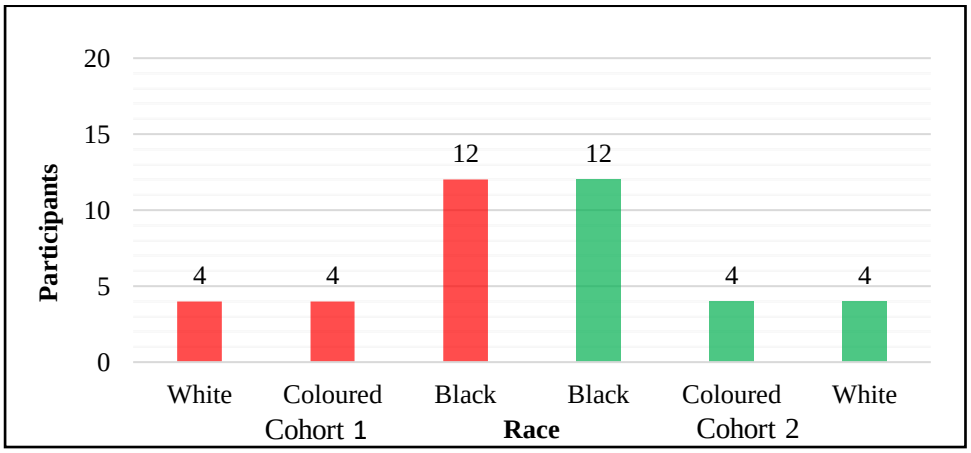


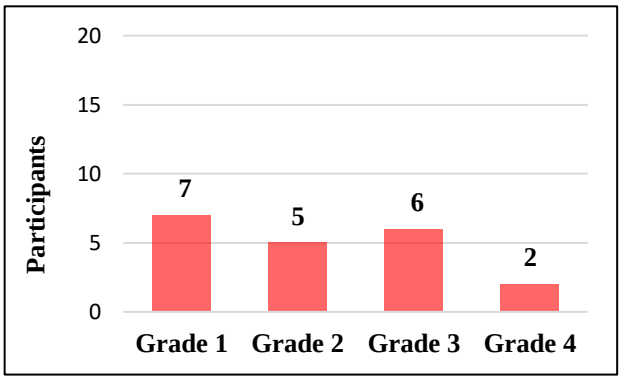
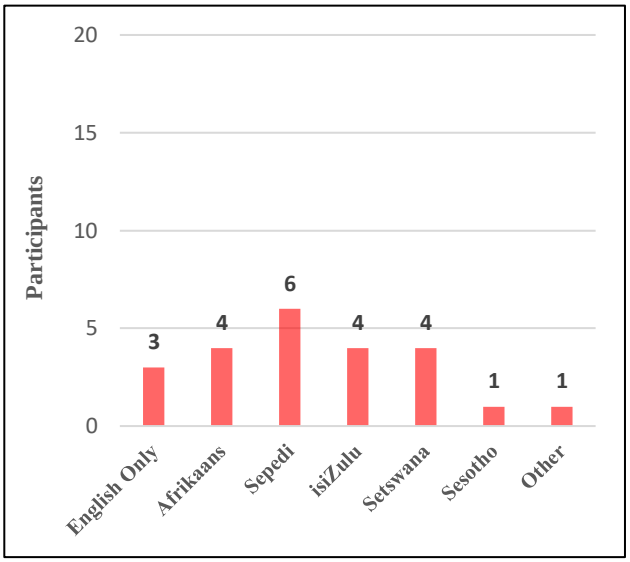
Figure 3.3. Race distribution of participants in the two comparison cohorts

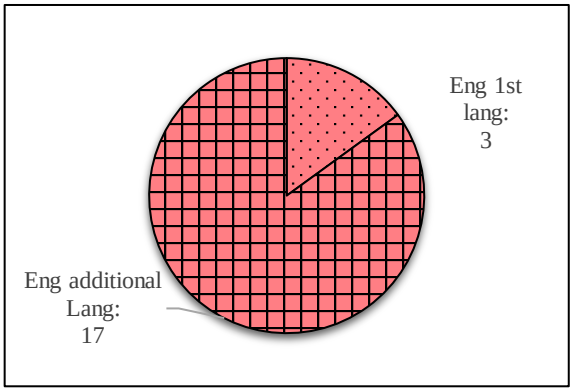
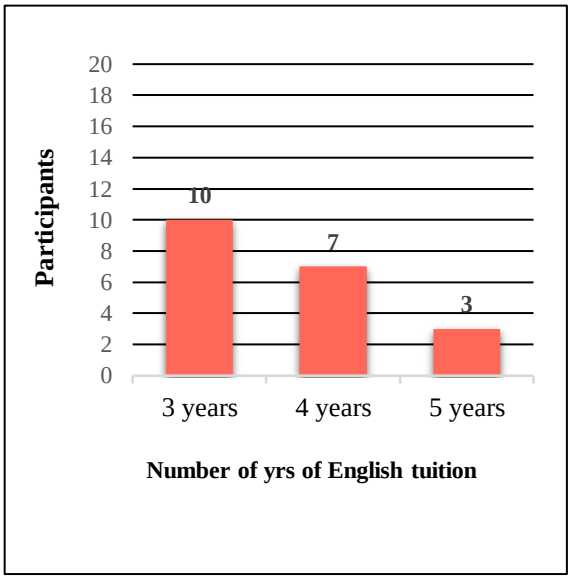
3.4.4.2 Non-matched variables

Table 3.5 and Table 3.6 show all the descriptive elements on which participants were not matched. Cohort 1 participants (children with blindness) are described in Table 3.5, and Cohort 2 participants are discussed in Table 3.6.

Table 3.5

Description of Cohort 1 Participants on Non-Matched Variables

Variables	Description	Graphical representation
Grade distribution	The participants consisted of seven first graders (35%), five second graders (25%), six third graders (30%) and two fourth graders (10%).	
Home language(s) spoken	Some participants spoke more than one language at home (over and above English as additional language they all used). Four spoke isiZulu, a Nguni language, while 11 spoke a Sotho language, namely, Sepedi (6), Setswana (4) and Sesotho (1). One participant spoke Kiswahili in addition to English at home. Four participants spoke Afrikaans at home while three participants spoke only English at home.	

Variables	Description	Graphical representation
Use of English	Three participants (15%) indicated that they use English as the main language spoken in the home environment while 17 participants (85%) use English as an additional language at home.	
Years of English tuition	Ten participants (50%) had received three years of formal exposure to English as their LoLT, including the preparatory phases, prior to entering foundation phase education. Seven participants (35%) had been exposed to four years of English as LoLT and one participant (15%) had received tuition in English for five years.	

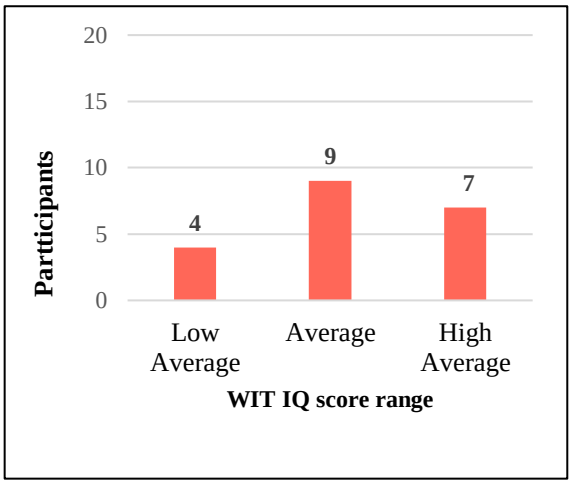
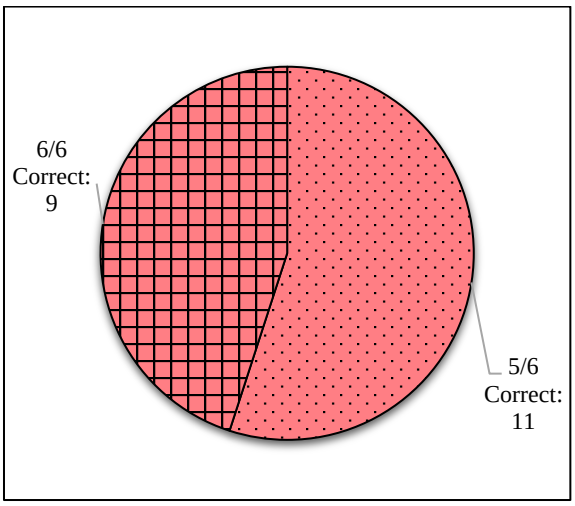
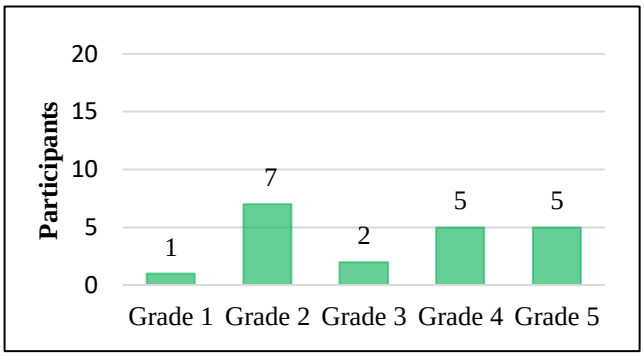
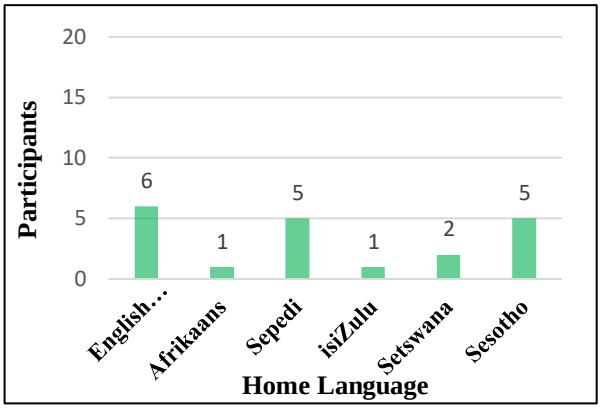
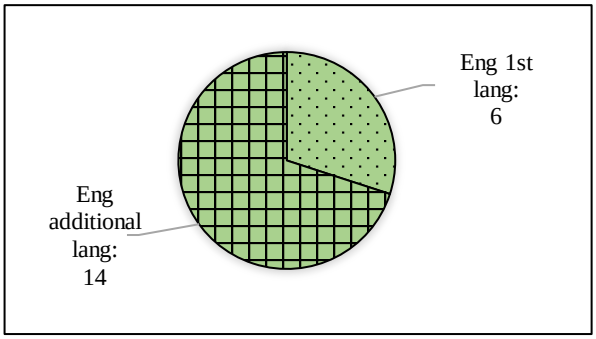
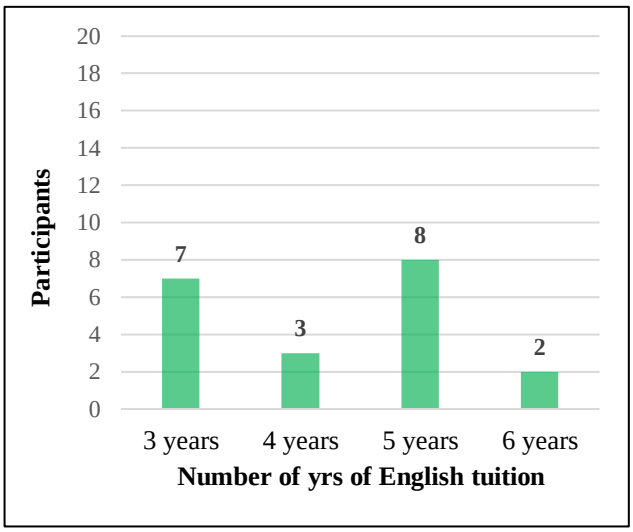
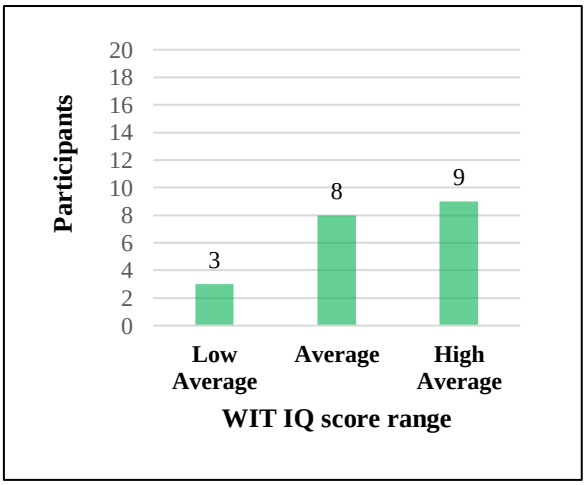
Variables	Description	Graphical representation
Cognitive functioning	All participants were of average cognitive functioning (i.e., IQ score of 80 and above). Four (20%) of the participants with a severe visual impairment showed a low average level of cognitive functioning (i.e., IQ score range: 80-89). Nine (45%) fell within the most common percentile rank of average cognitive functioning (i.e., IQ score range: 90-109). It was determined that 7 (35%) of the participants functioned cognitively at a high average level (i.e., IQ score range: 110-119).	
Primary emotion identification	During the screening process 11 participants (55%) achieved 83,3% success by correctly identifying 5 out of the 6 basic emotions presented. Nine participants (45%) achieved a 100% success rate.	

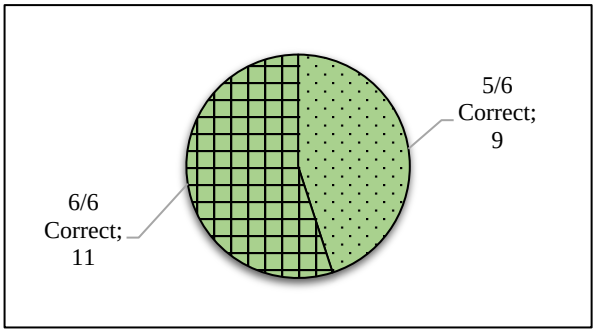
Table 3.6 shows the descriptive elements of Cohort 2 (typically developing children) on the variables on which the cohorts were not matched.

Table 3.6

Description of Cohort 2 Participants on Non-Matched Variables

VARIABLE	DESCRIPTION	GRAPHICAL REPRESENTATION
Grade distribution	The participants consisted of one first grader (5%), seven second graders (35%), two third graders (20%), five fourth graders (25%) and five fifth graders (25%).	
Home language(s) spoken	One spoke isiZulu, a Nguni language, while 12 spoke a Sotho language, namely, Sepedi (5), Setswana (2) and Sesotho (5). One participant spoke Afrikaans at home and six participants spoke only English at home.	
Use of English	Six participants (30%) indicated that they use English as the only language spoken at home while 14 participants (70%) utilized English as an additional language in their home.	

VARIABLE	DESCRIPTION	GRAPHICAL REPRESENTATION
Years of English tuition	Seven participants (35%) had received three years of formal exposure to English as their LoLT, including the preparatory phases prior to entering foundation phase education. Three participants (15%) had been exposed to four years of English as LoLT, eight participants (40%) had received tuition and learning in English for five years. Only 2 participants (10%) had received six years of exposure with English as the LoLT.	
Cognitive functioning	All the participants were of average cognitive functioning. Three of the participants (15%) with typical development showed a low average level of cognitive functioning (i.e., IQ score range: 80-89). Eight (40%), fell within the most common percentile rank of average cognitive functioning (i.e., IQ score range: 90-109). Nine (45%) functioned cognitively at a high average level (i.e., IQ score range: 110-119).	

VARIABLE	DESCRIPTION	GRAPHICAL REPRESENTATION
Primary emotion identification	During the screening process nine participants (45%) achieved 83,3% success by correctly identifying 5 out of the 6 primary emotions presented. Eleven participants (55%) achieved a 100% success rate during the primary emotion identification screener used for participant recruitment.	

3.4.5 Group equivalence

The two cohorts, i.e. Cohort 1 (children with blindness) and Cohort 2 (typically developing children) were matched on three variables, namely, age, gender, and race as is described in Section 3.4.4.1. An overview of the matched pairs of children from Cohort 1 and Cohort 2 is provided in Appendix K. Section 4.6 and Table 4.3 provide a summary of group equivalence on matched variables. Table 4.4 in Section 4.6 portrays the group equivalence of non-matched variables for this study.

3.5 Material and Equipment

3.5.1 Material used for screening

The materials used for screening included the biographical information sheet (Appendix A), the WIT (Williams, 1956), as well as the Primary Emotion Identification Screener (Appendix D), included in the Participant Screening Form (Appendix C). This Participant Screening Form (Appendix C) was used to summarise all data obtained during the screening procedure.

3.5.1.1 The biographical information sheet

The biographical information sheet was designed to obtain biographical information pertaining to the participant. This was completed by the researcher (based on an interview with the teacher) for the participants of both cohorts (see Appendix A).

3.5.1.2 The Williams Intelligence Test for Children with Defective Vision

As part of the screening procedures, the Williams Intelligence Test for Children with Defective Vision (WIT) (Williams, 1956) was administered to both groups in order to eliminate the possible presence of an intellectual disability. The WIT test is one of the limited number of tests of intelligence that have been validated for use with children who are blind or have a severe visual impairment but that can also be administered to children who do not have a visual impairment. It was fundamentally based on an early version of the Stanford-Binet Scale (Thorndike et al., 1986), and items were adapted in such a way that the test could be administered to both blind and sighted children aged five to fifteen years (Williams, 1956).

Instruments such as the Wechsler Intelligence Scale for Children-Revised (WISC-R) (Wechsler, 1974), the British Ability Scales (BAS) (Elliot, 1983), and the Standford-Binet Intelligence Test, 4th Edition (S-B, 4th) (Thorndike et al., 1986) may be well standardised for fully sighted children but are not suitable for children with a severe visual impairment, as many of the subtests are dependent on visual stimuli during administration. Tobin and Hill (2011) indicated that the wide range of intellectual processes probed by the WIT makes it a useful instrument for obtaining information about the cognitive development of a child with visual impairment. The WIT measures (i) reasoning (similarities, quantitative, and social reasoning), (ii) short-term memory, (iii) spatial imagery, (iv) retrieval and application of knowledge (number skills, verbal fluency, and comprehension), and (v) word definition.

Tobin and Hill (2011) determined the test-retest correlation coefficients to reach what can be considered highly satisfactory levels, the lowest being +0.835 between the first and third testings, and the highest being +0.936 between the second and third testings. The study of Parand and Behpazhouh (2001) also indicated high reliability and validity with split-half reliability for three groups of subjects ranging from 0.64 to 0.87. They found the correlation between the subjects' intelligence quotients and academic achievement to be 0.73.

As mentioned earlier, the WIT can be administered to children with, and without, a severe visual impairment or blindness. Williams (1956) indicated that even though some of the test items appear to be easier for blind than for sighted children, and vice versa, essentially, it means that one set of results help to balance the other, and accordingly, Williams (1956) concluded that this test proves valid for both groups of children. Currently, no specialised alternative for the WIT is available for the South African setting. As such, some of the Western test item content had to be adapted in order to make them contextually applicable to the South African context and to the variety of cultures found in South Africa (Bornman, Sevcik, Romski, & Pae, 2010).

As Bornman et al. (2010) recommend, when recruiting reviewers for the adaptation process, careful consideration should be given that individuals from the target cultural group for whom the instrument was being adapted has been included to ensure the applicability and reliability of the adaptations. Two South African psychologists – one clinical psychologist from an English-speaking cultural background and one educational psychologist from an African cultural background (with Sepedi as a home language) – identified the items that were in need of adaptation.

The identified items were then listed together with suggested alternatives and presented for input from a third South African psychologist with an African cultural background (with Sepedi as a home language) and in possession of a master's degree in psychology. This psychologist has extensive experience in psychometric, and specifically cognitive assessment of children, from a vast variety of African ethnic groups. The list was also presented to a South African speech-language pathologist. The speech-language pathologist was of English-speaking background and possessed a PhD degree with specialisation in Augmentative and Alternative Communication and expertise in severe disability assessment. The principles of linguistic equivalence, functional equivalence, and cultural equivalence, as outlined by Peña (2007), were upheld in the translation and adaptation process. Once consensus was reached after discussion, the test items were adapted and prepared for testing of their feasibility during the pilot study. A summary of the adaptations that were made is presented in Appendix L.

3.5.1.3 The Primary Emotion Identification Screener

Golan et al. (2015) tested six basic emotions, namely, *happy, sad, angry, afraid, disgusted,* and *surprised* with audio clips obtained from the emotion voice recordings bank of an emotions library called "Mindreading" (Baron-Cohen, Golan, Wheelwright, & Hill, 2004; Golan et al., 2015). These researchers tested each of the six primary emotions across three items. However, in the 2015 study, Golan et al. (2015) did not specify which voice recordings they selected from the 412 human emotion expressions available in the Mindreading library which are divided into 24 emotion categories. Each of the emotion categories are assessed by means of four methods of assessment consisting of six items each, namely, six facial images, six videos, six mini-stories, and six voice recordings. The emotion categories are sub-divided into a primary emotions identification voice task and HOE identification voice task. The primary emotions voice task was utilised as the Primary Emotion Identification Screener (see Appendix D) for the purpose of participant selection in this study.

Even though the test items did indicate the foils used, Golan et al. (2015) did not highlight which three of the six voice recordings they selected from the Mindreading library. Therefore, the current study had to initiate a method of compiling the voice recordings to be used for the Primary Emotions Screener. The voice recordings selected from the Mindreading library had to be validated for use with the intended population (South African children 8;0-11;11 years; months). To determine the voice recordings most accurately reflecting each of the six primary emotions to be tested, all six voice recordings available for each of the six primary emotions (i.e. 36) in the Mindreading library were presented to a panel of 11 multidisciplinary professionals for review and selection.

This panel consisted of psychologists, registered counsellors, psychometrists, speech and language therapists, occupational therapists, and medical doctors, all of whom had a minimum of five years of experience with children with disabilities. The purpose was to select voice recordings most representative of the specific emotional load and also to ensure face validity of the selected clips as items that could test the recognition of primary emotions. It was important to establish that there was no perceived interference from the accent of the speaker in the recording and also to ensure that the content of the clip was culturally, contextually, and linguistically appropriate to South African children, seeing that it was developed in a different context (Bornman et al., 2010; Peña, 2007).

The panel reached consensus in its final selection of the voice recording to be used for each of the primary emotion test items. Seeing that the purpose was to screen, and not to fully assess primary emotion recognition, the expert panel also recommended only one test item per emotion rather than three as used in the original assessment scale (Golan et al., 2015). The final Primary Emotion Identification Screener is presented in Appendix D. A handout listing simple definitions for the target emotion words as well as the foils was provided to the panel for easy reference during the voice clip selection process. These definitions were extracted from the original CAM-C emotion word definition list (Golan et al., 2015).

Once a voice recording was selected for each of the six basic emotions that would be used for the purpose of screening and selection, response cards to be used during administration were designed containing all four options (emotion words) and its corresponding definitions on each card (see Appendix D). The Primary Emotion Identification Screener (Appendix D) was administered to 50 typically developing children recruited from an aftercare centre in the age range 8;0-11;11 years; months in order to establish content validity. The purpose was to ascertain whether the six audio clips chosen for the screener (i) accurately represented the specific emotional load it was intending to measure and (ii) were applicable to the age range in question. Furthermore, it also evaluated whether one test item per emotion would be sufficient.

The same selection criteria as used for the main study was applied to select the 50 children (see Section 3.4.2.2 and Table 3.2). The same procedure as described in Section 3.4.2.3 was followed to obtain permission from the school (see Appendix M for principal permission letter for validation procedures and Appendix N for the teacher information letter), consent from parents/legal guardians (see Appendix O for parent/guardian consent letter for validation procedure), and assent from the children (see Appendix J for assent script). The procedures for administrating the Primary Emotion Identification Screener were identical to the procedures used to administer the CAM-C Voice Task (see Section 3.6.6). The criterion for passing the screener was arbitrarily set at no less than five of six correct answers.

The majority of the children (n=47; 94%), regardless of age, correctly identified at least five of the six basic emotions from the voice recordings. A total of forty-four children (88%) identified all items correctly, while three children (6%) identified five items correctly. Three

children did not pass the screener. Upon exploration, it became apparent that the mother of 8- and 9-year-old siblings seemed to have over-reported their proficiency in English, and their poor performance on the screener may have been the result of a language barrier. The third child who did not pass (10 years of age) had difficulty sustaining attention to the task and may have had an undiagnosed attention deficit disorder. Had this disorder been previously diagnosed, this child would have been excluded on the basis of a developmental problem being present. The percentage of correct responses for each of the six items is given in Table 3.7.

Table 3.7

Responses during Primary Emotion Identification Screener Validation (N=50)

	'Happy'	**'Angry'**	**'Sad'**	**'Surprised'**	**'Afraid'**	**'Disgusted'**
% correct	94%	94%	98%	90%	94%	94%
Number of participants	(44)	(44)	(49)	(45)	(44)	(44)

No adaptations were made to the Primary Emotion Identification Screener. It was deemed appropriate for application as a screening tool for recruitment during the main data collection process.

3.5.1.4 The Participant Screening Form

The Participant Screening Forms (see Appendix C) were designed to provide a concise tool for effective identification of participants that could be either considered for recruitment or eliminated based on the potential participant's profile summary visible at a glance. There were two versions of the form, one for each cohort, based on the selection criteria for the potential participants of the two cohorts. In essence, this form was a summary of the selection criteria, including the IQ score obtained from the WIT and the performance on the Primary Emotion Identification Screener. It was indicated on the form whether all the requirements were passed or not, which then resulted in a final 'include' or 'exclude' indicator. The form was used at both research sites during the screening of all children identified as potential participants by the teachers or aftercare caregivers whose parents/guardians had given consent.

3.5.2 Material used for data collection: The Cambridge Mindreading Face-Voice Battery for Children Voice Task

This instrument (Golan & Baron-Cohen, 2006) was designed specifically for measuring emotion identification in other individuals. For this study, only the Voice-Task section was administered.

3.5.2.1 Development, description, and application of the Cambridge Mindreading Face-Voice Battery for Children

This instrument is an adaptation of an emotion recognition battery for adults that was originally designed to assess the recognition of 15 emotion concepts (Golan & Baron-Cohen, 2006). The adapted battery for children has been utilised in samples with age ranges from 8;0-11;11 (Golan et al., 2008; Golan et al., 2015; LaCava et al., 2007). The CAM-C tests six primary emotions, namely, *happy, sad, angry, afraid, disgusted,* and *surprised.* The CAM-C also assesses nine HOEs and mental states, namely, *loving, embarrassed, undecided, unfriendly, bothered, nervous, disappointed, amused,* and *jealous*. The CAM-C tests emotion recognition using two subtests, each consisting of a unimodal task – a *Face Task* and *Voice Task.*

The two subtests consist of 45 items each – 18 primary emotion items and 27 HOE items, with each emotion being tested with three different items each. The Voice Task consists of recordings of short sentences (three to five seconds in duration) expressing various emotional intonations (Golan & Baron-Cohen, 2006). Male and female professional actors of various ages (children and adults) and ethnicities were used for the voice recordings in an attempt to increase the voice tasks's applicability and generalisability as well as enabling as large a population as possible, to be able to relate to it.

The two subtests (Face Task and the Voice Task) can be administered separately. Also, the primary emotion items can be administered separately to the HOE items (Golan & Baron-Cohen, 2006). The HOE concepts tested include emotions that are developmentally significant and are subtle variations of basic emotions that have a mental component (Golan et al., 2015). All nine of these HOEs are important for everyday social functioning. For each emotional concept, three voice items were created. The voice clips were derived from an

established interactive guide to emotions, called “Mindreading” (Baron-Cohen et al., 2004; Golan et al., 2015; Rafaeli, 2004.

Three foils were set for each item, using the emotion taxonomy. Selected foils are either set at the same developmental level or an easier level than the targeted emotion. Foils for the vocal items were selected so that they matched the verbal content of the scene but not the intonation itself. For example, “You’ve done it again”, spoken in an *amused* intonation, then had *interested, unsure,* and *thinking* as foils. The original version of the instrument provided the participants with a definition handout which includes all the definitions for the target emotions as well as the foils (Golan et al., 2015). In the study of Golan et al. (2015), the researchers presented the items and recorded responses electronically using software which the participants themselves operated on a personal computer.

A summary of the primary and HOEs tested by the CAM-C was available in electronic format online (Baron-Cohen, 2007) as well as the definition handouts. For the HOE items, these handouts consisted of a total of 49 emotion words with complex definitions for each and additional simple definitions for some of these words. Definition handouts contained both complex and simple definitions albeit with some of the simple definitions omitted. (See Appendix P for the list utilised for this study that was extracted from the original list as well as Section 3.5.2.4.1 for the development of the omitted simple definitions.) The voice recordings for all nine of the HOEs were available but not those used for the primary emotion testing. The CAM-C has been used to assess HOE identification in combination with other instruments and predominantly with the specific population of children with ASD.

3.5.2.2 Previous application of the Cambridge Mindreading Face-Voice Battery for Children

Studies in the field of emotion recognition utilising the CAM-C as an instrument of data collection are summarised in Table 3.8.

Table 3.8

Previous Studies Utilising the Cambridge Mindreading Face-Voice Battery for Children

Author(s)	Age Group	Title	Application
LaCava et al. (2007)	8;0 to 11;11	Using assistive technology to teach emotion recognition to students with Asperger syndrome: A pilot study	Explored the use of assistive technology to teach emotion recognition to eight children with Autism Spectrum Disorder (ASD). The CAM-C was used for pre- and post-testing of emotion recognition ability concerning the intervention implemented.
Golan et al. (2008)	8;3 to 11;8	The 'Reading the Mind in Films' Task [Child Version]: Complex emotion and mental state recognition in children with and without Autism Spectrum Conditions	Reports the results of the 'Reading the Mind in Films' Task (Child Version) (RMF-C) comparing recognition of complex emotions and mental states in social contexts by 23 children with ASD with that of 24 children with typical development. The CAM-C (Voice and Face tasks) and RMF-C results were correlated to investigate the applicability of the context element when assessing complex emotion recognition.
Golan et al. (2015)	8;0 to 11;11	The Cambridge Mindreading Face-Voice Battery for Children (CAM-C): Complex emotion recognition in children with and without Autism Spectrum Conditions	The study described how the CAM-C (Face and Voice tasks) were utilised in testing recognition of nine complex emotions by children with and without ASD and examined the psychometric properties of the CAM-C.

3.5.2.3 Psychometric properties of the Cambridge Mindreading Face-Voice Battery for Children

The quality of the data produced in research utilising methods such as vignettes or audio clips can be enhanced by minimising the possibility of participants employing the principle of *satisficing* when responding, that is, to cognitively process the content in a haphazard and ineffective way (Stolte, 1994). Some of the limitations of the use of audio stimuli were illustrated by Barling and Phillips (1993) and more recently by Boenink, Oderwald, De Jonge, Van Tilburg, and Smal (2004). A typical feature is that such methodologies frequently

maximise internal validity but are low in external validity and generalisability. This can in part be attributed to the distance between the content perception and the actual social reality (Barter & Renold, 2000). However, despite the highlighted limitations, several authors support the use of this mode of data collection in research with children and adolescents when exploring sensitive and/or complex topics (Barter & Renold, 2000; Boenink et al., 2004) such as emotions.

The psychometric properties of the CAM-C were established in two studies. Golan et al. (2015) established the validity of the CAM-C by evaluating the accuracy with which children aged 8;0-11;11 years with and without ASD could recognise nine complex emotions and mental states from video clips and voice recordings used in the CAM-C test battery. The performance of 30 high-functioning children with ASD was compared to a control group of typically developing children matched on gender, age, and IQ. CAM-C Face and Voice Task scores were positively correlated with each other ($r=60$; $p<.001$). A total of 21 participants from the ASD group took the CAM-C twice in order to establish test-retest reliability forming part of an intervention study in which these children fulfilled the purpose of no-intervention controls. The test-retest correlations were $r=.74$ for the Face Task and $r=.76$ for the Voice Task ($p<.001$ for both).

Golan et al. (2008) found that the CAM-C scores (based on scores from 23 children with ASD and 24 children with typical development) correlated well with another measure of HOE recognition, the Reading the Mind in Film's Task – Child Version (RMF-C). There was a positive correlation between the RMF-C scores and the CAM-C Face Task scores ($r=.68$; $p<.001$), the Voice Task ($r=.68$; $p<.001$), and the number of CAM-C emotion concepts recognised ($r=.63$; $p<.001$).

3.5.2.4 Use and adaptations for this study

The original instrument (CAM) from which the children's version was later developed can render an independent result for the vocal emotion recognition score (Golan & Baron-Cohen, 2006). For the purpose of this study, only the Voice Task sub-scale and only the items pertaining to HOEs were utilised for main data collection due to the characteristics of the sample (i.e. children with blindness).

3.5.2.4.1 Establishing face validity of voice clips

Upon selection of the measuring instrument – the Voice Task sub-scale of the CAM-C – the researcher had not been able to locate any study applying the selected instrument to the South African setting. To explore the face validity of the content, an expert panel review with nine professionals working in therapeutic disciplines, namely, three psychologists, one special education needs teacher, and five speech-language therapists/audiologists was conducted. None of the members who were part of the Primary Emotion Identification Screener validation multidisciplinary review panel were included in this expert panel. All of the members of the panel had a master's degree or higher qualification as well as exposure to, and experience with, children, including children with disabilities and/or special needs. The entire list of Voice Task items (three items of each of nine HOEs, therefore 27 voice clips) was played one by one to the whole panel, and for each item, the applicability to the South African context, as well as any possible risk of cultural bias, including the possible impact of foreign accents, was discussed amongst panel members. The members of the expert panel agreed that the content of each of the CAM-C Voice Task items was reflective of the emotion word it intended to reflect and that South African children would be able to relate not only to the content but also the vocabulary used. It was also agreed that the quality of the clips was clearly audible and that no confusion due to any foreign accent was present.

(i) Review of, and additions to, the definition handout:

The second expert panel review assisted in two stages with the development of simple definitions for some of the emotion words presented either as target emotions or foils where such definitions were omitted in the original version of the CAM-C definition supplement (Golan et al., 2015). In the first phase, a list of definitions of the emotion words with both the detailed and the very simple definitions for each emotion word (for target emotions as well as foils) were provided in writing to a group of 12 experts working with children and/or in the field of psychology. Where simple definitions were not available from the original CAM-C version, the researcher added her own definitions. Although the aim was to make additions to the list where the simple emotion definitions were omitted, the complex definitions were also provided as a guide for simple definitions.

The aforementioned panel consisted of two early childhood interventionists, two special education needs teachers, three speech-language therapists, two counselling psychologists,

and three clinical psychologists. All of the panel members were in possession of a minimum three-year tertiary qualification with at least two years of experience in their designated fields. The researcher provided both complex and simple definitions on a list which was distributed electronically to each professional, and they were requested to comment on the simple definitions proposed by the researcher. Professionals gave independent individual input in writing and returned their lists electronically via email. Complete consensus was reached on 46 of the 49 definitions upon first-round discussion.

During the second stage, the panel members suggested changes for three definitions. Based on their suggestions, these three definitions were revised and again presented to the panel via email. The members of the expert panel agreed that the content of each of the reviewed definitions were clear-cut and unambiguous. These definitions were compiled as a definition list handout for use by the administrator during the administration of the CAM-C Voice Task for easy reference in answering questions of the participants (see Appendix P). Furthermore, these definitions were then used to compile the response cards used as scaffolding by the participants during execution of the CAM-C Voice Task (see Appendices Q and R).

(ii) Response cards:

In the original version of the CAM-C administration, respondents utilised computer software to choose from the response options, and the target and foil emotion labels (words) with their corresponding definitions were compiled as a single-page hard copy handout, which they could refer to if needed. For this study, however, the voice clips were played manually by the researcher, and the participants responded by selecting an answer from a response card designed for each test item. The order of the test items was randomised as suggested by Golan et al. (2015). For Cohort 1 (children with blindness), the response cards consisted of 28 cm x 28 cm cardboard cards (see Appendix Q for example of Braille-printed response cards), containing the emotion label for target emotions and foils, as well as the simple definition from the emotion word definition list (see Appendix P). The cards were printed in Braille hard copy format. The Braille response cards were presented in separate sets of cards using either contracted (Grade 1) or uncontracted (Grade 2) Braille provided as options from which the participant could choose the format he/she was most comfortable with prior to administration. For Cohort 2 (typically developing children), the words were printed in traditional orthography, using a Times New Roman size 14 font on 15 x 21 cm cards (see Appendix R).

Two sets of response card booklets in both formats of Braille (uncontracted and contracted) were designed, produced, and proofread by the Braille Services Department of the South African Society for the Blind. Once the printed and Braille booklets with the response cards were obtained, the researcher, with the help of an adult Braille user with 32 years' experience, cross-checked both the printed and Braille formats of the sets of response cards to ensure that they were identical in content. Copies of the participant screening form, biographical information sheet, as well as the CAM-C response record sheet (see Appendix S) were printed and/or photocopied for use with each of the participants.

In contrast to the original CAM-C procedure utilised by Golan et al. (2015), the use of headphones was substituted for the use of audio speakers, as children with blindness were dependent on verbal instructions and reading scaffolding from the researcher. Accordingly, audio speakers were used in administration to both the comparison cohorts.

3.5.2.5 Internal consistency and construct validity of the Cambridge Mindreading Face-Voice Battery for Children Voice Task for this study

For a description of the internal consistency and construct validity of the CAM-C Voice Task, see Section 4.5.

3.5.3 Video recorder

A Samsung HMXF90 HD digital video camcorder 32GB Deluxe Bu was used to make a visual and auditory recording of the assent procedures as well as the data collection procedure.

3.5.4 Laptop and speakers

The audio clips for the CAM-C Voice Task were played using Windows Media Player on a Lenovo E50-80 Notebook (Intel Core i3-5005U 2.0 GHz processor) with Windows 2010 operating system installed on the laptop. A portable Phillips BT3000B audio speaker was used to amplify the voice clips.

3.5.5 Tympanometer

A Resonance R36M Clinical Middle Ear Analyser was used for assessing the participants' auditory functioning which formed part of the participant screening procedure. It was operated by an audiologist registered with the Health Professions Council of South Africa (HPCSA) who was trained in using the specific tympanometer.

3.6 Procedures

Figure 3.4 provides an overview of the steps completed for this study, pertaining both to the planning phase as well as the empirical phase. A description and/or summary of the procedures adhered to for each of these steps follows.

3.6.1 Approval, permission, and consent procedures

Prior to commencement of the study, the study was approved by the Ethics Committee of the Faculty of Humanities of University of Pretoria. Permission was obtained from the applicable provincial departments of education, namely, Limpopo Department of Education (Appendix F [i]) and Gauteng Department of Education (Appendix F [ii]), as well as from the designated school principals, allowing the researcher to recruit participants from these schools. Parental/legal guardian consent was obtained as described in Sections 3.4.1 and 3.4.2 as well as assent from participants themselves, as indicated by the participant assent script in Appendix J.

3.6.2 Material sourcing, adaptation, and/or development

The development of the Participant Screening Form, the adaptation of the Williams Intelligence Test for Children with Defective Vision (WIT) (Williams, 1956), and the development and validation of the voice clips utilised in the Primary Emotion Identification Screener is described in Section 3.5.1.3. The biographical questionnaire and the adaptation of the CAM-C Voice Task for HOE items (Golan et al., 2015) is discussed in Sections 3.5.1.1 and 3.5.2.4.

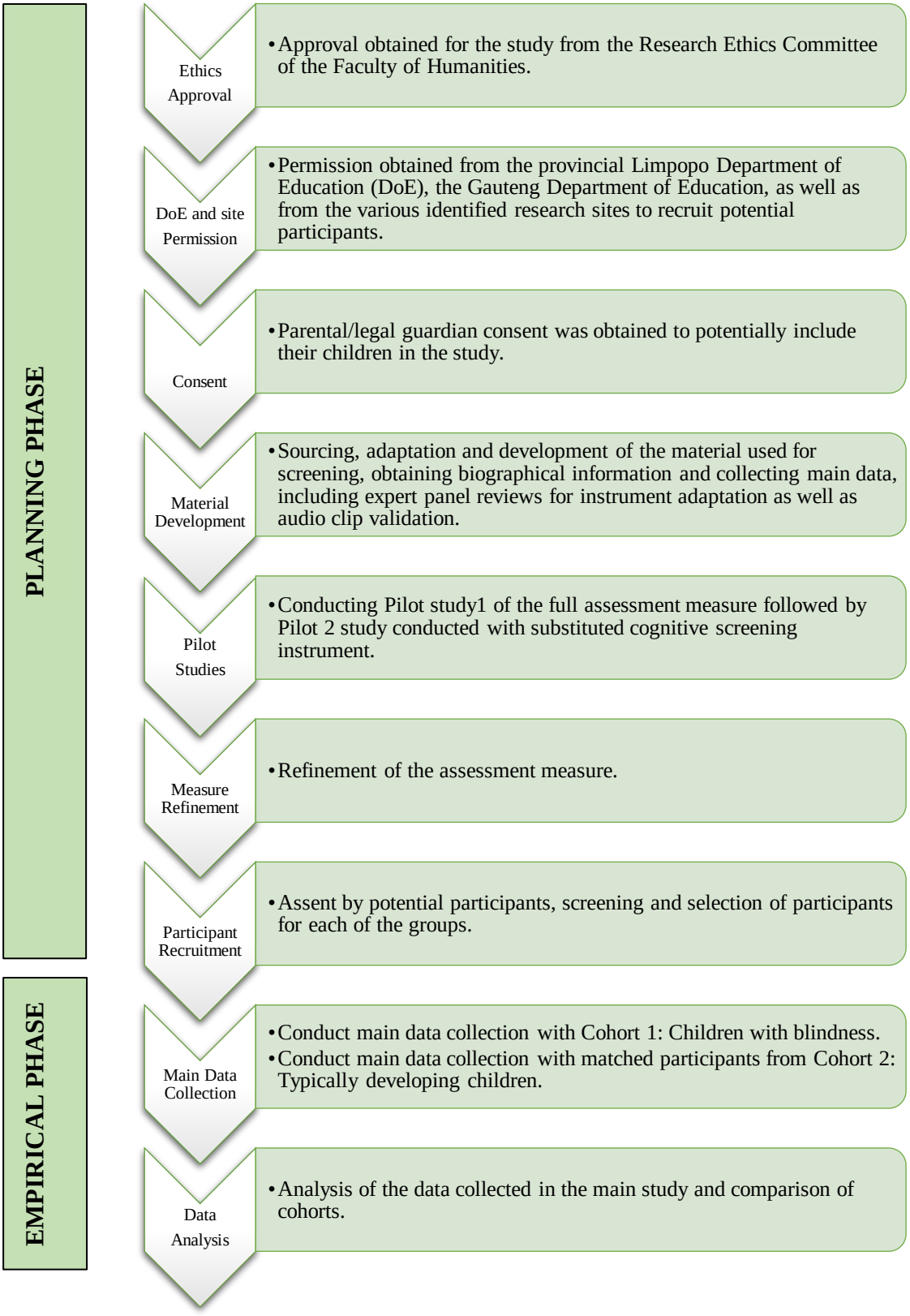


Figure 3.4. Procedural steps followed in this study

3.6.3 General procedures for obtaining background information, child assent, participant screening, and data collection

The first part of the data collection process took the form of a custom-designed biographic information sheet (see Appendix A). This section was completed by the researcher with the assistance of the class teacher in the form of a semi-structured interview (see Section 3.5.1.1). Next, the study was introduced to the child by means of an age-appropriate scripted primer (see Appendix T), to which the child responded verbally. The assent procedure was video recorded.

For procedures directly involving the children (assent, screening, and data collection), the school indicated a suitable time slot and venue for conducting individual screening and data collection with each child identified. In most cases, this consisted of an office or activity room availed to the researcher where noise interference and disruption of the procedure was minimised as far as possible. The child was accompanied to the assessment room by their class teacher, teaching assistant or aftercare teacher, and the researcher introduced herself. Several minutes of rapport building followed until the child appeared at ease enough to commence with data collection procedures. Assent and the first part of the screening procedures were conducted in the first session. Screening was completed during the second session, while data collection (administration of the CAM-C Voice Task) was conducted in a third session to avoid fatigue.

3.6.4 The pilot studies

3.6.4.1 Pilot study 1

A pilot study preceded the main study to evaluate the material and procedures planned for the main study. Various instruments were developed (Biographical Questionnaire and Primary Emotion Identification Screener), adapted (WIT), or were used in part (CAM-C Voice Task) for this study, and all were applied to the specific population (South African children with blindness and typically developing children) for the first time. The pilot study aimed particularly at establishing the instrument's relevance and feasibility (Thabane et al., 2010; Welman, Kruger, Mitchell, & Huysamen, 2005). The pilot study aimed to detect possible flaws in the measurements, their application procedures and to identify unclear or possibly

ambiguously formulated items (Welman et al., 2005). Furthermore, the pilot study established if the participant selection criteria were appropriate.

Four participants were selected for Pilot study 1 – a younger and an older participant with blindness and two participants (matched to the first two participants on age, gender, and race) without disabilities. The reason for selecting a participant from both the lower and higher age ranges was to ensure that all that was set out to be examined by the pilot study would indeed be applicable across the entire age range intended for the data collection.

The site chosen for the pilot study – a school for children with severe visual impairment and blindness which used English as LoLT – was one of the very few schools serving this population in the Limpopo province. Accordingly, the majority of the learners boarded at the school and only went home at the end of the term, and the principal, school nurse, and counsellor were the officially appointed guardians of the children while in the care of the institution. The written consent form was completed by the appointed guardian(s). Seven letters of consent were completed, and two children at this site were identified as meeting the selection criteria, excluding the Primary Emotion Identification Screener, which had not, at this point, formed part of the selection criteria.

To recruit typically developing participants, a mainstream school in the same geographical area was approached, and teachers identified children that would possibly meet the selection criteria. A total of eight letters were distributed to the parents of the children, and six letters were returned with consent granted. The participants were selected based on passing selection criteria as well as meeting matching requirements as described hereafter.

The pilot study included four participants, i.e. two participants with blindness (two females, aged 8;7 and 11;5) who were then matched to two typically developing participants according to gender, age, and race. All four of the participants were from Sepedi-speaking households. At the time of the pilot study, they were reported to have received a minimum of three years of tuition in English. English was a second language for all of them.

Table 3.9

Pilot Study 1: Participant Description

Participant	**Age**	**Gender**	**Race**	**Home language**	**Years of tuition in English**	**Audiometric test results**	**WIT results**
Participant 1: Child with blindness	8;7	Female	Black	Sepedi	Three	No hearing impairment present	Intellectual functioning falls within the *low average* category.
Participant 2: Child with blindness	11;5	Female	Black	Sepedi	Six	No hearing impairment present	Intellectual functioning falls within the *average* category.
Participant 1: Typically developing child	8;7	Female	Black	Sepedi	Three	No hearing impairment present	Intellectual functioning falls within the *high average* category.
Participant 2: Typically developing child	11;5	Female	Black	Sepedi and other	Six	No hearing impairment present	Intellectual functioning falls within the *average* category.

In Table 3.10, the accuracy with which the different participants identified both the primary emotions on the Primary Emotion Identification Screener (which was included as a descriptive measure) and HOEs from the CAM-C Voice Task is summarised.

Table 3.10

Emotion Identification Performance in Pilot Study 1

	Children with blindness		**Typically developing children**	
	8;7-year-old	11;5-year-old	8;7-year-old	11;5-year-old
Results: Primary emotion identification	2/6 correct (33%)	5/6 correct (83%)	2/6 correct (33%)	6/6 correct (100%)
Results: HOE identification	4/27 correct (14.8%)	8/27 correct (29.6%)	13/27 correct (48%)	10/27 correct (37%)

Table 3.11 contains the findings of Pilot study 1 in summarised form as well as the main concerns that indicated the need for adjustment and for which recommendations were made.

Table 3.11

Pilot Study 1: Findings and Recommendations

	Objectives	Materials & Equipment	Procedures	Results	Recommendations for adjustments
1.	To determine the feasibility of the recruitment procedure	School permission letters, teacher information letters, parent information letters, and consent forms	A school for children with severe visual impairment (SVI) or blindness and blindness in Limpopo was identified from a list provided by the South African Society for the Blind. One mainstream school for typically developing children was also identified in the same area. Appointments were scheduled with both the principals for an information session. Once they agreed to participate, the permission and consent letters were distributed to the teachers that would assist with identification of possible candidates for participation.	Making use of teachers to identify potential participants seemed both helpful and effective. The school for children with SVI and blindness suggested that the school nurse could also fulfil this function.	The school should be given the option to suggest the most appropriate person to assist with the identification process.

	Objectives	Materials & Equipment	Procedures	Results	Recommendations for adjustments
2.	To determine whether the procedures for screening participants for selection were appropriate to gather the desired data	Participant Screening Form (See Appendix C).	For each potential participant (including pilot study participants) identified by the teacher/school nurse (in the case of school for children with SVI and blindness), the teacher was asked to provide the required information to the researcher for completing the form.	The procedure of receiving information from the teacher and capturing it on the screening form was appropriate and useful in determining which participants can be recruited as well as eliminating children, and keeping record of those, who did not meet the selection criteria.	Screening procedures and form format are adequate and effective – no recommendations regarding procedure or format made; however, content needs to be adjusted (see below).
		Audiometric testing	A qualified, registered audiologist conducted the audiometric testing for each participant of the pilot study.	The audiometric testing was accurate and adequate in eliminating any possible hearing impairment.	Maintain current format for main study.
		The WIT (Williams, 1952)	The WIT was administered according to its prescribed standard procedure but using, where applicable, the adapted terminology as determined by the expert review.	The WIT was effective in determining the participants' level of cognitive functioning (IQ).	Maintain current format for main study.
3.	To determine whether selection criteria were appropriate		The selection criteria for each cohort, i.e. children with blindness and typically developing children were applied in the selection of the participants. These included all the selection criteria listed in Tables 3.1	All four participants met the suggested selection criteria for their respective groups. However, it was found that across the age range the participants (from both groups) had difficulty with	It was decided to recruit participants from urban rather than rural schools, as exposure to English is typically more prevalent and consistent in urban areas. Also, schools in urban

Objectives	Materials & Equipment	Procedures	Results	Recommendations for adjustments
		and 3.2, with the exception of the need to pass the Primary Emotions Identification Screener.	vocabulary of the emotion word definitions. Although teachers had reported that their language of LoLT had been English for a minimum of three years, it became apparent in subsequent discussions with teachers and support staff that, due to children's limited English exposure prior to school admission, teachers have no choice but to supplement their English teaching with the local languages most spoken in the area, namely, Sepedi. In addition, the two younger participants also struggled to identify the primary emotions on the Primary Emotions Identification Screener.	areas tend to accommodate children from various language backgrounds, and English is therefore used more consistently as the 'common language' (Department of Basic Education, South Africa, 2010). Achieving an age-equivalent score on the WIT Independent Vocabulary Test (Appendix B) was added as an additional selection criterion in order to ascertain adequate English language ability to complete the CAM-C. Apart from teachers reporting on the LoLT of each child, observations would be conducted at all sites to verify the LoLT. It was also decided that children all had to achieve at least 5/6 items correct on the Primary Emotions Identification Screener.

	Objectives	Materials & Equipment	Procedures	Results	Recommendations for adjustments
4.	To determine the applicability and usefulness of the scaffolding material during administration of the CAM-C Voice Task	CAM-C audio clips played via a computer; Sets of Response Cards in print, uncontracted or contracted Braille.	The participants with blindness were given the option to choose a set of response cards either printed in uncontracted (grade 1) or contracted (grade 2) Braille. The typically developing participants were presented with a set of printed orthography cards. Each response card was presented as each test item (audio clip) was played twice. The researcher assisted the participant to read each emotion word and its definition by themselves before, and again after, the audio clips were played.	The 8;7 (years; months) participant with blindness chose the uncontracted Braille format. The participant was not able to make use of the cards, as she was not yet able to read Braille fluently. The researcher had to read each card out loud for the child before and after each item was played.	The researcher needs to read the emotion words and their definition out loud to the participant before, and after, the audio clips were played.
				The 11;5 (years; months) participant with blindness chose the uncontracted Braille format. She was able to use the cards, as she was able to read uncontracted Braille fluently. The researcher was thus not required to assist with reading.	The researcher should read each card out loud to each participant, even those who experience no difficulty for the purpose of congruency and eliminating advantaging one participant over another.
				Neither of the typically developing participants experienced any difficulties with the reading of the scaffolding material.	The researcher should read each card out for all to ensure congruency and eliminate advantaging between the two cohorts.

	Objectives	Materials & Equipment	Procedures	Results	Recommendations for adjustments
5.	To determine the appropriateness of the adapted CAM-C Voice Task to test HOE recognition in South African children with blindness and without disabilities	CAM-C Voice Task audio clips played via a computer; Sets of Response Cards in print, uncontracted or contracted Braille.	Participants were provided with appropriate scaffolding material as described above. Each audio clip was played twice. Then the participant was asked to choose the emotion word from the card that best described how the speaker was feeling.	Participants had difficulty in understanding the emotion words and their definitions. This could have been caused by poor English skills as described under Point 3 in this table. The section following the CAM-C posing questions to the child regarding what made it easier or more difficult for the child to determine the emotion proved redundant, as a point of saturation was reached rapidly with each child answering almost similarly for each question, i.e. indicating (in age-appropriate expression in one form or another) that they relied on the intonation of the speaker's voice to identify the emotion.	Changes as mentioned under Point 3 were implemented. It was also decided to pilot these proposed amendments prior to the main data collection. Instead of posing the same question after each audio clip, it is recommended that the question section be removed altogether, or alternatively to ask the same question only once, in a more generalised manner, once all the audio clips have been played.
6.	To develop a checklist for the procedural integrity	CAM-C Voice Task Response Record sheet (Appendix S).	Requirements for ensuring procedural integrity were noted during each step of the pilot study. These notes	Procedural checklist items were identified.	Procedural checklist was developed (see Appendix U).

	Objectives	Materials & Equipment	Procedures	Results	Recommendations for adjustments
	of the data collection process		informed the design of the procedural checklist that was developed.		
7.	To test the clarity of the instructions used in the measuring instrument	CAM-C Voice Task.	For each of these instruments, the same instructions were used in the administration that would be used in the main study.	The participants all clearly understood the instructions and could follow and execute them with ease.	Maintain as is for main study.
8.	To determine the suitability of the equipment used in the data collection process	Lenovo G580 laptop; Panasonic HDC-HS60 video recorder.	The audio clips were played directly from the laptop hard drive.	Participants found audio clips clearly audible when questioned about clarity.	Maintain as is for main study.
			The video recorder was used to record the assent procedure and the data collection process of the CAM-C administration.	Participants found voice clips clearly audible when questioned about clarity.	Maintain as is for main study.
9.	To test the ease and accuracy of the recording and scoring procedures of responses on the various measuring instruments	WIT; CAM-C; Voice Task.	The standard indicated scoring procedures for these instruments were applied.	The recording and scoring format of the WIT and the CAM-C Voice Task proved effective.	Maintain as is for main study.
				The participants all clearly understood the instructions and could follow and execute them with ease.	Maintain as is for main study.

3.6.4.2 Pilot study 2

At first, it was attempted to get participants with English as a first language in order to eliminate the possible reoccurrence of the previous dilemma; however, due to the small incidence and prevalence of blindness being diagnosed before the age of one year, it was not possible to locate a sufficient number of participants meeting this criterion for the main data collection. A second pilot study was then undertaken retaining the original selection criteria of a minimum of three years English tuition exposure, but it was decided to verify the use of English as the LoLT through classroom observations at the two intended sites identified for participant recruitment. Furthermore, as recommended in Table 3.10, the WIT Independent Vocabulary Test was administered to ensure that level of English language development was equivalent to the participant's chronological age, ensuring proficiency in English. Also, urban rather than rural sites were selected. The main data collection then also took place at these sites.

Pilot study 2 included four participants, that is, two participants with blindness (one male aged 8;6 and one female aged 11;2) who were then matched to two typically developing peers according to age, gender, and race. At the time of the pilot study, they had all received a minimum of three years of tuition in English (including pre-school and Grade 0). Classroom observation confirmed the use of English as indeed being the LoLT at the two intended sites identified for participant recruitment, namely, the school for children with blindness and the aftercare centre for typically developing children in the Gauteng province, in an urban area. The researcher was allowed to sit in on some of the class activities and the aftercare centre homework session. Table 3.12 provides a description of the participants of Pilot study 2.

Table 3.12

Pilot Study 2: Participant Description

Participant	**Age**	**Gender**	**Race**	**Years of tuition in English**	**Audiometric test results**	**WIT results**
Participant 1.1: Child with blindness	8;6	Male	Black	Three	No hearing impairment present	Intellectual functioning falls within the *average* category.
Participant 1.2: Child with blindness	11;2	Female	Black	Six	No hearing impairment present	Intellectual functioning falls within the *average* category.
Participant 2.1: Typically developing child	8;6	Male	Black	Three	No hearing impairment present	Intellectual functioning falls within the *high average* category.
Participant 2.2: Typically developing child	11;2	Female	Black	Seven	No hearing impairment present	Intellectual functioning falls within the *high average* category.

With reference to Pilot study 2 in Table 3.13, the accuracy with which the different participants identified both the primary emotions on the Primary Emotion Identification Screener as well as HOEs from the CAM-C Voice Task is summarised.

Table 3.13

Emotion Identification Performance in Pilot Study 2

	Children with blindness		**Typically developing children**	
	8;6-year-old	11;2-year-old	8;6-year-old	11;2-year-old
Results: Primary emotion identification	5/6 correct (83%)	6/6 correct (100%)	6/6 correct (100%)	6/6 correct (100%)
Results: HOE identification	14/27 correct (52%)	19/27 correct (70%)	16/27 correct (59%)	20/27 correct (74%)

Pilot study 2 did not indicate any additional adjustments and/or recommendations necessary apart from those already indicated in Table 3.10. The Primary Emotion Identification Screener was effective and would successfully serve as a selection criterion. It was furthermore concluded that English as an additional language was adequate, permitting that

the participant's level of English proficiency is on par with their chronological age at the time of data collection. The WIT Independent Vocabulary Test would be conducted as a screening measure in this regard. Finally, it was determined that reading each of the response cards out loud to the participants during the instrument administration to eliminate any possible disadvantage that may occur due to differences in reading levels proved effective as a scaffolding tool.

3.6.5 Screening and selection of participants

The same screening procedure was followed for both Cohorts 1 and 2 in order to recruit participants. Once the potentially participating child's assent was obtained (as described in Section 3.6.3), the participant screening was conducted, which included a semi-structured teacher interview to complete the biographical information sheet (see Appendix A), administering the adapted version of the WIT (Williams, 1956) audiometric testing (tympanometry), as well as the Primary Emotion Identification Screener (Appendix D). First, the biographical information sheet was completed by the researcher with the assistance of the teacher/aftercare teacher. The hearing screening in the form of impedance measures and auditory reflex measures was then conducted by a qualified and registered audiologist. The potential participants were introduced to the audiologist, who then conducted the test in a separate room that was allocated for the day according to the standard procedures. Results from the screening measures were summarised using the Participant Screening Form (Appendix C).

Once the audiologist eliminated any hearing impairment or possible ear infection that could result in a conductive hearing loss, the potential participant was then accompanied by a teaching assistant to the evaluation room, which was separate from the classroom areas and was quiet to eliminate noise interference. Once the child was at ease with the researcher, the assistant would then leave the research room. The first part of the session was spent on establishing sufficient rapport with the child. The researcher would then proceed to ascertain that no cognitive impairment was present by administering the WIT (Williams, 1956). A description of the WIT test content and adaptation is provided in Section 3.5.1.2 (also see Appendix L). The researcher was seated across the table from the participant with a side table where stimulus material and the answer sheet was placed. The procedure was methodically

explained, and the participant was given the opportunity to ask questions or clarify any uncertainties.

The Independent Vocabulary Test of the WIT (Appendix B) was administered first in order to obtain an age-related indication of the child's language development and cognitive functioning. The corresponding age-related test item then served as a starting point for the full intelligence test administration. Each item was presented verbally, and the researcher recorded the responses (in code for sighted children as not to discourage them should they notice that they gave an incorrect response). The child was accompanied to the assessment room by their class teacher, teaching assistant or aftercare teacher, and the researcher introduced herself. Several minutes of rapport building followed until the child appeared at ease enough to commence with data collection procedures. Assent and the first part of the screening procedures were conducted in the first session. Screening was completed during the second session, while data collection (administration of the CAM-C Voice Task) was conducted in a third session to avoid fatigue.

The Primary Emotion Identification Screener was administered with each participant individually. Identical procedure was followed for Primary Emotion Identification Screener administration as is described for the CAM-C Voice Task administration in Section 3.5.1.3.

3.6.6 Data collection

During the third session, the main data collection procedure commenced using the data collection instrument, that is, the CAM-C Voice Task. The procedure followed was based on the CAM-C Voice Task administration procedures described by Golan et al. (2015). In preparation, the construct of emotion was introduced to the participant using the scripted primer (see Appendix T) introducing the construct of emotion. It was read to the participant, familiarising him/her with the broad concept of emotion as a manner of the feelings people can experience, and the participant was requested to name examples of emotions after example probes were provided. If the participant had difficulty, a short vignette was read to illustrate the construct. The request for examples of emotions was then repeated.

Following the foregoing, each of the emotion words on the response card as well as their simple definitions were read out loud to the participant and repeated if necessary. The

participant was given the opportunity to request clarity or ask for examples if needed. Once all the emotion words were introduced and explained, administration of the CAM-C Voice Task commenced.

A short introduction was read clarifying the format of the task (voice clips) containing the emotion-related content. This was followed by the test instructions which were presented verbally. The instructions gave an indication of the procedures to be followed. After a practice item was done together with the participant, each of the Voice Task items (voice clips) were played one by one on a laptop (for voice clip transcriptions, see Appendix V). Speakers were used instead of headphones due to the participants with blindness requiring auditory input from the researcher, and headphones would become cumbersome if the participant had to be requested to remove them frequently. To ensure procedural consistency, speakers instead of headphones were used with the group of typically developing children as well.

The Voice Task items were randomly ordered before the response booklets were compiled. Half of the response booklets were then compiled in this order and the other half in the reverse order. The items (audio clips/voice recordings) were therefore played in the predetermined (random) order to one-half of each of the two groups and then in reverse sequence to the second half of each of the two groups. The four possible response options for each Voice Task item were presented verbally prior to the audio clip being played to prevent working memory overload. A response card (see Appendices Q and R) in printed text or Braille for each of the Voice Task items was placed in front of the participant so that the participant could employ more than one mode of sensory interpretation to facilitate clarity if they so wished.

Confounding effects due to reading difficulties were avoided by the researcher by verbally presenting the response options and possible answers to the participant both before, and after, each audio clip was played. Each response card in the booklet contained all four of the emotion word options as well as the definition for each. A printed text version was provided to participants without disabilities, while an option of either uncontracted (Grade 1) or contracted (Grade 2) Braille was availed to the participants with blindness. They could choose the Braille format they were most comfortable with, as this depended on the academic as well as reading level of each child. The participant was asked to choose the one word that

best describes how the person saying the sentence in the audio clip was most likely feeling in that moment. The participant could point to an option and/or say the emotion word or its corresponding number as an indication of his/her answer. The participant's chosen emotion word was recorded on the response record sheet as described in Section 3.6.6 (also see Appendix S). The next item was presented, and no feedback was given to the participant on the correctness of their responses. Verbal encouragement was provided to maintain engagement and enthusiasm but taking care not to give any indication of the accuracy or error of an answer. The entire procedure was video recorded to ensure procedural integrity and reliability of data collected.

Once the administration of the CAM-C had been completed, the researcher thanked the participant for their participation and then accompanied the child back to the class teacher or assistant responsible for them. Upon returning to class, as a token of accolade, the teacher would either attach a texture-painted peg to the child's collar, in the case of children with blindness, or pin a "You're-a-star badge" to the shirt of the child without disabilities, which they could wear for the day (see Appendix W). These were provided by the researcher.

3.7 Data Analysis

3.7.1 Scoring, coding, and capturing of raw data

The Primary Emotion Identification Screener and the WIT (Williams, 1956) were scored following predetermined scoring protocols. The CAM-C Voice Task responses were not only indicated as correct or incorrect, but the actual incorrect emotion words chosen were also recorded. The biographical data such as age, gender, race, and home language was coded. All scored and coded data was captured on an Excel spreadsheet, and data was entered into IBM SPSS 24 as it is the most widely used package of its type and particularly suited to analyses of data in the field of social science (Arkkelin, 2014). The data was analysed by means of basic descriptive statistics followed by inferential statistical techniques.

3.7.2 Descriptive statistical analyses

The descriptive data analysis aimed to describe data by using analyses such as frequencies and percentages for the categorical variables and descriptive statistics such as the mean and

standard deviation for continuous variables. Appropriate graphical representations were used to present the findings of the analyses and provide a visual overview of the participants.

3.7.3 Inferential statistical analyses

The inferential data analysis aimed to test the non-directional main research hypothesis, namely, that there will be a significant difference in the levels of accuracy with which children with blindness identify HOEs in others from voice recordings, as compared to typically developing peers. Since the assumption of normality of distribution could not be met, non-parametric rather than parametric tests, were chosen (Siegel & Castellen, 1988). A two-tailed independent samples' test, namely, the Mann-Whitney test (for two groups) (Blanche, Blanche, Durrheim, & Painter, 2006; McMillan & Schumacher, 2006;) was used to determine whether children with blindness perform significantly differently than typically developing peers on HOE identification. Although the overall sample (N=40) may have been indicative of parametric test usage, as it exceeded the minimum number of 30 participants required for such testing (Siegel & Castellen, 1988), the comparison cohorts (n=20) and their age subgroups (n=10) were below this minimum, signifying the use of non-parametric statistical techniques as a preferred method of analysis. A summary of the statistical techniques employed are summarised in Table 3.14.

Table 3.14

Statistical Techniques Applied to the Study Data

Aim of Analysis	**Statistical Technique Utilised**
Description of the performance of each group on the CAM-C Voice Task	The performance of each cohort on the CAM-C Voice Task was described using frequencies and percentages. The error pattern in the CAM-C Voice Task responses was described using the percentage of correct responses on each of the CAM-C Voice Task test items.
Reliability of the CAM-C Voice Task	The Kuder-Richardson measure was used to establish the reliability of the CAM-C Voice Task measure, as the answers were dichotomous.
Group comparison(s) regarding performance on the CAM-C Voice Task	A non-parametric test, namely, the Mann-Whitney U-Test was used to compare the two independent groups on a continuous dependent variable. This non-parametric test was used, as the sample was fairly small and the assumption of normality could not be met. The two main comparison cohorts (children with blindness and typically developing children), as well as two

Aim of Analysis	Statistical Technique Utilised
	age subgroups within each of the cohorts (8;0-9;11 years; months and 10;0-11;11 years; months), were compared on the CAM-C Voice Task scores.

3.7.4 Procedural integrity

A checklist was developed for use by an independent observer to rate the integrity of the procedure used during the main data collection process (see Appendix U). The percentage of adherence to procedural steps was calculated, according to the following formula:

$$\frac{\text{Number of steps accurately executed}}{\text{Total number of steps}} \text{ X } 100$$

3.7.5 Reliability of data collected

Content checks for the CAM-C responses were also conducted by the independent observer just mentioned. (See Section 4.4 in Chapter 4 for a more detailed discussion in this regard.)

3.8 Ethical Considerations

At all times during this study, the researcher abided by the appropriate ethical principles as stipulated by the Belmont Report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979). Any study involving human participants need to adhere to the values of autonomy, non-maleficence, beneficence, and justice as summarised in this report. The principle of autonomy was upheld by obtaining voluntary informed consent from legal guardians and also voluntary informed assent from children themselves before involving the children in the study. Legal guardians were provided with written information letters and consent forms (Appendix I). Children were verbally informed of all aspects of the study in child-friendly language, using a script, and assent was requested verbally using a script (see Appendix J). The assent procedure was recorded on video. Prior to any interaction with the children, the researcher was introduced

by a trusted authority figure (their class teacher and principal) and a general information session took place explaining the purpose of the researcher's visit.

The child was accompanied to the assessment room by their teaching assistant, and the researcher conducted the assent procedure in the presence of the assistant after the rapport building phase of the session. The assent script was read to the potential participant explaining in detail what was expected of the child, and an opportunity for questions was given (see Section 3.6.3 for procedures followed). It was made clear to all participants that they would be allowed to withdraw at any stage of the study should they no longer wish to participate, for whatever reason, without any negative consequences following this decision. After assent was given verbally by the child by answering 'Yes' or 'No', the assessment commenced.

Where the principle of non-maleficence is concerned, it should first be noted that the conducted study did not pose any potential physical or psychological threat of harm to the participants (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979). Furthermore, because no emotional states were induced within the participants themselves, as they merely needed to identify such states in hypothetical others, no emotional distress was generated by the stimuli (CAM-C Voice Task audio clips). Participants experienced no loss following their involvement in the study conducted and were only given acknowledgement of their participation by receiving a badge or peg from their class teacher. The environment where the study was conducted was at their educational institution and was therefore a safe and familiar setting for the participating children. The individual interviews and test administrations were conducted in privacy, and participants were ensured of confidentiality regarding their responses. Regarding beneficence, the study was not designed to benefit the children directly. However, participants indirectly expanded their understanding of emotions in general and it could possibly help teachers to understand emotional development better as well as possible aspects that may need intervention.

The principle of justice requires that both burden and benefit be spread evenly across the population of interest of the study (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979). Upon conclusion of the study, the participants, their teachers, and parents were informed of access to the research results and findings' availability. The possibility of a future discussion of the research findings was

offered during an information session. All of the above information was clearly explained verbally and/or in writing to all parties involved prior to commencement of the study.

3.9 Conclusion

This chapter focused on the methodology employed in the study. It commenced by outlining the main aim and the sub-aims of the study. The research design was then described as well as the phases of the study. The participant selection criteria and recruitment procedures were given for both cohorts as well as a description of the research sites and participants. Next, the material and equipment required for screening and data collection were discussed, followed by a description of all procedures, including those followed for the pilot studies and the main data collection. Data analysis through descriptive and inferential statistics, as well as the procedural integrity of the data collection process and the reliability of the collected data, was reported. Finally, the ethical considerations in conducting the study were described.

The chapter that follows will consider results of this study.

CHAPTER 4
RESULTS

4.1 Introduction

The foregoing chapter discussed the research methodology employed in this study. This chapter presents the results of the study. It commences by presenting the proposed hypotheses and reiterates the procedural integrity of the data collection process as well as the reliability of the CAM-C Voice Task responses. The group equivalence of the two cohorts (children with blindness and typically developing peers) is highlighted by discussing the matched as well as the non-matched variables. The results of the study are then presented according to the sub-aims delineated in Chapter 3, namely:

(i) To measure and describe the accuracy with which the cohort of children with blindness aged 8;0-11;11 years can identify HOEs in others from voice recordings and to compare the performance of two subgroups (children aged 8;0-9;11 and children aged 10;0-11;11) within this cohort

(ii) To measure and describe the accuracy with which a cohort of typically developing children aged 8;0-11;11 years can identify HOEs in others from voice recordings and to compare the performance of two subgroups (children aged 8;0-9;11 and children aged 10;0-11;11) within this cohort

(iii) To compare the overall accuracy with which the two cohorts can identify HOEs in others from voice recordings

(iv) To compare the accuracy with which the age subgroups (children aged 8;0-9;11 and children aged 10;0-11;11) across the two cohorts can identify HOEs in others from voice recordings

(v) To describe response patterns to each of the 27 CAM-C Voice Task items across by both cohorts

For ease of reference, Figure 4.1 provides a visual overview of the presentation and interpretation of the research results.

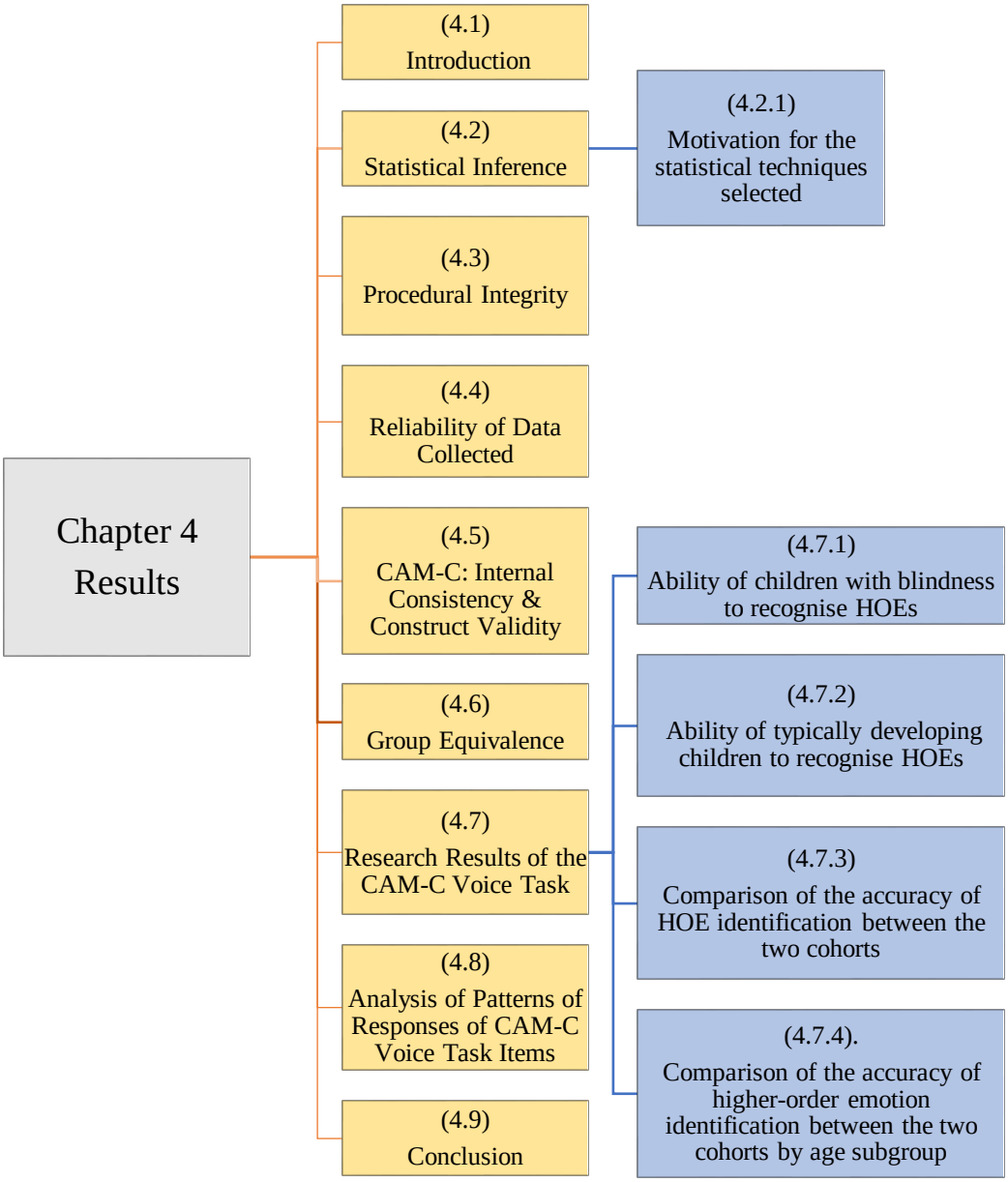


Figure 4.1. Schematic outline of results

4.2 Statistical Inference

To address each of the sub-aims, hypothesis testing was done as part of the statistical inference. Pertaining to sub-aims (iii) and (iv), a non-directional hypothesis was posed as the alternative hypothesis, as it was hypothesised that children with blindness will identify HOEs at a different level of accuracy than typically developing peers. This hypothesis was tested separately for each cohort (sub-aims (i) and (ii)).

H_0: There will be no significant difference in the levels of accuracy of HOE identification between children with blindness and typically developing peers.

H_1: There will be a significant difference in the levels of accuracy of HOE identification between children with blindness and typically developing peers.

This hypothesis was tested by comparing results between the two cohorts as a whole, and also by comparing results of the younger age subgroups across cohorts as well as results of the older subgroups across cohorts.

In order to achieve sub-aims (i) and (ii), a non-directional hypothesis was posed as the alternative hypothesis, as it was hypothesised that there will be a significant difference in the levels of accuracy of HOE identification between older children (10;0-11;11 years; months) and younger children (8;0-9;11 years; months) within each cohort:

H_0: There will be no significant difference in the levels of accuracy of HOE identification between older children (10;0-11;11 years; months) and younger children (8;0-9;11 years; months) within each cohort.

H_1: There will be a significant difference in the levels of accuracy of HOE identification between older children (10;0-11;11 years; months) and younger children (8;0-9;11 years; months) within each cohort.

4.2.1 Motivation for the statistical techniques selected

Pallant (2011, 2013) indicates that not only frequency distributions but also sample sizes should be taken into account when the necessity and application of tests of normality are considered. Seeing that the overall sample size is borderline (N=40) with each cohort consisting of 20 participants, divided further into smaller groups of 10 participants per age subgroup, tests of normality were not warranted, as a normal distribution was unlikely to manifest. Accordingly, since the assumption of normality of distribution could not be met, non-parametric rather than parametric tests, were selected (Siegel & Castellen, 1988).

A two-tailed independent samples' test, namely, the Mann-Whitney U-Test (for two groups) (McMillan & Schumacher, 2006; Terre Blanche, Durrheim, & Painter, 2006) was used to determine whether children with blindness perform significantly differently than typically

developing peers on HOE identification. Non-parametric rather than parametric tests were thus utilised for two reasons (Pallant, 2011, 2013). First, the aim was not really only to investigate distributions of normality but rather to compare differences within, and across, cohorts. Secondly, a sample size below 30 signifies the motivation for non-parametric test use (Cohorts: n=20).

4.3 Procedural Integrity

In accordance with the guidelines provided by Gast (2010), the procedural score sheets endeavoured to allow for scoring of each procedural variable. An independent observer (a counselling psychologist in possession of a master's degree in psychology with 19 years' clinical experience) conducted the procedural integrity checks by observing the video recorded data collection sessions (see Section 3.7.4 for procedures followed). To randomly select a representative number of recordings of data collection sessions (from the total of 40 sessions conducted for the 40 participants) for procedural integrity checks, the recordings were categorised by cohort and age subgroup. Two recordings from each age subgroup from each cohort were randomly selected. This amounted to eight data collection recordings or 20% of all data collection sessions. The independent observer then watched the video recordings of the eight data collection sessions of the chosen participants and checked adherence to procedural steps using the checklists provided (see Appendix U).

Gast and Ledford (2014) bring out that 20% to 50% of a sample should be checked, depending on the sample size, for procedural and content reliability. The data collection session of two participants from each of the two age subgroups from each of the two cohorts were randomly selected. The observer scored the adherence to prescribed procedures using the provided checklist (see Appendix U). The percentage of steps adhered to was calculated for each of the participants using the formula:

$$\text{Percentage agreement} = \frac{\text{Number of correctly administered procedural steps}}{\text{Total number of procedural steps}} \times 100$$

A summary of the overall procedural integrity ratings of the administration of the CAM-C Voice Task is provided in Table 4.1.

Table 4.1

Procedural Integrity of Data Collection

Cohorts	**Cohort 1**				**Cohort 2**			
Participants	1.3	1.7	1.12	1.19	2.3	2.7	2.12	2.19
Procedural integrity	98%	100%	97%	100%	99%	99%	100%	100%

Note. Numbers 1.1 - 1.20 represent Cohort 1 and numbers 2.1 - 2.20 represent Cohort 2

The procedural integrity of the administration of the CAM-C Voice Task varied from 97% to 100% with the average overall integrity at a rate of 99.5%. According to Gast and Ledford (2014), a minimum level of 80% agreement between raters is regarded as a sufficient benchmark for an indication of the reliability of data. The results suggest that the CAM-C Voice Task procedure was reliably executed.

4.4 Reliability of Data Collected

The same independent observer who assisted with procedural integrity also transcribed the responses of the same eight participants to the CAM-C Voice Task from the video recordings onto blank response record sheets provided (see Appendix S). These responses were then compared item by item to the responses recorded by the researcher for each of the participants, and the percentage of agreement was calculated using the formula:

$$\text{Percentage agreement} = \frac{\text{Number of correctly transcribed responses}}{\text{Total number of possible responses}} \times 100$$

$$= (8 \times 27) \div 216 \times 100$$
$$= 216 \div 216 \times 100$$
$$= 100\% \text{ agreement between two independent raters}$$

Table 4.2 presents the percentage agreement between the originally recorded and the transcribed CAM-C Voice Task responses per participant.

Table 4.2

Overall Level of Agreement on CAM-C Voice Task Item Responses

Cohorts	**Cohort 1**				**Cohort 2**			
Participants	1.3	1.7	1.12	1.19	2.3	2.7	2.12	2.19
Data reliability	100%	100%	100%	100%	100%	100%	100%	100%

Note. Numbers 1.1 – 1.20 represent Cohort 1 and numbers 2.1- 2.20 represent Cohort 2

Item-by-item comparison revealed that on all 27 possible items, for all eight of the selected participants, agreement regarding observed responses was 100%. Therefore, responses were transcribed reliably across all participants within both cohorts. This exceeds the minimum of 85% level of agreement required between the two raters regarding transcriptions of responses as indicated by Heilmann et al. (2008).

4.5 Internal Consistency and Construct Validity of the Cambridge Mindreading Face-Voice Battery for Children Voice Task for this Study

By using the Kuder-Richardson Formula 20, the findings from this study revealed the internal consistency of the CAM-C Voice Task (HOE items) to be high at a level of 0.804. The instrument therefore showed high internal consistency. The CAM-C Voice Task (HOE items) also exhibited construct validity in that significant differences were found both between younger and older groups of participants, and also between children with blindness and children without disability, as predicted by the theory and hypotheses (McMillan & Schumacher, 2006).

4.6 Group Equivalence

To determine the comparability of the two participant cohorts, group equivalence was determined on both matched and non-matched variables (see Tables 4.3 and 4.4). Fisher's Exact Test (two-tailed) was used to assess the association between categorical variables (Field, 2013; Pallant, 2013). Continuous variables were compared using the Mann-Whitney U-Test (two-tailed) (Field, 2013). Regarding matched variables, participants were matched on age (in years, measured as a categorical variable), gender, and race (as a proxy for culture), as these all impact on HOE identification ability (Brackett et al., 2006; Durand et al.,

2007; Elfenbein & Ambady, 2003; Fischer, 2000). As indicated in Table 4.3, the two cohorts were identical on these variables.

Table 4.3

Group Equivalence of Matched Variables (N=40)

Matched variables		**Cohort 1 (*n*=20)** *n*	%	**Cohort 2 (*n*=20)** *n*	%	**p-values**
Age	8;0-8;11 years; months	9	45%	9	45%	
	9;0-9;11 years; months	1	5%	1	5%	
	10;0 – 10;11 years; months	8	40%	8	40%	1.000[a]
	11;0-11;11 years; months	2	10%	2	10%	
Gender	Male	10	50%	10	50%	
	Female	10	50%	10	50%	1.000[a]
Race	Black	12	60%	12	60%	
	Coloured	4	20%	4	20%	1.000[a]
	White	4	20%	4	20%	

[a] The p-value was determined using the Fisher's Exact Test.

For details regarding pair-by-pair participants matching of the two cohorts, please see Appendix K. Table 4.4 indicates the non-matched variables for which group equivalence was determined. School grades, home language, and performance on the Primary Emotion Identification Screener were compared between the two cohorts. Furthermore, cognitive functioning in the form of IQ scores (based on WIT results) and language development, specifically the command of English vocabulary (measured by the WIT Independent Vocabulary Test scores), were also compared amongst the cohorts.

For clarity, the home language categories indicated in Table 4.4 grouped English and Afrikaans as Western European languages, whereas the Nguni language group included

isiZulu (n=4). The Sesotho language group included Sepedi (n=6), Setswana (n=4), and Sesotho (n=1).

Table 4.4

Group Equivalence of Non-Matched Variables (N=40)

Non-matched variables		**Cohort 1 (*n*=20)**		**Cohort 2 (*n*=20)**		**p-values**
		n	**%**	***n***	**%**	
Grade	1	7	35%	1	5	
	2	5	25%	7	35	
	3	6	30%	2	10	0.011 [a*]
	4	2	10%	5	25	
	5	-	-	5	25	
Home language	Western European	7	35%	7	35	
	Nguni	3	15%	2	10	0.912 [a]
	Sotho	10	50%	11	55	
English usage	First language	6	30%	4	20	
	Additional language	14	70%	16	80	0.358 [a]
Years of English tuition	3	10	50%	7	35	
	4	7	35%	3	15	0.086 [a]
	5	3	15%	8	40	
	6	-	-	2	10	
Primary emotion identification score (max=6)	5	11	55%	9	45	0.376 [a]
	6	9	45%	11	55	
IQ (WIT)	Median	107.50		109.0		0.758[b]
Independent vocabulary test (WIT)	Median	16.5		16.5		0.883[b]

[a] The p-value was determined using the Fisher's Exact Test. [b] The p-value was determined using the Mann-Whitney U-Test

* $p<0.05$.

It has been shown that age (Durand et al., 2007), IQ (Mayer et al., 2001), and language competence (Cohen, 2010; Tomasello & Farrar, 1986) all influence the ability to recognise HOEs. Furthermore, the ability to recognise primary emotions developmentally precedes the ability to identify HOEs (Greenberg, 2010; Saarni, 2000). Although the ability to identify primary emotions was a selection criterion, there was still some scope for variability within the groups, since scores of 5/6 or 6/6 were accepted. It was therefore desirable that the two cohorts should not differ on these variables.

Although the participants were not matched on the variables indicated in Table 4.4, it is clear that the two cohorts were comparable on IQ, English language competence, years of English tuition, as well as primary emotion identification ability, thereby eliminating these as possible confounding variables. A statistically significant difference pertaining to grade is expected due to the fact that South African children with a disability, such as blindness, would probably not only start school later than the expected 6-7 years of age but that they are also likely to progress through chronological academic grades at a slower pace than children without any disability (Human Rights Watch, 2015).

4.7 Research Results of the Main Measurement Instrument: The Cambridge Mindreading Face-Voice Battery for Children Voice Task

This section addresses the sub-aims of the study by presenting and interpreting results obtained from the main measuring instrument, namely, the CAM-C Voice Task (Baron-Cohen, 2007; Golan et al., 2015). With the presentation of results pertaining to each of the sub-aims, the median rather than mean scores was utilised in the interpretation of results, since a median is the most appropriate way to determine the central tendency of each of the sets of data when employing non-parametric tests. This is especially the case when there is a need to determine whether the data contains any outliers or where it is suspected that there may not be a normal distribution – as was hypothesised for this study (Stevens, 2009). The Mann-Whitney U-Test is the most applicable statistical form of analysis to be implemented when medians across data sets are compared.

4.7.1 Ability of children with blindness (Cohort 1) to identify higher-order emotions

The average (mean) score by Cohort 1 participants on the CAM-C Voice Task was 14.4 (*SD*=4.1; range: 7-22 [15]; maximum number of correct responses possible: 27). It is clear that, on average, participants were only able to identify about half of the HOEs correctly. The median score was 16.

In Figure 4.2, a frequency distribution of the CAM-C Voice Task responses of Cohort 1 is reflected. From Figure 4.2, it is evident that scores ranged between 7 and 22 correct, and that half of Cohort 1 participants (*n*=10) obtained between 16 to 19 correct responses on the CAM-C Voice Task, with 16 items correct being the mode.

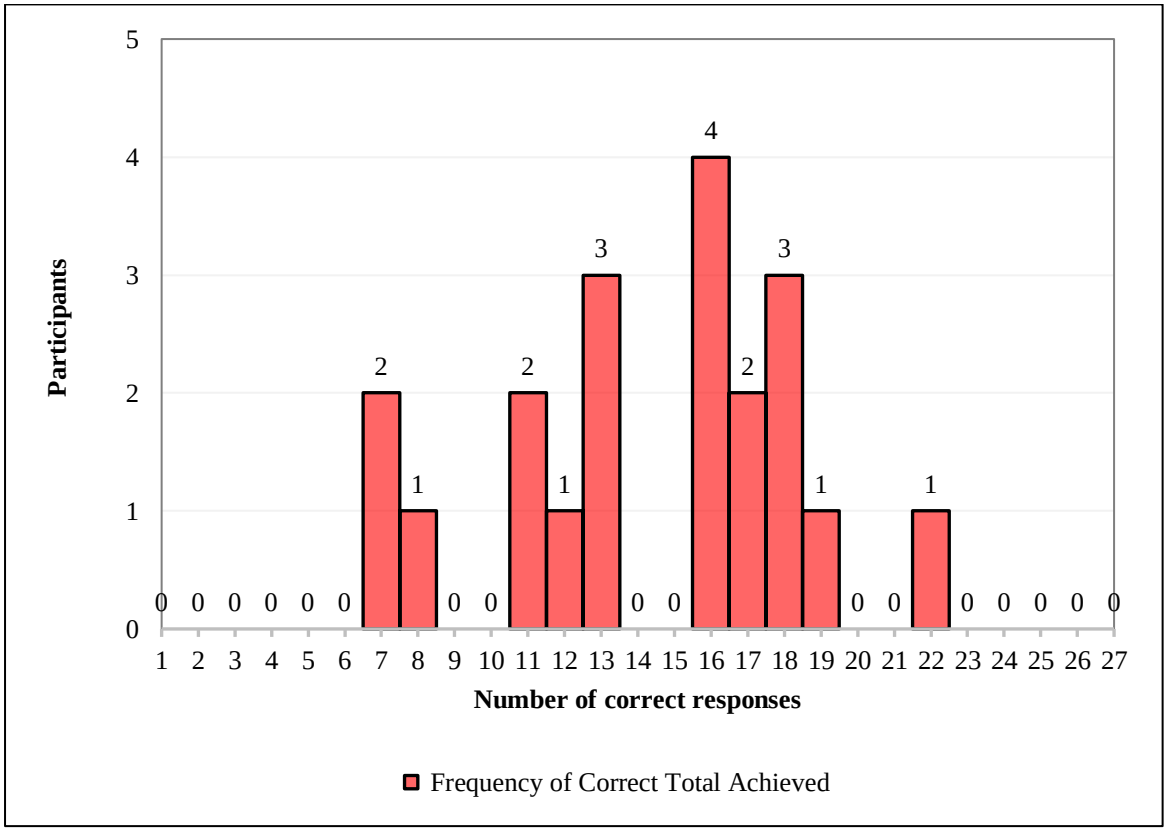


Figure 4.2. Frequency distribution of Cohort 1 on CAM-C Voice Task responses

Comparisons were also made between the two age subgroups within Cohort 1. When comparing the two age subgroups (8;0-9;11 years; months versus 10;0-11;11 years; months), it became clear that younger children with blindness had more difficulty in identifying HOEs than older children in the same cohort. The mean for the younger groups was 11.5 (*SD*=3.3;

range: 7-16 [9]), and for the older group it was 17.3 (*SD*=2.5; range: 12-22 [10]). The median score was 12.0 for the younger age group (8;0-9;11 years; months) and 17.5 for the older subgroup (10;0-11;11 years; months). These values are summarised in Table 4.5.

Following the aforementioned comparisons, the Mann-Whitney U-Test was conducted to test the proposed non-directional hypothesis. The results showed that differences between the two age subgroups were statistically significant at the 1% level of confidence (p=0.0011; see Table 4.5).

Accordingly, for this sub-aim it can be said that H_0 was rejected in favour of H_1 at a level of 1% significance:

H_0: Older children with blindness (10-11 years) will not achieve a different level of accuracy in HOE identification than younger children (8-9 years).

H_1: Older children with blindness (10-11 years) will achieve a different level of accuracy in HOE identification from younger children (8-9 years).

Table 4.5

Cohort 1 (Children with Blindness): CAM-C Voice Task Performance by Age Subgroup (n=20)

Age subgroups	Median CAM-C Voice Task Score	p-value
8;0-9;11 years; months (n=10)	12.0	0.0011**
10;0-11;11 years; months (n=10)	17.5	
Entire Cohort 1 (n=20)	16.0	

** p<0.001.

4.7.2 Ability of typically developing children (Cohort 2) to identify higher-order emotions

The mean score by Cohort 2 participants on the CAM-C Voice Task was 18.0 (*SD*=5.3; range: 8-27 [19]; maximum number of correct responses possible: 27). It is evident that, on average, participants were able to identify two-thirds of the HOEs correctly. The median score was 18.2.

In Figure 4.3, a frequency distribution of the CAM-C Voice Task responses of Cohort 2 is reflected. From Figure 4.3, it is apparent that responses ranged from 8 to 27 correct. Eighteen correct responses was the mode.

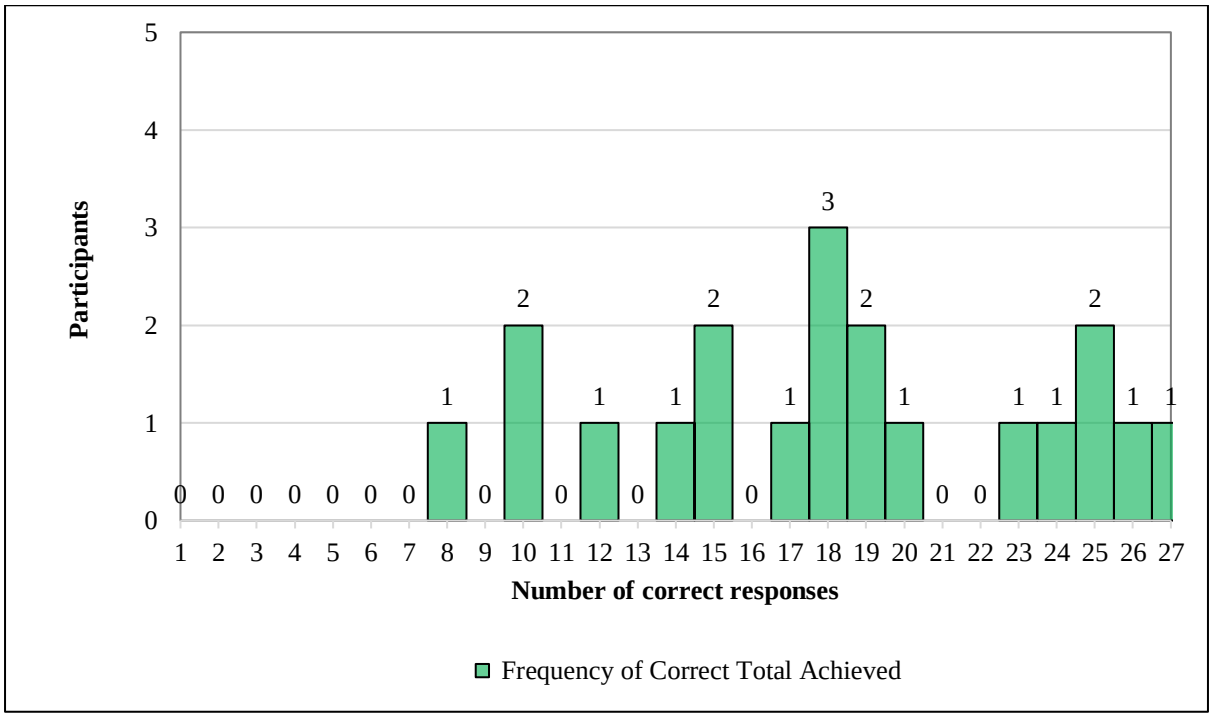


Figure 4.3. Frequency distribution of Cohort 2 on CAM-C Voice Task responses

Comparisons were also made between the two age subgroups (8;0-9;11 years; months versus 10;0-11;11 years; months). When these results are compared, it becomes evident that younger children with typical development had more difficulty in identifying HOEs than older children in the same cohort (see Table 4.6). The mean for the younger groups was 13.9 (*SD*=3.8; *range*: 8-19 [11]), and for the older group it was 22.4 (*SD*=3.6, range: 17-27 [10]). The median score was 14.5 for the younger age group (8;0-9;11 years; months) and 23.5 for the older subgroup (10;0-11;11 years; months). These values are summarised in Table 4.6.

Following these comparisons, the Mann-Whitney U-Test was conducted to test the proposed non-directional hypothesis. The results showed that differences between the two age subgroups were statistically significant at the 0.1% level of confidence ($p<0.001$). Therefore, for this sub-aim H_0 was rejected in favour of H_1 at a level of 0.1% level of significance:

H_0: Typically developing older children (10;0-11;11 years; months) will not achieve a different level of accuracy in HOE identification than younger children (8;0-9;11 years; months) in the same cohort.

H_1: Typically developing older children (10;0-11;11 years; months) will achieve a different level of accuracy in HOE identification than younger children (8;0-9;11 years; months) in the same cohort.

Table 4.6

Cohort 2 (Typically Developing Children): CAM-C Voice Task Performance by Age Subgroup (n=20)

Age groups	Median CAM-C Voice Task Score	p-value
8;0-9;11 years (*n*=10)	14.5	0.0008***
10;0-11;11 years (*n*=10)	23.5	
Entire Cohort (*n*=20)	18.2	

*** p<0.001.

4.7.3 Comparison of the accuracy of higher-order emotion identification between the two cohorts

To address the third sub-aim and compare the overall performance of the two cohorts, namely, children with blindness and typically developing peers, the CAM-C Voice Task scores were compared using the Mann-Whitney U-Test. Results revealed a significant difference, with children affected by blindness (Cohort 1) identifying HOEs with significantly less accuracy than their typically developing peers (Cohort 2) (p=0.0294). Results are presented in Table 4.7.

For this sub-aim, H_0 was rejected in favour of H_1 at a level of 5% significance:

H_0: Children with blindness will not achieve a different level of accuracy in HOE identification than typically developing peers.

H_1: Children with blindness will achieve a different level of accuracy in HOE identification than typically developing peers.

Table 4.7

Comparison of CAM-C Voice Task Performance for Both Cohorts (N=40)

Cohort	Median CAM-C Voice Task Score	p-value
Cohort 1 (*n*=20)	16.0	0.0294*
Cohort 2 (*n*=20)	18.2	

* p<0.05.

The sample size of the comparison cohorts (*n*=20) contraindicated a comparison of the nine tested HOEs' response patterns of children with blindness and their typically developing peers, since 50% of the cells (expected counts in a contingency table) showed expected frequencies less than five (Pallant, 2013). The rule of thumb is not to exceed more than 20% of cells with an expected frequency of less than five (Pallant, 2013). The overall cohort comparison of response choices concerning the nine HOEs tested on a preliminary Chi-square test suggested that there were no significant differences between the two cohorts as far as their choices of the various options were concerned ($p>0.05$).

Accordingly, the statistical recommendation was that a descriptive analysis per cohort (*n*=20) should be done regarding the nine HOEs tested instead of inferential analysis in order to gain some insight regarding the participants' performance on each of the nine HOEs tested. Table 4.8 presents a summary of HOE performance of the entire sample as well as the two cohorts on the CAM-C Voice Task. The number of correct responses for each of the test items testing that specific emotion was summed up. A percentage of correct responses was also calculated, by dividing the number of correct responses by the total number of responses. Since each emotion was tested by three test items, the total number of responses per emotion for the total sample was 120 (3 items X 40 participants), while the total number of responses per cohort per emotion amounted to 60 (3 items X 20 participants).

Table 4.8

Cohort Performance on HOE Identification on the CAM-C Voice Task (n=20) Ranked by Performance of the Entire Sample

Emotion	**Number and percentage of correct responses**		
	Entire sample (*N*=40)	**Cohort 1 (*n*=20)**	**Cohort 2 (*n*=20)**
Jealous	95 (79.2%)	40 (66.7%)	55 (91.7%)
Loving	93 (77.5%)	42 (70.0%)	51 (85.0%)
Undecided	85 (70.8%)	41 (68.3%)	44 (73.3%)
Bothered	79 (65.8%)	38 (63.3%)	41 (68.3%)
Disappointed	71 (59.2%)	31 (51.7%)	40 (66.7%)
Unfriendly	70 (58.3%)	29 (48.3%)	41 (68.3%)
Embarrassed	54 (45.0%)	22 (36.7%)	32 (53.3%)
Amused	51 (42.5%)	17 (28.3%)	34 (56.7%)
Nervous	51 (42.5%)	28 (46.7%)	23 (38.3%)

Performance across the entire sample indicated that ‘jealous’ (79.2%) was the HOE most frequently correctly identified, closely followed by ‘loving’ (77.5%), and 70.8% of the participants from the sample correctly identified ‘undecided’. ‘Bothered’ and ‘disappointed’ were correctly identified by 65.8% and 59.2% respectively. The third most frequently incorrectly identified HOE was ‘embarrassed’ (45.0%) while ‘nervous’ and ‘amused’ were equally poorly identified at 42.5%. ‘Unfriendly’ was correctly identified by a total of 58.3% of all the participants.

Cohort 2 identified HOEs with a greater level of accuracy across all eight of the nine HOEs. The biggest discrepancies between the performance of the two cohorts were seen on the emotions ‘amused’ (56.7% versus 28.3% correct) and ‘jealous’ (91.7% versus 66.7%) correct. The only emotion Cohort 1 identified with greater accuracy than Cohort 2 was ‘nervous’ (46.7% versus 38.3%).

When compared by cohort, the cohorts showed an overlap in patterns of HOE identification. Table 4.9 summarises the ranking of emotions from most accurately to least accurately identified as per cohort.

Table 4.9

Ranking of HOEs from Most to Least Accurately Identified per Cohort

Ranking	Cohort 1 ranking	Cohort 2 ranking
1	Loving	Jealous
2	Undecided	Loving
3	Jealous	Undecided
4	Bothered	Bothered
5	Disappointed	Unfriendly
6	Unfriendly	Disappointed
7	Nervous	Amused
8	Embarrassed	Embarrassed
9	Amused	Nervous

The rankings indicate that the emotions ‘loving’, ‘jealous’, and ‘undecided’ were easiest to identify from the CAM-C Voice Task. The emotions ‘nervous’, ‘amused’, and ‘embarrassed’ were the most difficult to identify for both cohorts.

4.7.4 Comparison of the accuracy of higher-order emotion identification between the two cohorts by age subgroups

The median scores for the age subgroups in both cohorts are shown in Figure 4.4, clearly highlighting two aspects. First, that Cohort 2 (typically developing children) performed overall higher on the CAM-C Voice Task than Cohort 1 (children with blindness), and secondly, that older children perform better than younger children in both of the age subgroups within each of the cohorts.

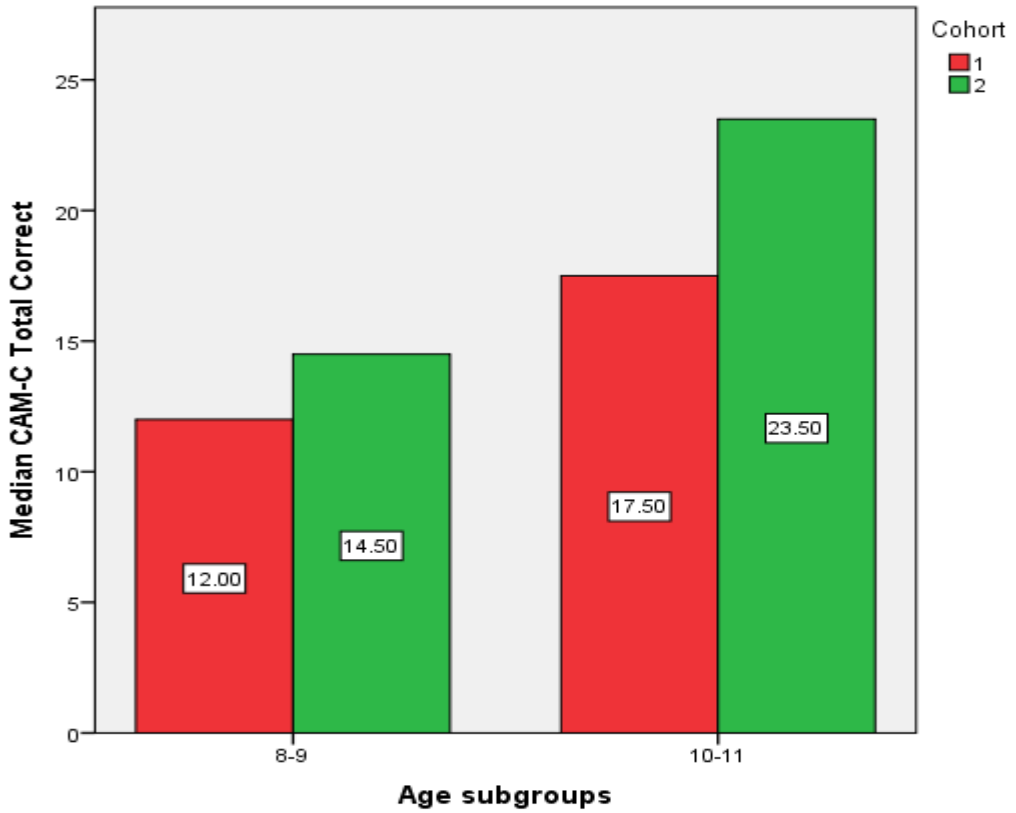


Figure 4.4. CAM-C Voice Task performance within the comparison cohorts

Next, the Mann-Whitney U-Test was used to determine whether significant differences between the two cohorts were also apparent within the two age subgroups (8;0-9;11 years; months and 10;0-11;11 years; months) across cohorts. Results are presented in Table 4.10.

Table 4.10

Comparison of CAM-C Voice Task Performance of both Cohorts by Age Subgroup

Age subgroup	Cohort	Median	p-value
8;0-9;11 years;	Cohort 1	12.0	0.1841
months	Cohort 2	14.5	
10;0-11;11 years;	Cohort 1	17.5	0.0038**
months	Cohort 2	23.5	

** p<0.01.

From Table 4.10, it is evident that for children in the age group 8;0-9;11 (years; months), the median CAM-C score for typically developing children (14.5) was higher than that of the children with blindness (12.0). However, the results were not statistically significant (p=0.1841).

Therefore, H_0 was confirmed at a level of 5% significance for the 8;0-9;11-year-old age group when compared across the cohorts:

H_0: Children aged 8;0-9;11 years; months with blindness will not achieve a different level of accuracy in HOE identification than typically developing peers.

H_1: Children aged 8;0-9;11 years; months with blindness will achieve a different level of accuracy in HOE identification than typically developing peers.

In the older age group of 10;0-11;11 (years; months), typically developing children performed at a statistically significantly higher level regarding correct HOE identification than children with blindness (p=0.0038).

For the older children aged 10;0-11;11 (years; months), H_0 was rejected in favour of H_1 at a level of 1% significance when compared across the cohorts:

H_0: Children aged 10;0-11;11 years; months with blindness will not achieve a different level of accuracy in HOE identification than typically developing peers without disabilities.

H_1: Children aged 10;0-11;11 years; months with blindness will achieve a different level of accuracy in HOE identification than typically developing peers.

Once again, the sample size of the age subgroups (n=10) contraindicated a statistical comparison of the nine tested HOEs' response patterns between age subgroups. Table 4.10 therefore provides a descriptive summary of the CAM-C Voice Task HOE identification performance of the two cohorts as sub-divided by age subgroup.

Table 4.11

Average Performance on the Nine HOEs tested by the CAM-C Voice Task

Emotion	**Percentage correct responses**			
	Subgroup aged 8;0-9;11 (*n*=20)		**Subgroup aged 10;0-11;11 (*n*=20)**	
	Cohort 1 (n=10)	**Cohort 2 (n=10)**	**Cohort 1 (n=10)**	**Cohort 2 (n=10)**
Jealous	16 (53.3%)	25 (83.3%)	24 (80.0%)	30 (100%)
Loving	19 (63.3%)	24 (80.0%)	23 (76.7%)	27 (90.0%)
Undecided	14 (46.7%)	16 (53.3%)	27 (90.0%)	28 (93.3%)
Bothered	16 (53.3%)	12 (40.0%)	22 (73.3%)	28 (93.3%)
Disappointed	11 (36.7%)	15 (50.0%)	20 (66.7%)	25 (83.3%)
Embarrassed	9 (30.0%)	13 (43.3%)	14 (46.7%)	19 (63.3%)
Amused	5 (16.7%)	10 (33.3%)	12 (40.0%)	24 (80.0%)
Unfriendly	12 (40.0%)	17 (56.7%)	17 (56.7%)	24 (80.0%)
Nervous	15 (50.0%)	4 (13.3%)	13 (43.3%)	19 (63.3%)

From Table 4.11, a relatively stable pattern of performance is evident across emotions, with younger children with blindness mostly performing poorer than younger typically developing children, and older children with blindness consistently performing poorer than older typically developing children. The only exceptions to this pattern were seen in the responses to the emotion ‘nervous’, where the younger subgroup (8;0-9;11 years; months) of children with blindness outperformed the younger subgroup of typically developing children.

4.8 Analysis of Patterns of Responses on CAM-C Voice Task Items

To understand whether similar patterns of responses were observed across the 27 items of the CAM-C, the percentage of participants choosing each of the foils for each item were calculated. The sample size of the comparison cohorts (n=20 and n=10 for the age subgroups) once again contraindicated a statistical comparison of the responses of the two cohorts to each of the 27 items of the CAM-C – once again, 50% of the cells (expected counts in a contingency table) showed expected frequencies less than five. Accordingly, the statistical recommendation was that an item-by-item analysis for the entire sample (N=40) be done in order to detect patterns of erroneous responses given by participants. Table 4.12 shows the percentage of respondents that chose each of the four options (correct answer or one of three foils) per item of the CAM-C Voice Task. The items are ranked from those that were answered correctly most frequently to the item that received the least correct responses.

The table reflects the responses of the entire sample. The shading in the table indicates the grouping of items according to those that were identified correctly by more than two-thirds of participants, those correctly identified by between one- and two-thirds, and those identified by less than a third of participants.

Table 4.12

Ranking of CAM-C Voice Task Item Response Accuracy

Item	**Correct answer and percentage of respondents choosing the correct response option**	**Foils and percentage of participants choosing each**		
10	Jealous (82.5%)	Disappointed (12.5%)	Proud (5.0%)	Thinking -
8	Loving (82.0%)	Complaining (5.0%)	Bored (2.5%)	Delighted (10.0%)
14	Disappointed (77.5%)	Proud (2.5%)	Touched (7.5%)	Disbelieving (15.0%)
15	Jealous (77.5%)	Bossy (10.0%)	Angry (7.5%)	Hurt (5.0%)
21	Undecided (77.5%)	Bothered -	Interested -	Disbelieving (22.5%)
3	Loving (75.0%)	Relaxed (12.5%)	Delighted (5%)	Decided (7.5%)
4	Jealous (75.0%)	Teasing (17.5%)	Proud (2.5%)	Sure (2.5%)
9	Bothered (75.0%)	Affectionate (2.5%)	Troubled (20.0%)	Patient (2.5%)
18	Loving (75.0%)	Grateful (5.0%)	Sure (2.5%)	Honest (17.5%)
6	Undecided (67.5%)	Surprised (20.0%)	Sneaky (7.5%)	Bothered (5.0%)
2	Undecided (67.5%)	Unimpressed (7.5%)	Mysterious (10.0%)	Curious (15.0%)
19	Bothered (67.5%)	Unsure (10.0%)	Disgusted (17.5%)	Amused (5.0%)
13	Embarrassed (65.0%)	Touched (2.5%)	Disliking (20.0%)	Surprised (12.5%)

Item	Correct answer and percentage of respondents choosing the correct response option	Foils and percentage of participants choosing each		
24	Unfriendly (65.0%)	Disgusted (2.5%)	Sure (17.5%)	Hurt (15.0%)
11	Unfriendly (57.5%)	Interested (5.0%)	Cheeky (32.5%)	Excited (5.0%)
7	Bothered (55.0%)	Disbelieving (25.0%)	Liked (2.5%)	Impressed (17.5%)
23	Disappointed (55.0%)	Grumpy (7.5%)	Sure -	Hurt (37.5%)
22	Amused (52.5%)	Impressed (10.0%)	Afraid (12.5%)	Excited (25.0%)
26	Unfriendly (52.5%)	Tired (15.0%)	Shy (20.0%)	Teasing (12.5%)
27	Nervous (50.0%)	Terrified (37.5%)	Sad (10.0%)	Interested (2.5%)
17	Disappointed (47.5%)	Angry (7.5%)	Sad (17.5%)	Ashamed (27.5%)
20	Amused (42.5%)	Excited (20.0%)	Tempting (17.5%)	Impressed (20.0%)
25	Nervous (40.0%)	Unsure (10.0%)	Asking (35.0%)	Shocked (15.0%)
12	Nervous (37.5%)	Disgusted (50.0%)	Excited (7.5%)	Touched (5.0%)
16	Embarrassed (37.5%)	Wishful (45.0%)	Decided -	Annoyed (17.5%)
5	Embarrassed (35.0%)	Afraid (12.5%)	Hopeful (2.5%)	Asking (50.0%)
1	Amused (32.5%)	Unsure (30.0%)	Thinking (15.0%)	Interested (22.5%)

From Table 4.12, it is clear that Item 1 was the most difficult item with only 32% of participants presenting the correct response, while Item 10 proved to be the easiest, as 82.5% of the participants managed the correct answer. A total of 12 items were identified correctly by more than two-thirds (>66%) of the participants. A further 14 items were identified by

more than one-third (>33%) but less than two-thirds (<67%) of participants. Only one item was identified by less than a third (<33%) of the participants.

It is clear that both the emotions ‘jealous’ (Items 10, 15, and 4) and ‘loving’ (Items 8, 3, and 18) were identified on all three items testing that emotion with an accuracy of 75% or more. The emotion ‘undecided’ (Items 21, 6, and 2) was identified with an accuracy of 77.5% on Item 21 and with an accuracy of 67.5% on both Items 6 and 2. The responses to the items testing the two emotions that were identified with the lowest accuracy overall varied in accuracy from 52.5% to 65.0% (‘unfriendly’; Items 24, 11, and 26) and 37.5% to 50% (‘nervous’; Items 27, 25, and 12). The other four emotions showed more variability in the accuracy of responses to the three items testing them. Responses amongst the three items ranged in accuracy between 32.5% and 52.5 % (‘amused’; Items 22, 20, and 1), 35% and 65% (‘embarrassed’; Items 13, 16, and 5), 47.5% and 77.5% (‘undecided’; Items 14, 23, and 17), and 55% and 75% (‘bothered’; Items 9, 19, and 7).

Regarding foils, 76 of the 81 foils were chosen by at least one participant in response to the CAM-C items. Only the foils ‘thinking’ (Item 10), ‘bothered’ and ‘interested’ (Item 21), ‘sure’ (Item 23), and ‘decided’ (Item 16) were never chosen. On only three items on the CAM-C was a foil selected more frequently than the correct target emotion. The specific items and the foils chosen with this high frequency are summarised in Table 4.13. In case of Items 5 (target emotion: ‘embarrassed’), the foil ‘asking’ was selected 50% of the time, with the correct response only being selected 35% of the time. Similarly, the foil ‘disgusted’ (Item 12) was also selected 50% of the time, while the correct response ‘nervous’ was only selected 37.5% of the time. On Item 16, the foil ‘wishful’ was selected 45% of the time, whereas the target response ‘embarrassed’ was selected 37.5% of the time.

Table 4.13

Frequency and Content of Incorrect CAM-C Voice Task Responses

Item	Item transcription	Correct response	% of participants choosing correct response	Foil chosen	% of participants choosing foil
5	"Do you think… eh… anyone saw me?"	Embarrassed	35%	Asking	50%
12	"Don't put that near me."	Nervous	37.5%	Disgusted	50%
16	"Ugh! I wish it hadn't happened."	Embarrassed	37.5%	Wishful	45%

4.9 Conclusion

In this chapter, the research results were expounded and interpreted based on the objectives of the study. The procedural integrity and the reliability of the recorded data were portrayed. Furthermore, the group equivalence of the two cohorts (i.e. children with blindness and their typically developing peers) was depicted by discussing the factors on which they were matched and the variables which were controlled. The presentation of research results obtained from the main instrument of measurement, the CAM-C Voice Task, aimed to address each of the sub-aims of the study by explicating performance of each group as well as comparing results both within, and across, each of the two cohorts. The proposed research hypotheses were tested for each of the sub-aims. Data was descriptively explored to obtain an impression of responses per emotion by cohorts and age subgroups. Finally, the patterns of responses in each of the 27 items of the CAM-C were described, and foils that were chosen with a higher frequency than the target emotions were highlighted.

The next chapter will focus on a discussion of the results of the study.

CHAPTER 5
DISCUSSION

5.1 Introduction

The previous chapter presented the results of the study. In this chapter, the results of the study are discussed. This discussion focuses on exploring factors that could have impacted on the results found for each of the sub-aims in the previous chapter. First, results pertaining to children with blindness are deliberated upon, followed by those of typically developing children. Then a comparison of the overall results of the two cohorts ensues. This is followed by a comparison of the younger age group (8;0-9;11 years; months) across the two comparison cohorts, and the same is done for the older age subgroups (10;0-11;11 years; months). Finally, patterns of responses on the nine HOEs tested are discussed, followed by scrutiny of response errors on incorrectly chosen foils on certain items that showed repetition of error on the main measurement instrument by the entire sample (both cohorts), and possible explanations for their occurrence are offered.

5.2 Reliability and Construct Validity of the Cambridge Mindreading Face-Voice Battery for Children Voice Task (Higher-Order Emotion Items)

The findings from this study revealed the internal consistency of the CAM-C Voice Task (HOE items) to be high at a level of 0.804, as determined by applying the Kuder-Richardson Formula 20. The instrument therefore showed high internal consistency. Significant differences were found both between younger (8;0-9;11 years; months) and older (10;0-11;11 years; months) groups of participants, and also between children with blindness and typically developing children, as predicted by the theory and literature reviewed as well as the proposed hypotheses (McMillan & Schumacher, 2006). Accordingly, it can be deduced that the CAM-C Voice Task (HOE items) also exhibited construct validity.

5.3 Higher-Order Emotion Identification in Others by Children with Blindness

This study found that, on average, children with blindness in the age range 8;0-11;11 years; months were only able to identify about half of the HOEs in others correctly (see Section 4.7.3) when measured by using voice recordings. A possible reason for this poor performance could be that children depend on more than only auditory stimuli when attempting to understand the emotions of others. As pointed out by Adolphs (2002), emotion identification demands the ability to perceive emotion, specifically by means of visual and/or auditory properties of facial, gestural, or vocal expressions of emotion and information about the environment in which interpersonal interaction takes place. Von Salisch (2001) states that these social parameters of emotional understanding are molded mostly by face-to-face interactions between children and their communication partners.

Children with blindness have difficulty in abiding by these parameters, as these are dependent on non-verbal cues which are often only observable through sight, rather than aural perception. The absence of contextual cues could therefore also be a contributory factor to the difficulty of children with blindness to identify HOEs. The influence of the limitation of perceptual cues of a facial and gestural nature will come to the fore more prominently as the discussion progresses to the comparison of this ability of children with blindness to their typically developing peers (see Section 5.4).

Even though primary emotion identification was not the focus of this study, screening of the presence of this ability formed part of the selection criteria, since the presence of primary emotion identification ability is a prerequisite for HOE identification development (Parrott, 2001). In a study by Minter et al. (1991), primary emotion identification by children aged 6;0-12;11 years; months with congenital blindness was investigated through the recognition of vocally expressed primary emotions and found that they were less able to identify such emotions than their typically developing peers, while they were equally accurate than their typically developing peers in identifying non-emotional objects according to vocal qualities. This study did not investigate a comparison of emotion-loaded sounds to non-emotion-loaded sounds but focused only on emotion identification, and specifically of HOEs.

One interesting finding of this study stands in contrast to Minter et al. (1991), since this study determined that children with blindness were able to identify primary emotions with equal

accuracy to their typically developing peers (see Tables 3.5, 3.6, and 4.4) from emotion-loaded voice clips. However, the participants in Minter et al.'s study covered an age range from 6;0-12;11 years; months (mean age: 7;5 years; months), whereas the participants in this study were aged 8;0-11;11 years; months (mean age: 9;5 years; months). The results of this study stand in agreement with later findings of Rosch-Levecq (2006) that children with blindness can indeed identify primary emotions from verbal expression from the age of four.

Where the principal focus of this study is concerned, namely, HOE identification, one of the most important clinically relevant findings was that older children (10;0-11;11 years) were able to identify HOEs with significantly higher levels of accuracy than younger children (8;0-9;11 years) with blindness (see Table 4.5). Possible motivations for this phenomenon may be that the ability to detect the intensity of emotion expression increases with age, as denoted by Stifter and Fox (1990) and Gao and Maurer (2009). Older children with blindness may therefore be able to pick up subtle variations in emotion expression with more sensitivity, for example, differences in speech rate, pitch, energy, and intonation (Hirschberg, Liscombe, & Venditti, 2003) more accurately than younger children.

Furthermore, it is possible that children with blindness learn to compensate for the absence of facial and gestural modelling of emotion through personal constructions of emotion meaning-making (Greenberg, 2010), broadening their emotion vocabulary (Na et al., 2016) and expanding emotion schemes. Emotion schemes – in other words, networks of emotion meanings and the connections between these (Barrett, 2011) – assist the child in making narrative sense of their emotional experience (Greenberg, 2010). As interconnectedness of emotion combinations proliferate due to a heightened ability to personally and socially construct such meanings, the ability to identify HOEs also increase (Haviland-Jones, Gebelt, & Stapley, 1997; Saarni, 2011).

5.4 Higher-Order Emotion Identification in Others by Typically Developing Children

A second finding of this study was that, on average, typically developing children are able to identify two-thirds of HOEs correctly when expressed by others in voice recordings (see Section 4.7.3). This suggests that typically developing children are more skilled at inferring the emotional states of others than children with blindness because they are likely more

competent in interpreting emotion in a manner that maximises the rudimentary purpose thereof.

Emotions, at their core, serve as an adaptive form of information processing that orients the child to his/her environment and prepares them for the required actions to be taken in order to promote optimal personal and interpersonal functioning (Greenberg, 2010; Mash & Wolfe, 2012). To achieve this, the child needs to obtain emotional competence as the outcome of efficacious emotional development (Trentacosta & Izard, 2007). The three central components of emotional competence are that of emotion identification, emotion response, and emotion regulation (Saarni, 1999, 2011). In Chapter 2, the skills set underpinned by these three central components were described in detail (see Section 2.5.1.1). This study focused on the first of the three central components, namely, emotion identification, with specific reference to HOEs and affirms Saarni's (1999, 2011) HOE identification ability as a prerequisite for emotional competence.

This study supported the sequence of progressive emotional development as proposed by Saarni (2011) and cross-referenced this with the increased refinement of ToM in children with typical development as postulated by Astington and Dack (2008). It was established that children beyond the age of six can identify HOEs with increasing levels of accuracy as they grow older. This study suggests an association between emotional competence as an end goal of successful emotional development and HOEs identification, as well as the association of HOE identification, as an embedded component of ToM. Typically developing children 10;0-11;11 years; months of age identified HOEs at a greater level of accuracy than younger children 8;0-9;11 years; months of age without any disability (see Table 4.6). Seeing that findings from this study are consistent with the sequential progression of typical emotional developmental pathways of typically developing children, it can be deduced that the CAM-C Voice Task sub-scale is a reliable instrument for measuring HOEs identification in others by children aged 8;0-11;11 years; months.

Golan et al. (2015) also utilised the CAM-C Voice Task (HOEs) to test HOE recognition of, amongst others, 25 children with typical development having an average age of 10;0 years; months (range: 8;2-12;1 years; months). The average level of accuracy achieved by them on this task was 74.8% (20.1 items correct of a possible 27 items). In this study, the average age of participants in Cohort 2 was 9;5 years; months (range: 8;0-11;11 years; months) and the

nine HOEs tested by the CAM-C Voice Task were correctly identified at an average level of 66.6% (18 items correct of a possible 27 items). On average, participants in this study were approximately seven months younger than participants in the Golan et al. (2015) study and performed 7.4% lower on the HOE identification Voice Task than the Golan et al. (2015) participants. In light of the findings in this study that younger typically developing children (mean age 8;5 years; months) had a mean accuracy score of 13.5 (50% correct) and the subgroup of older children (mean age 10;9 years; months) had a mean accuracy score of 22.4 (83.0% correct), it is likely that the slight difference between Golan et al.'s findings and those of this study are attributable to age. It seems therefore that, although the participants from Golan et al. (2015) were from a different country (UK) and cultural context, their performance on the CAM-C Voice Task was similar to that of the participants in this study.

5.5 Comparison of the Accuracy with Which Children with Blindness and Typically Developing Children Identify Higher-Order Emotions

The core question in this study sought to compare the levels of accuracy with which children with blindness and typically developing children can identify HOEs in others from voice recordings. The most discernable finding to emerge from the analysis was that children with blindness identify HOEs in others at a significantly lower level than typically developing children. In Chapter 4, the hypothesis was posed that there is a significant difference in the level of accuracy of HOE identification in others when children with blindness (8;0-11;11 years; months of age) are compared to typically developing peers (aged 8;0-11;11 years; months) (see Section 4.7.3 and Table 4.7). This hypothesis was supported by the data.

The possible explanation for this finding is that the mode of sight plays a critical role in the development of HOE identification skills. Since HOE identification is closely linked to the development of ToM, the same mechanisms that are suggested to delay the development of ToM in children with blindness may also result in a delay in developing HOE identification skills (De Gelder et al., 2002; Kujala et al., 2009; Sandler & Hobson, 2001). Specifically, vision plays a central role in the development of joint visual attention as well as the ability of perspective taking which are considered as prerequisites for developing ToM (McAlpine & Moore, 1995). The type and degree of visual impairment have a direct influence on the extent of delay in ToM with children having visual impairment, therefore, resulting in children with legal blindness, as was investigated in this study, being most adversely affected in this regard.

Regarding the performance on specific emotions, children with blindness (Cohort 1) experienced greatest difficulty identifying 'amused' (28.3% accuracy), while typically developing children (Cohort 2) grappled with accurately identifying 'nervous' (38.3% level of accuracy). These emotions are both tertiary emotions according to Parrott's (2001) tree structure of emotions which are the synchronisations of several chains of thought pertaining to the cognitive appraisals of situational stimuli. Secondary emotions, on the other hand, can be understood as meaning-making of the situational emotional responses (i.e. combining the original primary emotions), tertiary emotions can be viewed almost as meta-emotion, and subjective interpretation due to personal frame of reference or an internal state may have played a large role in this difficulty as well.

The overall ranking in difficulty with accurately identifying HOEs did not differ greatly between groups (see Table 4.9), as the two cohorts experienced difficulty with the same emotions, namely, 'amused', 'nervous', and 'embarrassed', albeit at slightly different rates of performance. Furthermore, both the cohorts could identify 'loving', 'jealous', and 'undecided' with similar levels of success, as these HOEs were the easiest for both cohorts to correctly identify. This kind of pattern in performance, in other words, showing similarity in the type of emotions experienced as easy and difficult could tentatively suggest a delay rather than some form of fully diagnosable psychopathology in the HOE identification ability of children with blindness.

It was also hypothesised that younger children with blindness (age 8;0-9;11 years; months) will identify HOEs with different levels of accuracy than typically developing peers. One surprising finding was that even though typically developing younger children performed slightly better than children with blindness on the CAM-C Voice Task (see Figure 4.4), no statistically significant differences in the levels of accuracy of HOE identification was evident when the age group 8;0-9;11 (years; months) children were compared across the two cohorts (see Table 4.8). One possibility may be that differences do exist, but the significance of this difference may be indiscernible due to the small sample size (n=10) of the age subgroups.

Furthermore, Astington and Edward (2010) and Sodian and Kristen (2010) suggested that by the age of four or five, children with typical development have the ability to realise that

people speak and act on the basis of the way those people subjectively perceive the world even when their thoughts do not reflect the objective reality. From the age of six onwards, children further progress onto understanding not only the thoughts of others but also start to identify their HOEs (Astington & Dack, 2008). This study therefore demonstrates that it may be possible that at the age of eight to nine, children with blindness have developed some capacity of ToM application through HOE identification. Glumbić et al. (2011) proposed that children with blindness may exhibit the lowest scores on ToM tasks at the age of seven to eight years, but that it is present to some extent as suggested by the findings of this study.

The hypothesis that significant differences between accuracy levels of HOE identification of children with blindness aged 10;0-11;11 (years; months) and their typically developing peers will be evident was confirmed by the research results. Significant differences are evident in the ability of children with blindness and their typically developing peers to identify HOEs (see Figure 4.4 and Table 4.9). Accordingly, where there seemingly exists a parallel developmental pattern in the ability of HOE identification in younger children across the cohorts at the age group 8;0-9;11 (years; months), this path appears to diverge at the ages of 10;0-11;11 (years; months).

The speed and accuracy of emotion identification (De Sonneville et al., 2002), as well as the ability to increasingly detect subtler mental states (i.e. HOEs), improve during the entire developmental course of childhood (Vicari et al., 2000). Emotion processing, including emotion identification, and mental state recognition skills become progressively more advanced. From the age of seven, children start modulating relationship dynamics through HOEs identification and expression (Saarni, 2011). As mentioned earlier, this corresponds with, and is confirmed by, Theory of Mind, where typical development of the ability to understand and identify HOEs in the self and others surfaces from the age of six onwards (Astington & Dack, 2008; Astington & Edward, 2010). The aforementioned authors indicated that ToM should be instilled in children with blindness by at least the age of 11, suggesting that although vision may play a critical role, it is not essential for all children. Before the age of 11, only a 19-month delay – as compared to typically developing peers – should be expected.

By the age of 11-12 years, Glumbić et al. (2011) indicate that no significant differences pertaining to ToM exist between children with blindness and typically developing children.

In their study, they used false belief tasks (which test the ability to construe the understanding of a false belief another may hold in their mind) to test ToM. This study did not test ToM ability per se but employed ToM as a guideline of when HOE identification ability should be expected to be present in children with typical development, seeing that HOE identification is a central component of ToM as indicated in Chapter 2. This study found that children with blindness aged 10-11 identify HOEs with significantly less accuracy than their typically developing peers.

The divergence in the emotion identification developmental pathway seen from the age of 10-11 years beseeches further investigation into such ability during the next developmental stages. This is especially so since Glumbić et al. (2011) suggest that despite the differences in the developmental trajectory of ToM, research on adults with blindness demonstrated that these adults showed the same ToM capacity and application as sighted adults. Further investigation will be helpful in understanding how the ability of HOE identification pans out as children with blindness mature.

The results of this study may suggest that some aspects of ToM (namely, HOE identification) are not as well developed in blind children as other aspects of ToM, such as those tested by Glumbić et al. (2011). Outcomes from this study's investigation further corroborate with the idea of Brambring and Asbrock (2010), who suggested that findings regarding ToM in children with blindness may be skewed by using false belief tasks reliant on visual stimuli only as the main form of measurement with this unique population. Findings in this study may suggest that, apart from false belief tasks using auditory stimuli, other skills (such as HOE identification) that form part of ToM may need to be tested when evaluating ToM in children with blindness in order to get a more comprehensive picture of all aspects of this skill.

5.6 Patterns of Responses to Cambridge Mindreading Face-Voice Battery for Children Voice Task

HOEs are more context-bound. McIntyre and Göcke (2006, p. 266) point out that *"context is linked to modality and emotion is strongly multi-modal"* in the sense that some emotions are more distinct from one modality over another (Cowie et al., 2005). This means that the mode of stimulus used to test the emotion has a direct impact on the accuracy of emotion

identification, as certain emotions are more likely to be accurately identified from a specific mode of input than another. For example, anger may be easily identified by auditory input, as tone, rate, and volume of speech strongly convey the emotion load of the message. However, an emotion such as embarrassment may not be identified from auditory stimuli as readily as it may be from visual stimuli (i.e. a person blushing). HOEs are often dependent on more than one mode of input because of their complex nature (Parrott, 2001), whereas a singular mode of input, such as auditory stimuli, may be sufficient for primary emotion identification.

Accordingly, children with blindness may struggle to learn HOEs more so than primary emotions, as was confirmed in Chapter 4 (see Tables 4.4 and 4.7) where there was no significant difference in primary emotion identification ability between the two groups. On that account, learning HOEs, especially those that are more heavily reliant on multi-modal input for identification, could be more problematic for children with blindness. (Also see Section 6.4.2 for further discussion of this impact.)

With reference to specific item analysis (see Tables 4.12 and 4.13), the analysis of responses to each item did not yield any unexpected results or clear outliers amongst the 27 items. On only three of the 27 items, one foil was chosen with a higher frequency than the correct target emotion. These items are each discussed and tentative reasons are proposed for the high frequency with which the specific foil was chosen.

Item 5: "Do you think … eh … anyone saw me?" The correct response was 'embarrassed' and the incorrect foil most frequently chosen was 'asking'. It is possible that 'asking' was chosen due to the emotion statement itself actually being a question and spoken with the congruent intonation of posing a question.

Item 12: "Don't put that near me." The correct response was 'nervous' and the incorrect foil most frequently chosen was 'disgusted'. This error could be related to possible imagined content the participant may have associated with the concept "that" – whatever "that" was – should not be put near him/her could have been imagined to be of a disgusting nature.

Item 16: "Ugh! I wish it hadn't happened!" The correct response was 'embarrassed' and the incorrect foil most frequently chosen was 'wishful'. The word "wish" being used in the statement may have been interpreted wrongly as a clue or direct indication of the answer to

be given. The foil being a word actually encompassed in the voice clip statement may have been misleading.

5.7 Conclusion

This chapter deliberated on the research results and statistical inference as presented in Chapter 4. This discussion focused on the level of accuracy with which children with blindness can identify HOEs in others from voice recordings and by exploring factors that could have impacted on the results as tested by the hypotheses for each of the sub-aims. First, results pertaining to children with blindness were examined, followed by that of typically developing children. Then a comparison of the overall results of the two cohorts ensued with consideration given to this ability in the younger – and older subgroups, both within and across – cohorts. Finally, patterns of responses on the nine HOEs tested were discussed, followed by scrutiny of response errors on incorrectly chosen foils on certain items that showed repetition of error on the main measurement instrument by the entire sample (both cohorts), and possible explanations for their occurrence were offered.

The chapter that follows provides conclusions of this study.

CHAPTER 6
CONCLUSIONS

6.1 Introduction

The penultimate chapter discussed the results of this study. This chapter contains a summary of the research findings, including the conclusions of the study. Clinical implications and a critical evaluation of the study considering its contribution and strengths, as well as limitations, are presented, followed by recommendations for future research.

6.2 Summary of Findings

The accurate identification of HOEs allows for imputing the emotional and mental states of others (Golan et al., 2015; LaCava et al., 2007). It presupposes the ability to put oneself in the place of another and to take the other person's psychological perspective, also known as ToM (Baron-Cohen, 1995, 2005; LaCava et al., 2007), into consideration. The ability to comprehend the emotional and mental states of others underlies the effective practice of social skills and is central in the process of emotional competence (Baron-Cohen, 2002; Golan et al., 2015). The core question in this study sought to compare the levels of accuracy with which children with blindness and their typically developing peers can identify HOEs in others from voice recordings.

The central finding to emerge from this study is that children with blindness (8;0-11;11 years; months) identified HOEs with significantly lower levels of accuracy than their typically developing peers. This ability to identify HOEs in others is related to the child possessing ToM skills. ToM refers not only to the ability of the self-awareness of one's own emotions (Morris et al., 2008) but more importantly to be able to understand the minds of others, where 'mind' includes both emotions and thoughts (Astington & Dack, 2008). This ability develops during the corresponding chronological stage of emotional competence as proposed by Saarni (2011).

The second most prominent finding was that, within both cohorts of children with blindness and typically developing peers, older children identified HOEs with greater accuracy than younger children. Older children with blindness, 10;0-11;0 (years; months), were able to

identify HOEs with significantly higher levels of accuracy than younger children aged 8;0-9;11 (years; months) in that cohort. Typically developing children aged 10;0-11;11 (years; months) identified HOEs at a considerably greater level of accuracy than younger children aged 8;0-9;11 (years; months) in that cohort. Thus, it can be said that HOE identification ability increases and improves as the children get older. This is applicable to both children with blindness and typically developing children between the ages of 8;0-11;0 (years; months).

When the performance of the age subgroup across the two cohorts was compared, one surprising finding was that, in the younger age subgroups (children aged 8;0-9;11 years; months), no statistically significant difference in the levels of accuracy of HOE identification was evident between cohorts. However, typically developing children did perform slightly better than children with blindness on the CAM-C Voice Task, when looking at mean and median scores. When older children (10;0-11;11 years; months) with blindness were compared to their typically developing peers, a significant difference was evident in the ability of children with blindness and their typically developing peers in this age subgroup. Children with blindness performed significantly poorer than their typically developing peers. It appears that HOE identification ability shows a diverging developmental trajectory as children get older when this ability is compared between children with blindness and their typically developing peers. This trajectory, which is opposed to that of the ToM proposed perspective of 'catching up' around the age of 11 years, suggests further research in the interplay of these components.

6.3 Clinical Implications

As highlighted in the literature reviewed in Chapter 2, blindness can expose young children to a multitude of developmental risks, including vulnerabilities in the emotional development domain. Emotional competence is paramount for the child's psychosocial functioning (Suveg et al., 2007). The results from this study showed that children with blindness identify HOEs less accurately than typically developing children, possibly leaving them more vulnerable to socio-emotional difficulties. Accordingly, it would be beneficial to develop screening strategies for ascertaining vulnerabilities and/or deficits in HOE identification ability of children with blindness at an early developmental stage as a proactive measure to avoid, or minimise, later emotion-related complications as the child matures.

Secondary to this, designing programmes to facilitate the development of HOE identification ability as part of psychosocial mediation in emotion-related interventions for children with blindness should be considered. Such programmes should employ intrapersonal HOE recognition before advancing to addressing HOE identification in others by children with blindness. The most suitable context for such screening and intervention would be the school setting as part of a multidisciplinary amalgamation of interventions such as occupational therapy and psychotherapeutic support. Involving the family in these intervention programmes that could either be home-based or conducted in a clinical setting would assist the family of a child with blindness to understand their child's emotional development and difficulties therewith better, thereby strengthening familial relationships. It will also psycho-educate parents in assisting children with the clinical emotion training programmes implemented by the multidisciplinary team.

Moreover, this study suggests the need for developing a more authentic and comprehensive assessment of HOE identification that identifies, and assesses, multiple modes of input the child with blindness applies in inferring the emotional states of others. (See Section 6.4.2 for further indications in this regard.) Such prolific measuring instruments will render a clinical presentation of both the psychosocial and emotional difficulties the child with blindness may experience that resonates more accurately with their actual life reality and lived experience of the role of HOE identification in their day-to-day functioning.

6.4 Evaluation of the Study

A critical evaluation of this study's strengths, the contribution it makes to the field(s) of interest, as well as the limitations identified, will be discussed next.

6.4.1 Strengths and contributions

To the researcher's knowledge, this study was the first comparative study internationally that investigates HOE identification in children with blindness matched to a cohort of typically developing peers. A published measuring instrument (CAM-C Voice Task) was sourced that could be completed by both children with blindness as well as their typically developing peers. Face validity of the measuring instrument (for use with South African children) was

established through a stringent expert panel review process. High internal consistency of the instrument was confirmed by using the Kuder-Richardson Formula 20, which revealed the internal consistency of the CAM-C Voice Task (HOE items) to be at a level of r=0.804. The instrument therefore showed high internal consistency. Significant differences on the CAM-C Voice Task (HOE items) were found both between younger and older groups of participants, and also between children with blindness and typically developing peers. This suggests that the measure could distinguish between groups that were expected to perform differently.

The procedural integrity of the administration of the CAM-C Voice Task varied from 97% to 100% with the average overall integrity at a rate of 99.5%. According to Gast and Ledford (2014), a minimum level of 80% agreement between raters is regarded as a sufficient benchmark for an indication of the reliability of data. The results suggest that the CAM-C Voice Task procedure was reliably executed.

Item-by-item comparison revealed that on all 27 possible items, for all eight of the selected participants, agreement regarding observed responses was 100%. Therefore, responses were transcribed reliably across all participants within both cohorts. This exceeds the minimum of 85% level of agreement required between the two raters regarding transcriptions of responses as indicated by Heilmann et al. (2008).

Considering the low levels of both global and local incidence and prevalence of children with blindness (see Section 2.1.3), managing to obtain a sample of 20 children with blindness in the specified age group who met the strict selection criteria can be regarded as a strength. The selection criteria were outlined in Chapter 3 (see Section 3.4.1.1).

Another key strength of this study was the rigorous matching of the participants from the two cohorts in important factors influencing HOE identification, namely, age, gender, and race (the latter was used as a proxy for culture). This eliminated various potentially confounding variables that could have been responsible for group differences and strengthens the internal validity of the research findings (Creswell, 2013; McMillan & Schumacher, 2006).

Another factor that may be considered a strength is the sample homogeneity. Even though participants were not matched on the variables of IQ, English language competence, years of English tuition, or primary emotion identification ability, the two cohorts were comparable

on these variables, as no statistically significant differences existed between the cohorts (see Table 4.4). According to Cohen and Crabtree (2006), high levels of sample homogeneity expand the depth of understanding of the population being investigated. Additionally, by extension, the sample data is also said to be homogeneous, which strengthens the stability of the data collected (International Statistical Institute, 2002).

6.4.2 Limitations

The results of the study have to be interpreted in the light of several limitations. First, the sample sizes of the age subgroups (n=10) of the cohorts are relatively small and therefore do not allow for making assertive generalisations to the relevant age groups of a larger population(s) of children with blindness and their typically developing peers and limited the possibility of the application of inferential statistical techniques.

Although the reliability of the CAM-C Voice Task subscale was established, the sample size of this study was too small to use more sophisticated statistical methods, for example, a t-test to determine validity. This is despite the fact that construct validity based on the different performance of different cohorts and age subgroups can be inferred.

HOE identification was only explored using one type of task – namely, voice recordings, to which an emotion was ascribed by the process of choosing one of four emotion labels. HOE identification from an auditory task alone is somewhat decontextualised. In reality, children with blindness also make use of other sources of input such as contextual cues, and accordingly, multiple modes of measurement, such as combining social stories and auditory tasks, could have been considered.

This study did not employ academic school Grade as a matching variable. However, it is reiterated that this was unavoidable, as explained in Chapters 3 and 4. Moreover, there is no direct literature that links HOE identification to Grade level as such, but rather to the variables of age and language skills – both of which were matched in this study.

Although no other statistically significant differences on almost all of the descriptive variables between the two cohorts were detected, except, for example, school grade, the small sample size and use of non-parametric statistical methods may have rendered statistical

analysis less sensitive or too weak to detect (albeit subtle) differences and influences. Accordingly, the influence of such possible differences in results cannot be completely ruled out.

6.5 Recommendations for Future Research

In terms of directions for future research, further work could be done based on the following recommendations:

- In view of the fact that there is a widening gap in HOE identification ability between children with blindness and their typically developing peers, it is a natural progression of this work to broaden the age range of samples in order to widen the developmental stages of HOE identification being studied as recommended by Golan et al. (2015). Age ranges should include adolescence and early adulthood in the study of the developmental trajectory. This will aid in exploring how the emotional developmental pathway of, specifically, children with blindness develops as compared to their typically developing peers across a wider age range to see if, when, and how convergence or catch-up may take place.
- Another option would be to consider a longitudinal study with the same participants spanning across different stages of emotional development. However, caution will have to be taken with such a study considering that participants may develop test-wiseness, and a longitudinal study will have to control this aspect in some manner in its methodology. The Mind Reading emotions library (Baron-Cohen, 2007), for example, on which the CAM-C (Golan et al., 2015) is based, consists of six difficulty levels applicable to different age ranges as emotion understanding advances and emotion identification ability increases. The CAM-C makes use of two of these levels which cover the age range 8;0-11;11 (years; months).
- A larger sample size for future comparative studies will assist in making more confident generalisations to the larger population of children with blindness' HOE identification. It would be interesting to conduct a comparative study of the genders where males and females have a severe visual impairment or blindness in order to examine the effect gender roles and gender-related perceptions have on HOE understanding and identification (Ficher, 2000) in children with blindness.

- Seeing that in reality children with blindness also make use of other sources of input such as contextual cues (Lemerise & Arsenio, 2000), multiple modes of measurement, for example, combining social stories and auditory tasks, such as the CAM-C Voice Task should be considered for future HOE identification studies and include methodologies making systematic attempts at integration of affect and cognition. (See Section 5.6 where explanations in this regard were given.)
- HOE identification and its relationship to ToM need further investigation. In this study, the ability to identify HOEs has been proposed as one aspect of ToM (McAlpine & Moore, 1995). Previous research on ToM in blind and sighted children mainly employed false belief tasks to test ToM development. The ToM developmental progression pathway tested by false belief tasks suggests that children catch up around the age of 11 years. In this study, a progressive widening gap increasing with age was established in HOE identification ability. Therefore, the relationship of HOE identification ability and other ToM tasks such as false belief should be investigated and perhaps explore the possibility that HOE identification tests could serve as an alternative and/or supplementary measure of ToM assessment in children with and without blindness (Dyck et al., 2004). This will provide greater insight into the progression and development over time to better understand how these different manifestations of ToM develop in children with and without blindness.

6.6 Summary

This chapter presented a summary of the main findings in comparing HOE identification ability of children with blindness to typically developing peers. Clinical implications, as well as a critical evaluation of the contribution, strengths, and limitations of the study, were provided followed by recommendations for possible future research.

REFERENCES

Adolphs, R. (2002). Recognizing emotion from facial expressions: Psychological and neurological mechanisms. *Behavioral and Cognitive Neuroscience Reviews, 1*(1), 21-62.

Arkkelin, D. (2014). Using SPSS to understand research and data analysis. *Psychology Curricular Materials. Book 1.* Retrieved from http//:scholar.valpo.edu/ on 05 May 2016.

Arnold, M. B. (1960). *Emotion and personality: Vol. 1. Psychological aspects*. New York, NY: Columbia University Press.

Astington, J. W., & Dack, L. A. (2008). Theory of mind. In M. M. Haith & J. B. Benson (Eds.), *Encyclopedia of infant and early childhood development* (Vol. 3, pp. 343-356). San Diego, CA: Academic Press.

Astington, J. W., & Edward, M. J. (2010). The development of theory of mind in early childhood. *Social Cognition in Infancy, 5,* 16.

Averill, J. R. (2012). The future of social constructionism: Introduction to a special section of emotion review. *Emotion Review, 4*(3), 215-220. doi: 10.1177/1754073912439811

Balbi, J. (2008). Epistemological and theoretical foundations of constructivist cognitive therapies: Post-rationalist developments. *Dialogues in Philosophy, Mental and Neuro Sciences, 1*(1), 15-27.

Bänziger, T., Grandjean, D., & Scherer, K. R. (2009). Emotion recognition from expressions in face, voice, and body: The Multimodal Emotion Recognition Test (MERT). *Emotion, 9*(5), 691. doi: 10.1037/90017088

Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind.* Boston: MIT Press/Bradford Books.

Baron-Cohen, S. (2002). The extreme male brain theory of autism. *Trends in Cognitive Sciences*, *6*(6), 248-254.

Baron-Cohen, S. (2003). *The essential difference: Men, women and the extreme male brain.* London: Penguin.

Baron-Cohen, S. (2005). The empathizing system. *Origins of the social mind: Evolutionary psychology and child development*, 468-492.

Baron-Cohen, S. (2007). University of Cambridge Mind reading emotions library user guide. London, UK: Jessica Kingsley Publishers.

Baron-Cohen, S., Golan, O., Wheelwright, S., Grenader, Y., & Hill, J. (2010). Emotion word comprehension from 4-16 years old: A developmental survey. *Frontiers in Evolutionary Neuroscience, 2(*12), 1-8. doi: 10.3389/fnevo.2010:00109

Baron-Cohen, S., Golan, O., Wheelwright, S., & Hill, J. J. (2004). *Mind reading: The interactive guide to emotions*. London: Jessica Kingsley Publishers.

Barling, J., & Phillips, M. (1993). Interactional, formal, and distributive justice in the workplace: An exploratory study. *The Journal of Psychology*, *127*(6), 649-656.

Barrett, L. F. (2006). Are emotions natural kinds? *Perspectives on psychological science*, *1*(1), 28-58. doi: 10.1111/j.1645-6916.2006.00003.x

Barrett, L. F. (2011). Was Darwin wrong about emotional expressions? *Current Directions in Psychological Science*, *20*(6), 400-406. doi: 10.1177/0963721411429125

Barter, C., & Renold, E. (2000). 'I wanna tell you a story': Exploring the application of vignettes in qualitative research with children and young people. *International Journal of Social Research Methodology*, *3*(4), 307-323. doi: 10.1080/13645570050178594

Bateman, A., & Fonagy, P. (2010). Mentalization based treatment for borderline personality disorder. *World Psychiatry, 9*(1), 11-15. doi: PMCID: PMC2816926

Beck, L., Kumschick, I. R., Eid, M., & Klann-Delius, G. (2011). Relationship between language competence and emotional competence in middle childhood. *Emotion*, *12*(3), 503. doi: 10.1037/90026320

Becker, C., & Wachsmuth, I. (2006). Modelling primary and secondary emotions for a believable communication agent. In *International Workshop on Emotion and Computing, in conjunction with the 29th annual German Conference on Artificial Intelligenz*, pp. 39-34.

Bedny, M., Pascual-Leone, A., & Saxe, R. (2009). Growing up blind does not change the neural bases of Theory of Mind. *Proceedings of the National Academy of Sciences of the United States of America*, *106*(27), 11312-11317. doi: 10.1073/pnas.0900010106

Begeer, S., Dik, M., Voor de Wind, M. J., Asbrock, D., Brambring, M., & Kef, S. (2014). A new look at theory of mind in children with ocular and ocular-plus congenital blindness. *Journal of Visual Impairment and Blindness, 33,* 479-487

Bensalah, L. (2011). The emergence of the teaching/learning process in preschoolers: Theory of Mind and age effect. *Early Child Development and Care, 181*(4), 505-516. doi: 10.1080/03004430903507191

Ben-Ze'ev, A. (2000). *The subtlety of emotions*. Cambridge: Cambridge Press.

Beukelman, D. R., & Mirenda, P. (2013). *Augmentative and alternative communication. Supporting children and adults with complex communication needs* (4th ed.). Baltimore, MD: Paul H. Brookes.

Blanche, M. T., Blanche, M. J. T., Durrheim, K., & Painter, D. (2006). *Research in practice: Applied methods for the social sciences*. Pretoria: Juta and Company Ltd.

Bloom, P., & German, T. P. (2000). Two reasons to abandon the false belief task as a test of theory of mind. *Cognition*, *77*(1), B25-B31. PII: S0010-0277(00)00096-2. doi: 0010.0277/00/$

Boenink, A., Oderwald, A., De Jonge, P., Van Tilburg, W., & Smal, J. (2004). Assessing student reflection in medical practice. The development of an observer-rated instrument: Reliability, validity and initial experiences. *Medical Education, 38*(4), 368-377. doi: 10.1046/j.1365-2923.2004.01787.x

Bornman, J. (December, 2006). How to adapt books for children with visual impairment. Free State Libraries Newsletter – Libraries: Learning better, Living better (pp. 14-16).

Bornman, J., & Rose, J. (2017). *Believe that all can achieve. Increasing classroom participation in learners with special support needs* (2nd ed.). Pretoria: Van Schaik Publishers.

Bornman, J., Sevcik, R., Romski, M., & Pae, H. (2010). Successfully translating language and culture when adapting assessment measures. *Journal of Policy and Practice in Intellectual Disabilities, 7*(2), 111-118. doi: 10.1111/j.1741-1130.2010.00254.x

Boyatzis, C., Chazan, E., & Ting, C. (1993). Preschool children's decoding of facial emotions. *Journal of Genetic Psychology, 154*, 375-382. doi: 10.1080/00221325.1993.10532190

Bracher, G. L., & Matta, A. (2017). School Psychological Practice with Vision-Impaired Students. In *A Handbook of Australian School Psychology.* New York, NY: Springer International Publishing.

Brackett, M. A., Rivers, S. E., Shiffman, S., Lerner, N., & Salovey, P. (2006). Relating emotional abilities to social functioning: A comparison of self-report and performance measures of emotional intelligence. *Journal of Personality and Social Psychology, 91*, 780-795. doi: 10.1037/0022.3514.91.4.780

Brambring, L., & Asbrock, D. (2010). Validity of false belief tasks in blind children. *Journal of Autism and Developmental Disorders, 40*(12), 1471-1484. doi: 10.1007/510803-010-1002-2

Burum, B. A., & Goldfried, M. R. (2007). The centrality of emotion to psychological change. *Clinical Psychology: Science and Practice, 14*, 407-413. doi: 10.1111/j.1468-2850.2007.0010.x

Calvo, M. G., & Marrero, H. (2009). Visual search of emotional faces: The role of affective content and featural distinctiveness. *Cognition and Emotion*, *23*(4), 782-806. doi: 10.1080/02699930802151654

Campbell, J., & Johnston, C. (2009). Emotional availability in parent-child dyads where children are blind. *Parenting: Science and Practice, 9*(3-4), 216-227. doi: 10.1080/15295190902844456

Campos, J. J., Frankel, C. B., & Camras, L. (2004). On the nature of emotion regulation. *Child Development, 75*(2), 377-394. doi: 10.1111/1467-9507.2007.00389.x

Camras, L., & Allison, K. (1985). Children's understanding of emotional facial expressions and verbal labels. *Journal of Nonverbal Behavior, 9*, 84-94. doi: 10.1007/FBF00987140

Caron, A. J., Caron, R. E., & MacLean, D. J. (1988). Infant discrimination of naturalistic emotional expressions: The role of face and voice. *Child Development, 1*, 606-616. doi: 10.2307/1130560

Celani, G., Battacchi, M. W., & Arcidiacono, L. (1999). The Understanding of the emotional meaning of facial expressions in people with Autism. *Journal of Autism and Developmental Disorders, 29*(1), 57-66. doi: 10.1023/A:1025970600181

Chen, D. (1999). Early intervention: purpose and principles. In D. Chen (Ed.), *Essential elements in early intervention: Visual impairment and multiple disabilities* (pp. 3-21). New York, NY: AFB Press.

Clore, G. L., & Centerbar, D. B. (2004). Analyzing anger: How to make people mad. *Emotion, 4*(2), 139-144. doi: 10.1037/1528.3542.4.2.139

Cohen, D., & Crabtree, B. (2006). *Qualitative research guidelines project.* Retrieved from http://www.qualres.org/HomeHomo-3804.html

Cohen, N. J. (2010). The impact of language development on the psychosocial and emotional development of young children. Language Development and Literacy. *Encyclopedia on Early Childhood Development* (2nd ed., pp. 1-5). North York, ON: Hicks-Delerest Center.

Cole, P. M., Jenkins, P. A., & Shott, C. T. (1989). Spontaneous expressive control in blind and sighted children. *Child Development, 60*, 683-688. doi: 10.2307/1130733

Cooper, H. M. (1988). Organizing knowledge synthesis: A taxonomy of literature reviews. *Knowledge in Society, 1*, 104-126. doi: 10.1007/FBF03177550

Cowie, R., Douglas-Cowie, E., & Cox, C. (2005). Beyond emotion archetypes: Databases for emotion modelling using neural networks. *Neural Networks*, *18*(4), 371-388. doi: 10.1016/j.neunet.2005.03.002

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. Los Angeles: Sage publications.

Cummings, A, J., & Rennels, J. L. (2014). How mood and task complexity affect children's recognition of other's emotions. *Social Development*, *23*(1), 80-99. doi: 10.111/sode.12038

Damasio, A. R. (1994). *Descartes' error: emotion, reason, and the human brain*. New York, NY: Grosset/Putnam.

Damasio, A. R. (1999). *The feeling of what happens: Body and emotion in the making of consciousness*. New York, NY: Harcourt Brace.

De Gelder, B., Pourtois, G., & Weiskrantz, L. (2002). Fear recognition in the voice is modulated by unconsciously recognized facial expressions but not by unconscious recognized affective pictures. *National Academy of Sciences of the United States of America, 99*(6), 4121-4126. doi: 10.1073/pnas.062018499

De Sonneville, L. J., Vershoor, C. A., Njiokiktjien, C. C., Veld, V., Toorenaar, N. N., & Vranken, M. M. (2002). Facial identity and facial emotions: Speed, accuracy and processing strategies in children and adults. *Journal of Clinical and Experimental Neuropsychology, 24*, 200-213. doi: 10.1076/jcen.24.2.200989

Demir, T., Bolat, N., Yavuz, M., Karaçetin, G., Doğangün, B., & Kayaalp, L. (2014). Attachment characteristics and behavioural problems in children and adolescents with congenital blindness. *Archives of Neuropsychiatry, 51,* 116-121. doi: 10.4274/npa.y6702

Denham, S. A. (1998). *Emotional development in young children*. New York, NY: Guilford Press.

Department of Basic Education, Republic of South Africa. (2010). *The status of the language of learning and teaching (LoLT) in South African public schools: A quantitative review.* Pretoria: Department of Basic Education.

Durand, K., Gallay, M., Seigneuric, A., Robichon, F., & Baudouin, J.Y. (2007). The development of facial emotion recognition: The role of configural information. *Journal of Experimental Child Psychology, 97*(1), 14-27. doi: 10.1016/j.jecp.2006.12.001

Dyck, M., Farrugia, C., Shochet, I., & Holmes-Brown, M. (2004). Emotion recognition/understanding ability in hearing or vision-impaired children: Do sounds, sights, or words make the difference? *Journal of Child Psychology and Psychiatry, 45*(4), 789-800. doi: 10.1111/j.1469-7610.2004.00272.x

Dyck, M., Ferguson, K., & Shochet, I. (2001). Do autism spectrum disorders differ from each other and from non-spectrum disorders on emotion recognition tests? *European Child and Adolescent Psychiatry, 10*(2), 105-116.

Ekman, P. (1992). Facial expressions of emotion: new findings, new questions. *Psychological Science, 3*, 34-38. doi: 10.1111/j.1467-9280.1992.tb002353.x

Ekman, P. (1998). Universality of emotional expression? A personal history of the dispute. *The expression of the emotions in man and animals* (3rd Ed.), 363-393. New York, NY: Oxford University Press. doi: 10.1145/1180995.1181043

Ekman, P. (2003). *Emotions revealed*. New York, NY: Times Books.

Ekman, P. (2007). The directed facial action task. In J. A. Coan & J. J. B. Allen (Eds.), *Handbook of emotion elicitation and assessment* (pp. 47-53). Oxford, UK: Oxford University Press.

Ekman, P. (2016). What scientists who study emotion agree about. *Perspectives on Psychological Science, 11*(1), 31-34. doi: 10.1177/145691615596992

Ekman, P., Levenson, R. W., & Friesen, W. V. (1983). Autonomic nervous system activity distinguishes among emotions. *Science, 221*(4616), 1208-1210.

Elfenbein, H. A., & Ambady, N. (2003). Universal and cultural differences in recognizing emotions. *Current Directions in Psychological Science, 12*(5), 159-164. doi: 10.1111/1467-8721.01252

Elliot, C. D. (1983). *British ability scales*. Windsor: NFER-Nelson.

Fehr, B., & Russell, J. A. (1984). Concept of emotion viewed from a prototype perspective. *Journal of experimental psychology: General*, *113*(3), 464.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Thousand Oaks, CA: Sage.

Fischer, A. (2000). *Gender and emotion: Social psychological perspectives*. Cambridge: Cambridge University Press.

Frick, K. D., & Foster, A. (2003). The magnitude and cost of global blindness: an increasing problem that can be alleviated. *American Journal of Ophthalmology, 135*(4), 471-476. doi: 10.1016/S002-9394(02)02110-4

Frijda, N. H. & Scherer, K. R. (2009). Emotion definition (psychological perspectives). In D. Sander & K. R. Scherer (Eds.), *Oxford companion to emotion and the affective sciences* (pp. 142-143). Oxford, UK: Oxford University Press.

Frijda, N. H. (1986). *The emotions*. New York, NY: Cambridge University Press.

Frijda, N. H. (2007). *The laws of emotion*. Mahwah, NJ: Lawrence Erlbaum Associates.

Galati, D., Miceli, R., & Sini, B. (2001). Judging and coding facial expression of emotions in congenitally blind children. *International Journal of Behavioral Development*, *25*(3), 268-278. doi: 10.1080/01650250042000393

Galati, D., Sini, B., Schmidt, S., & Tinti, C. (2003). Spontaneous facial expressions in congenitally blind and sighted children aged 8-11. *Journal of Visual Impairment and Blindness*, *97*(7), 418-428.

Gao, X., & Maurer, D. (2009). Influence of intensity on children's sensitivity to happy, sad, and fearful facial expressions. *Journal of Experimental Child Psychology*, *102*, 503-521. doi: 10.1016/j.jecp.2008.11.002

Garfield, J. L., Peterson, C. C., & Perry, T. (2001). Social cognition, language acquisition and the Theory of Mind. *Mind & Language, 16*(5), 494-541. doi: 10.1111/1468-0017.00180

Gast, D. (2010). *Single subject research methodology in behavioral sciences*. New York, NY: Routledge.

Gast, D. L., & Ledford, J. R. (2014). Applied research in education and behavioral sciences. *Single case research methodology: Applications in special education and behavioral sciences*. New York, NY: Routledge.

Gilbert, C., & Awan, H. (2003). Blindness in children – half of it is avoidable, and suitable cost effective interventions are available. *British Medical Journal, 327*(7418), 760-761. doi: 10.1136/bmj.327.7418.760

Glumbić, N., Jablan, B., & Hanak, N. (2011). Theory of mind of the persons with visual impairments: Theoretical explanations and assessment procedures. *Specijalnaedukacija i Rehabilitacija (Beograd), 10*(3), 495-508.

Golan, O., & Baron-Cohen, S. (2006). Systemizing empathy: Teaching adults with Asperger syndrome or high-functioning autism to recognize complex emotions using interactive multimedia. *Development and Psychopathology, 18*(2), 591-617. doi: 10.1017/S0954579406060305

Golan, O., Baron-Cohen, S., & Golan, Y. (2008). The 'reading the mind in films' task [child version]: Complex emotion and mental state recognition in children with and without autism spectrum conditions. *Journal of Autism and Developmental Disorders, 38*(8), 1534-1541. doi: 10.1007/s10803-006-0252-5

Golan, O., Sinai-Gavrilov, Y., & Baron-Cohen, S. (2015). The Cambridge Mindreading Face-Voice Battery for Children (CAM-C): Complex emotion recognition in children with and without autism spectrum conditions. *Molecular Autism, 6*(1), 22. doi: 10.1186/s13229-015-0018-2

Gray, J. R., Schaefer, A., Braver, T. S., & Most, S. B. (2005). Affect and the resolution of cognitive control dilemmas. In L. F. Barrett, P. M. Niedenthal & P. Winkielman (Eds.), *Emotion and consciousness* (pp. 67-94). New York, NY: Guilford Press.

Greenberg, L. (2006). Emotion-focused therapy: A synopsis. *Journal of Contemporary Psychotherapy*, *36*(2), 87-93. doi: 10.1007/s10879-006-9011-3

Greenberg, L. S. (2010). Emotion-focused therapy: A clinical synthesis. *Focus, 8,* 32-42. doi: 10.1176/voc.8.1.voc32

Greenberg, L. S., & Safran, J. D. (1998). Emotion in Psychotherapy. *American Psychologist, 44,* 19-29. doi: 10.1002/jclp.1030

Greenberg, L., & Pascual-Leone, J. (2001). A dialectical constructivist view of the creation of personal meaning. *Journal of Constructivist Psychology, 14*, 165-186. doi: 10.1080/10720530151143539

Greenberg, L., & Safran, J. (1987). *Emotion in psychotherapy: Affect, cognition, and the process of change.* New York, NY: Guilford.

Gross, A., & Ballif, B. (1991). Children's understanding of emotion from facial expressions and situations: A review. *Developmental Review, 11*, 368-398. doi: 10.1016/0273-2297(91)90019-K

Hardman, M., Drew, C., & Egan, W. (2005). *Human exceptionality: school, community and family*. Boston, MA: Pearson Education.

Haviland-Jones, J., Gebelt, J., & Stapley, J. (1997). The Questions of Development in Emotion. In P. Salovey & J. Sluyter (Eds.), *Emotional Development and Emotional Intelligence: Educational Implications*. New York, NY: Basic Books.

Heilmann, J., Miller, J. F., Iglesias, A., Fabiano-Smith, L., Nockerts, A., & Adriacchi, K. D. (2008). Narrative transcription accuracy and reliability in two languages. *Topics in Language Disorders, 28*(2), 178-188. doi: 10.1097/01.TLD.0000318937.39301.76

Hess, U., Senécal, S., Kirouac, G., Herrera, P., Philippot, P., & Kleck, R. E. (2000). Emotional expressivity in men and women: Stereotypes and self-perceptions. *Cognition & Emotion, 14*(5), 609-642. doi: 10.1080/02699930050117648.

Hibberd, F. J. (2006). *Unfolding social constructionism*. Berlin: Springer Science & Business Media.

Hirschberg, J., Liscombe, J., & Venditti, J. (December, 2003). Experiments in emotional speech. In *ISCA & IEEE Workshop on Spontaneous Speech Processing and Recognition*. Tokyo: Tokyo Institute of Technology.

Hobson, P., & Bishop, M. (2003). The pathogenesis of autism: Insights from congenital blindness. *Philosophical Transactions of the Royal Society of London. Series B. Biological Sciences, 358*, 335-344. doi: 10.1098/rstb.2002.1201

Holder, H. B., & Kirkpatrick, S. W. (1991). Interpretation of emotion from facial expressions in children with and without learning disabilities. *Journal of Learning Disabilities, 24*(3), 170-177. doi: 10.1177/002221949102400305

Human Rights Watch. (2015). *World Report.* New York, NY: Human Rights Watch.

Iversen, K. D., Ptito, M., Møller, P., & Kupers, R. (2015). Enhanced chemosensory detection of negative emotions in congenital blindness. *Neural Plasticity*, 1-7. doi:10.1155/2015/469750

Izard, C. E. (1977). *Human emotions*. New York, NY: Plenum Press.

Izard, C. E. (1992). Basic emotions, relations amongst emotions and emotion-cognition relations. *Psychological Review, 99*, 561-565. doi: 10.1037/0033-295x.99.3.561

Izard, C. E., & Harris, P. (1995). Emotional development and developmental psychopathology. In D. J. Cohen & D.V. Cichetti (Eds.), *Developmental psychopathology, vol 1, theory and methods* (pp.467-503). Oxford: John Wiley and Sons.

Kang, S. M., & Shaver, P. R. (2004). Individual differences in emotional complexity: Their psychological implications. *Journal of Personality*, *72*(4), 687-726. doi: 10.1011/j.0022-3505.2004.00277.x

Kello, A. B., & Gilbert, C. E. (2003). Causes of severe visual impairment and blindness in children in schools for the blind in Ethiopia. *British Journal of Ophthalmology, 87,* 526-530. doi: 10.1136/bjo.87.5.526

Kerlinger, F. N., & Lee, H. B. (2000). *Foundations of behavioral research*. Stanford: Wadsworth.

Korkmaz, B. (2011). Theory of mind and neurodevelopmental disorders of childhood. *Pediatric Research, 69,* 101R-108R. doi: 10.1203/PDR0b013e318212c177

Koster-Hale, J., Bedny, M., & Saxe, R. (2014). Talking about seeing: Perceptual sources of knowledge are encoded in the theory of mind brain regions of sighted and blind adults. *Cognition, 133,* 65-78. doi: 10.1016/j.cognition.2014.04.006

Kujala, M. V., Tanskanen, T., Parkkonen, L., & Hari, R. (2009). Facial expressions of pain modulate observers lang-latency STS responses. *Human Brain Mapping, 30*(12), 3910-3960. doi: 10.1002/hbm.20816

LaCava, P. G., Golan, O., Baron-Cohen, S. & Smith-Myles, B. (2007). Using assistive technology to teach emotion recognition to students with Asperger Syndrome. *Remedial and Special Education, 28*(3), 174-181. doi: 10.1177/07419325070280030601

Landsberg, E. (2016). In E. Landsberg (Ed.), D. Krüger & E. Swart (Assistant Eds.)., *Addressing barriers to learning. A South African perspective* (3rd ed., pp. 407-427). Pretoria: Van Schaik Publishers.

Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York, NY: McGraw-Hill.

Lazarus, R. S. (1982). Thoughts on the relations between emotion and cognition. *American Psychologist, 37*(10), 1019-1024. doi: 10.1037/003-066x.37.9.1019

Lazarus, R. S. (1991). *Emotion and adaptation*. New York, NY: Oxford University Press.

Leeds-Hurwitz, W. (2009). Social construction of reality. In S. Littlejohn & K. Foss (Eds.), *Encyclopedia of Communication Theory* (pp. 892-895). Thousand Oaks, CA: Sage Publications. doi: 10.1146/annurev.50.18.080192.002105

Lemerise, E. A., & Arsenio, W. F. (2000). An integrated model of emotion processes and cognition in social information processing. *Child Development, 71*(1), 107-118. doi: 0009-3902/2000/7101-0013

MacDonald, P., Kirkpatrick, S., & Sullivan, L. (1996). Schematic drawings of facial expressions for emotion recognition and interpretation by preschool-aged children. *Genetic, Social, and General Psychology Monographs, 122*, 373-388.

Manassis, K., & Young, A. (2000). Perception of emotions in anxious and learning disabled children. *Depression and Anxiety, 12*(4), 209-216. doi: 10.1002/1520-6394(2000)12:4<209::AID-DA4>30

Markham, R., & Adams, K. (1992). The effect of type of task on children's identification of facial expressions. *Journal of Nonverbal Behavior, 16*, 21-39. doi: 10.1007%2FBF00986877?LI=true

Mash, E., & Wolfe, D. (2012). *Abnormal child psychology* (2nd ed.). Belmont: Cengage Learning.

Mayer, J. D., Salovey, P., Caruso, D. R., & Sitarenios, G. (2001). Emotional intelligence as a standard intelligence. *Emotion, 1*, 232-242. doi: 10.1037//1528-3542.1.3.232

McAlpine, L. M., & Moore, C. L. (1995). The development of social understanding in children with visual impairment. *Journal of Visual Impairment and Blindness, Part 1 of 2, 89*(4), 349-359.

McGuire, A. E., & Michalko, R. (2011). Minds between us: Autism, mindblindness and the uncertainty of communication. *Educational Philosophy and Theory*, *43*(2), 162-177. doi: 10.1111/j.1469-5812.2009.00537.x

McIntyre, G., & Göcke, R. (2006, December). Researching emotions in speech. In *Proceedings of the Eleventh Australasian International Conference on Speech Science and Technology (SST2006)*, (pp. 264-269), Auckland: New Zealand.

McMillan, J. H., & Schumacher, S. (2006). *Research in education. Evidence-based inquiry.* (6th ed.). Boston: Pearson.

Milligan, K., Astington, J. W., & Dack, L. A. (2007). Language and theory of mind: Meta-analysis of the relation between language ability and false-belief understanding. *Child Development*, *78*(2), 622-646. doi: 10.1111/j.1467-86224.2007.01018.x

Minter, M., Hobson, R., & Bishop, M. (1998). Congenital visual impairment and 'theory of mind'. *British Journal of Developmental Psychology, 16,* 183-196. doi: 10.11/j.2044-835x.1998.tb00918.x

Minter, M. E., Hobson, R. P., & Pring, L. (1991). Recognition of vocally expressed emotion by congenitally blind children. *Journal of Visual Impairment & Blindness, 85*(1), 411-415.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & Prisma Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS medicine, 6*(7), e1000097. doi: 10.1371/journal.pmed.1000097

Moors, A. (2009). Theories of emotion causation: A review. *Cognition & Emotion, 23*(4), 625-662. doi: 10.1177/1754073912463601

Morris, P. H., Doe, C., & Godsell, E. (2008). Secondary emotions in non-primate species? Behavioural reports and subjective claims by animal owners. *Cognition and Emotion, 22*(1), 3-20. doi: 10.1080/02699930701273716

Na, J. Y., Wilkinson, K., Karny, M., Blackstone, S., & Stifter, C. (2016). A synthesis of relevant literature on the development of emotional competence: Implications for design of augmentative and alternative communication systems. *American Journal of Speech-Language Pathology*, *25*(3), 441-452. doi: 10.1044/2016_AJSLP-14-0124

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. (1979). *Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research*. US: Federal Register

Oatley, K., & Johnson-Laird, P. N. (1987). Towards a cognitive theory of emotions. *Cognition and Emotion, 1*, 29-50. doi: 10.1080/02699938708408362

Ortony, A., & Turner, T. J. (1990). What's basic about emotion? *Psychological Review, 97*(3), 315-331. doi: 10.1037/0033-295X.97.3.315.

Ortony, A., Clore, G. L., & Collins, A. (1988). *The cognitive structure of emotions*. New York, NY: Cambridge University Press.

Pallant, J. (2011). *SPSS survival manual. A step by step guide to data analysis using SPSS* (4th ed.). Sydney: Allen & Unwin.

Pallant, J. (2013). *SPSS survival manual*. Berkshire: McGraw-Hill.

Panksepp, J. (1982). Toward a general psychobiological theory of emotions. *Behavioral and Brain Sciences, 5*, 407-467. doi: 10.1017/S0140525x00012759

Panksepp, J. (1998). *Affective neuroscience: The foundations of human and animal emotions.* New York, NY: Oxford University Press.

Panksepp, J. (2000). Emotions as natural kinds within the mammalian brain. In M. Lewis, J. M. Haviland-Jones & L. F. Barrett (Eds.), *Handbook of Emotions* (3rd ed., pp. 137-156). New York, NY: Guilford Press

Pao, T. L., Chen, Y. T., Yeh, J. H., & Li, P. J. (2006, September). Mandarin emotional speech recognition based on SVM and NN. In *Pattern Recognition, 2006. ICPR 2006. 18th International Conference on* (Vol. 1, pp. 1096-1100). IEEE. doi: 10.1109/ICPR.2006.780

Parkinson, B. (2012). Piecing together emotion: Sites and time-scales for social constructionism. *Emotion Review, 4*(3), 291-298. doi: 10/1177/1754073912439764

Parkinson, B., Fischer, A. H., & Manstead, A. S. (2005). *Emotion in social relations. Cultural, group, and interpersonal processes*. New York, NY: Psychology Press.

Parrott, G. W. (2007). Components and the definition of emotion. *Social Science Information, 46*, 419-423. doi: 10.1080/02699930802645739

Parrott, G. W. (2001). *Emotions in social psychology*. Philadelphia: Psychology Press.

Peña, E. D. (2007). Lost in translation: Methodological considerations in cross-cultural research. *Child Development, 78*(4), 1255-64. doi: 10.1111/j1467-8624.2007.01064.x

Peterson, C. C., Peterson, J. L., & Webb, J. (2000). Factors influencing the development of a theory of mind in blind children. *British Journal of Developmental Psychology*, *18*(3), 431-447. doi: 10.1348/026151000165788

Rafaeli, A. (2004). Emotions in the workplace: Understanding the structure and role of emotions in organizational behavior. In R. G. Lord, R. J. Klimoski & R. Kanfer (Eds.), *Human Relations – New York* (pp. 5-19). Thousand Oaks: Sage Publications.

Reber, A. S., & Reber, E. S. (2001). *Dictionary of psychology* (3rd ed.). London: Penguin.

Ribordy, S. C., Camras, L. A., Stefani, R., & Spaccarelli, S. (1988). Vignettes of emotion recognition research and affective therapy with children. *Journal of Child Clinical Psychology, 17*, 322-325. doi: 10.1207/s15374424jccp1704_4

Rieffe, C., Terwogt, M. M., & Cowan, R. (2005). Children's understanding of mental states as causes of emotions. *Infant and Child Development, 14,* 259-272. doi: 10.1002/icd.391

Roch-Levecq, A.-C. (2006). Production of basic emotions by children with congenital blindness: Evidence for the embodiment of theory of mind. British Journal of Developmental Psychology, 24(3), 507-528. doi: 10.1348/026151005x50663

Roseman, I. J., & Smith, C. A. (2001). Appraisal theory: overview, assumptions, varieties, controversies. In K. R. Scherer, A. Schorr & T. Johnstone (Eds.), *Appraisal processes in emotion* (pp. 3-34). New York, NY: Oxford University Press.

Roseman, I. J. (1991). Appraisal determinants of discrete emotions. *Cognition and Emotion, 5*, 161-200. doi: 10.1080/02699939108411034

Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological Review, 110*, 145-172. doi: 10.1037/0033-295X.110.1.145

Saarni, C. (2011). Emotional development in childhood. In R.E. Tremblay, M. Boivin & R. De V. Peters (Eds.), *Encyclopedia on Early Childhood Development*. Montreal, Quebec: Center of Excellence for Early Childhood Development and Strategic Knowledge Cluster on Early Child Development. Retrieved from http://www.child-encyclopedia.com/documents/SaarniANGxp1.pdf.

Saarni, C. (1999). *The development of emotional competence*. New York, NY: Guilford Press.

Saarni, C. (2000). The social context of emotional development. In M. Lewis & J. Haviland (Eds.), *Handbook of emotions* (2nd ed., pp. 306-322). New York, NY: Guilford Press.

Saarni, C., Campos, J. J., Camras, L. A., & Witherington, D. (1998). Emotional development: Action, communication, and understanding. In N. Eisenberg, W. Damon & R.M. Lerner (Eds.), *Handbook of child psychology*. Hoboken, NJ: John Wiley & Sons.

Sander, D., Grandjean, D., & Scherer, K. R. (2005) A systems approach to appraisal mechanisms in emotion. *Neural Networks*, 18, 317-352. doi: 10.1016/j.neunet.2005.03.001

Sandler, A-M., & Hobson, P.R. (2001). On engaging with people in early childhood: The case of congenital blindness. *Clinical Child Psychology and Psychiatry, 6*(2), 205-222. doi: 10.1177/1359104501006002004

Schachter, S., & Singer, J. E. (1962). Cognitive, social, and physiological determinants of emotional state. *Psychological Review, 69*(1), 379-399.

Scherer, K. R., & Ellgring, H. (2007). Are facial expressions of emotion produced by categorical affect programs or dynamically driven by appraisal? *Emotion, 7*, 113-130. doi: 10.1037/1528-3542.7.1.113

Scherer, K. R. (1984). On the nature and function of emotions: A component process approach. In K. R. Scherer & P. Ekman (Eds.), *Approaches to emotion* (pp. 293-317). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Scherer, K. R. (1994). Toward a concept of "modal emotions." In P. Ekaman & R. J. Davidson (Eds.), *The nature of emotion: fundamental questions* (pp. 25-31). New York, NY: Oxford University Press.

Scherer, K. R. (1999). Appraisal theories. In T. Dalgleish & M. Power (Eds.), *Handbook of cognition and emotion* (pp. 637-663). Chichester, UK: John Wiley & Sons.

Scherer, K. R. (2001). Appraisal considered as a process of multilevel sequential checking. In K. R. Scherer, A. Schorr & T. Johnstone (Eds.), *Appraisal processes in emotion: Theory, methods, research* (pp. 92-120). New York, NY: Oxford University Press.

Scherer, K. R. (2005). What are emotions? And how can they be measured? *Social Science Information, 44*, 693-727. doi: 10.1177/0539018405058216

Scherer, K. R. (2009a). The dynamic architecture of emotion: Evidence for the component process model. *Cognition and Emotion, 23*, 1307-1351. doi: 10.1080/02699930902928969

Scherer, K. R. (2009b). Emotions are emergent processes: They require a dynamic computational architecture. *Philosophical Transactions of the Royal Society B, 364*, 3459-3474. doi: 10.1098/astb.2009.0141

Shioiri, T., Someya, T., Helmeste, D., & Tang, S. (1999). Misinterpretation of facial expression: A cross-cultural study. *Psychiatry and Clinical Neurosciences, 53*(1), 45-50. doi: 10.1046/j.1440-1819.1990.00469.x

Siegel, S., & Castellan, J. N. J. (1988). *Nonparametric Statistics for the Behavioural Sciences*. New York, NY: McGraw-Hill.

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *J. Pers. Soc. Psychol, 48*, 813-838. doi: 10.1037//0022-3514.48.4.813

Sodian, B., & Kristen, S. (2010). *Theory of mind*. Berlin Heidelberg: Springer.

Solomon, R. C. (2002). Back to basics: On the very idea of "Basic Emotions". *Journal for the Theory of Social Behaviour*, *32*(2), 0021-8308. doi: 10.1111/1468-5914.00180

Statistics South Africa. (2016). *Community Survey 2016, Statistical Release P0301.* Pretoria: Statistics South Africa.

Stevens, J. P. (2009). *Applied multivariate statistics for the social sciences* (5th ed.). New York, NY: Routledge.

Stifter, C. A., & Fox, N. A. (1990). Infant reactivity: Physiological correlates of newborn and 5-month temperament. *Developmental Psychology*, *26*(4), 582. doi: 10.1037/0012-1649.26.4.582

Stolte, J. F. (1994). The context of satisficing in vignette research. *The Journal of Social Psychology*, *134*(6), 727-733. doi: 10.1080/00224545.1994.9923007

Sullivan, L. A., Kirkpatrick, S. W., & MacDonald, P. M. (1995). Interpretation of facial expressions of emotions in sexually abused and non-abused children. *Journal of Child Clinical Psychology, 17*, 322-325.

Suveg, C., Southam-Gerow, M. A., Goodman, K. L., & Kendall, P. C. (2007). The role of emotion theory and research in child therapy development. *Clinical Psychology: Science and Practice, 14*, 358-371. doi: 10.1111/j.1468-2850.2007.00096.x

Terre Blanche, M., Durrheim, K., & Painter, D. (2006). *Research in practice (2nd Ed.).* Cape Town, UCT Press.

Thabane, L., Ma, J., Chu, R., Cheng, J., Ismaila, A., Rios, L. P., … Goldsmith, C. H. (2010). A tutorial on pilot studies: The what, why and how. *BMC Medical Research Methodology, 10*(1), 1. doi: 10.1186/1471-2288-10-1

Thorndike, R. L., Hagen, E. P., & Sattler, J. M. (1986). *The Stanford-Binet Intelligence Scale: Fourth Edition*. Chicago, IL: Riverside Publications.

Tobin, M. J., & Hill, E. W. (2011). Issues in the educational, psychological assessment of visually impaired children. Test-retest reliability of the Williams Intelligence Test for Children with Defective Vision. *The British Journal of Visual Impairment, 29*(3), 208-214.

Tomasello, M., & Farrar, M. J. (1986). Joint attention and early language. *Child Development*, 1454-1463. doi: 10.2307/1130423

Tomkins, S. S. (1962). *Affect, imagery, consciousness: Vol. 1. The positive affects*. New York, NY: Springer.

Trentacosta, C. J., & Izard, C. E. (2007). Kindergarten children's emotion competence as a predictor of their academic competence in first grade. *Emotion, 7*(1), 77-88. doi: 10.1037/1528-3542.7.1.77

Vicari, S., Reilly, J. S., Pasqualetti, P., Vizzotto, A., & Caltagirone, C. (2000). Recognition of facial expressions of emotions in school-age children: the intersection of perceptual and semantic categories. *Acta Paediatrica, 89*(7), 836-845. doi: 10.11/j.1651-2227_2000.tb00392.x

Von Salisch, M. (2001). Children's emotional development: Challenges in their relationships to parents, peers and friends. International Journal of Behavioural Development, 25(4), 310-323. doi: 10.1080/01650250143000058

Wang, Q. (2003). Emotion situation knowledge in American and Chinese preschool children and adults. *Cognition & Emotion*, *17*(5), 725-746. doi: 10.1080/02699930302285

Wechsler, D. (1974). *Wechsler intelligence scale for children – Revised*. New York, NY: Psychological Corporation.

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychol. Rev, 92,* 548-573. doi: 10/10370033-295x.92.4.548

Wellman, H. M., & Liu, D. (2004). Scaling of Theory-of-Mind Tasks. *Child Development, 75*(2), 523-541. doi: 10.11/j.1467-8624.2004.00691.x

Welman, J., Kruger, F., Mitchell, B., & Huysamen, G. (2005). *Research methodology* (3rd ed.). Cape Town: Oxford University Press.

Wenar, C., & Kerig, P. (2000). *Developmental psychopathology: From infancy through adolescence*. New York, NY: McGraw-Hill.

Widen, S. C., & Russell, J. A. (2004). The relative power of an emotion's facial expression, label, and behavioral consequence to evoke preschoolers' knowledge of its cause. *Cognitive Development, 19,* 111-125. doi: 10.1016/j.cogdev.2003.11.004

Williams, M. (1956). *Williams Intelligence Test for Children with Defective Vision*. Windsor: NFER-Nelson.

World Health Organization (WHO). (2010). *International Statistical Classification of Diseases and Related Health Problems,* 10th revision (ICD-10). Retrieved from http://www.who.int/classification/icd/ICD10Volume2_en_2010.pdf

World Health Organization (WHO). (2014). *Visual Impairment and Blindness. Fact sheet no. 282*. Geneva: World Health Organization.

Wright, B. (2008). Development in deaf and blind children. *Psychiatry, 7*(7), 286-289. doi: 10.1016/j.mppsy.2008.05.007

Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist, 3*, 151-175. doi: 10.1037/0003-066X.35.2.151

APPENDIX A

BIOGRAPHICAL INFORMATION SHEET

For office use

Record Number: ☐

(To be completed by the researcher based on information provided by the teacher during an interview.)

Instructions: Tick the appropriate box and fill in the response on the blank line. *Office use.*

1. Sex: Male: ☐ Female: ☐ ☐
2. D.O.B: _____ Age: _____ ☐
3. Current Grade: _____ ☐
4. Race: _____ ☐
5. Any other conditions/diagnoses apart from visual impairment: ☐

_____

6. Home language(s): _____ ☐
7. Number of years of English as LoLT: _____ ☐
8. Has the child ever repeated a year at school? Yes: ☐ No: ☐
9. Legal blindness diagnosed before the age of 1 year? Yes: ☐ No: ☐

APPENDIX B

WILLIAMS INTELLIGENCE TEST FOR CHILDREN WITH DEFECTIVE VISION (WIT):

INDEPENDENT VOCABULARY TEST

Procedure: Say, "*I want to see how many words you know. Listen carefully and tell me what these words mean. 'Bicycle,' what is a bicycle?"* Proceed with the words in the order listed, repeating each time *"What is a . . . ?"* or *"What does . . . mean?"* With older subjects the formal questions may be omitted after the third word; just pronounce the word. If the reply is vague, it is permissible to say, *"Please explain a little more,"* or *"Tell me a little more about it."* The following is the list and the order of the words to be used:

1. Bicycle	11. Join	21. Fable	31. Vesper
2. Knife	12. Nuisance	22. Belfry	32. Espionage
3. Hat	13. Brave	23. Cedar	33. Imminent
4. Letter	14. Nonsense	24. Plural	34. Ballast
5. Spade	15. Diamond	25. Armoury	35. Catacomb
6. Umbrella	16. Sword	26. Affliction	36. Mantis
7. Cushion	17. Brim	27. Recede	37. Chattel
8. Nail	18. Hero	28. Seclude	38. Aseptic
9. Donkey	19. Gamble	29. Stanza	39. Dilatory
10. Fur	20. Microscope	30. Nitroglycerine	40. Flout

Except where low intellectual functioning is suspected, the first nine words need not be given to subjects over eight years of age. The general rule is to continue down the list until eight consecutive words have been failed.

For each age group the mean score, representing number of words correct, is given below:

Age Range	Mean Score
3 years 6 months – 4 years 5 months	5
4 years 6 months – 5 years 5 months	7
5 years 6 months – 6 years 5 months	9
6 years 6 months – 7 years 5 months	11
7 years 6 months – 8 years 5 months	13
8 years 6 months – 9 years 5 months	15
9 years 6 months – 10 years 5 months	17
10 years 6 months – 11 years 5 months	18
11 years 6 months – 12 years 5 months	19
12 years 6 months – 13 years 5 months	20
13 years 6 months – 14 years 5 months	22
14 years 6 months – 15 years 5 months	23
15 years 6 months – 16 years 0 months	24

The general rule is that any recognized meaning of the word is acceptable; logical definition is not required. Awkwardness of expression and lack of precision is disregarded. Any of the following would be satisfactory: a synonym, a recognised use, one or more definite features or primary features of an object, general classification to which the word belongs, a correct symbolic use, several less definitive but correct descriptive features which cumulatively indicate understanding of the word and, and in the case of verbs, definite examples of action or causal relation. It is generally desirable for the examiner to take down the subject's responses verbatim.

APPENDIX C

PARTICIPANT SCREENING FORM(S)

Cohort 1: Children With Blindness

Child's Name: _____

Grade: _____ D.O.B: _____

Selection criteria	Method of measurement of criteria	Meets criteria
Children within the chronological age range of 8;0 – 11;11 yrs; mnths.	Biographical information sheet.	
Blindness from birth or diagnosed before the age of 1 year.	Information is provided by the school teacher on the biographical information sheet.	
Age equivalent language abilities in English	Participant has received at least three years of instruction in English. In addition, s/he has an age-equivalent score on the WIT Independent Vocabulary Test.	
Typical cognitive development	Participant has an Intelligence Quotient that falls above the intellectual disability range on the WIT. Teacher report indicates that s/he has never repeated a year at school on the biographical information sheet.	
No hearing impairment	Participant passed a hearing screening test consisting of a tympanogram and auditory reflex measures.	
Passed Primary Emotion Screener	Participant has to pass primary emotion screener by obtaining a minimum of 5/6 correct answers.	

INCLUDED		**EXCLUDED**	

Cohort 2: Typically Developing Children

Child's Name: _____

Grade: _____ D.O.B: _____

Selection criteria	Method of measurement of criteria	Meets criteria
Children with chronological age range of 8;0 – 11;11 yrs; mnths.	Teacher report.	
No uncorrected visual impairment present	Information provided by the teacher on the biographical information sheet.	
Age Equivalent language abilities in English	Participant has received at least three years of instruction in English. In addition, s/he has an age-equivalent score on the WIT Independent Vocabulary Test.	
Typical Cognitive Development	Participant has an Intelligence Quotient that falls above the intellectual disability range on the WIT. Teacher report indicates that s/he has never repeated a year at school on the biographical information sheet.	
No hearing impairment	Participant has to pass a hearing screening test consisting of a tympanogram and auditory reflex measures.	
Passed Primary Emotion Screener	Participant has to pass primary emotion screener by obtaining a minimum of 5/6 correct answers.	

INCLUDED		**EXCLUDED**	

APPENDIX D

PRIMARY EMOTION IDENTIFICATION SCREENER

Introduction:

Say: *"We are now going to talk about some feeling words.* Familiarize the child with each of the six basic emotions in turn.

"*I am now going to play you some short sentences that different people are saying. After each sentence, I will stop the recording and ask you to choose a word from four different words that best describes how the speaker is feeling. If you feel that more than one word is correct, please choose the word which you consider to be the best. This is how it is going to work*":

Before I play the voice, I will read you the four words from which you have to choose the best one as well as an explanation of what each word means. You will also be able to follow on the response card which I will place in front of you. If you can't remember the meaning of a word you can find it on the response card or ask me to tell you the meaning again."

For children with blindness:
"Do you prefer Uncontracted (Grade 1) or Contracted (Grade 2) braille?"
Select the suitable booklet for the child.

Instructions:

i) Place the response card for the audio clip in front of the child;
ii) Read each Practice item emotion word and its definition out loud to the child;
iii) Play the audio clip;
iv) Ask the child to choose one of the four emotion words (may say word or number, or point to an option);
v) Record the child's response in the column provided on the response sheet.

Say: *"We are now going to do a practice sentence together. Remember to choose the word that best describes how the speaker is feeling. Are you ready?"*

1. **Primary Emotions Voice Task Practice Item:**

Follow instructions as indicated.

The Practice Item

- ➡ Play primary emotions practice item: "Come and sit down here."
- ➡ Ask: Which word best describes how the speaker is feeling?

1. Silly	2. Kind	3. Bossy	4. Fine

NOTE: *Should the child give an incorrect response, help the participant self-correct his or her response by using the definitions as guidance in demonstrating how to distinguish the meanings of the words.*

2. **Primary Emotions Voice Task**

Instructions:

i) Discuss the relevant primary emotion words using the hand-out provided.

ii) ii) Proceed to administer the Primary Emotion Voice-Task items 1-6 according to the instructions provided earlier.

Primary Emotions Response Sheet:

Item	Target emotion	Answers and foils printed on response cards								Response
PI	Kind	1.	silly	2.	kind	3.	bossy	4.	fine	
1.	Angry	1.	disgusted	2.	sad	3.	angry	4.	happy	
2.	Afraid	1.	happy	2.	afraid	3.	sad	4.	surprised	
3.	Disgusted	1.	surprised	2.	angry	3.	disgusted	4.	happy	
4.	Sad	1.	angry	2.	afraid	3.	sad	4.	surprised	
5.	Happy	1.	disgusted	2.	happy	3.	angry	4.	afraid	
6.	Surprised	1.	happy	2.	angry	3.	surprised	4.	sad	

APPENDIX E

UNIVERSITY OF PRETORIA ETHICS COMMITTEE APPROVAL LETTER

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Humanities
Research Ethics Committee

20 May 2016

Dear Prof Bornman

Project:	**Children with congenital blindness' perceptions of secondary emotions in others**
Researcher:	**I Greyvenstein**
Supervisor:	**Dr K Tönsing**
Department:	**Centre for Augmentative and Alternative Communication**
Reference number:	**22308505**

Thank you for the response to the Committee's correspondence of 17 March 2016.

The Research Ethics Committee noted the amendment to the above study and the submission of the outstanding permissions from the schools. The application was approved at an *ad hoc* meeting held on 20 May 2016. Data collection may therefore commence.

Please note that this approval is based on the assumption that the research will be carried out along the lines laid out in the proposal. Should your actual research depart significantly from the proposed research, it will be necessary to apply for a new research approval and ethical clearance.

The Committee requests you to convey this approval to the researcher.

We wish you success with the project.

Sincerely

Prof. Maxi Schoeman
Deputy Dean: Postgraduate Studies and Ethics
Faculty of Humanities
UNIVERSITY OF PRETORIA
e-mail: tracey.andrew@up.ac.za

Kindly note that your original signed approval certificate will be sent to your supervisor via the Head of Department. Please liaise with your supervisor.

APPENDIX F

(i) LIMPOPO DEPARTMENT OF EDUCATION APPROVAL LETTER

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

Ref: 2/5/6/1 Enq: MC Makola PhD Tel No: 015 290 9448 E-mail:MakolaMC@edu.limpopo.gov.za

Greyvenstein .I
University of Pretoria.
Pretoria
0001

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH

1. The above bears reference.
2. The Department wishes to inform you that your request to conduct research has been approved. Topic of the research proposal: **"THE NATURE OF EMOTIONAL DEVELOPMENT OF CHILDREN WITH SEVERE VISUAL IMPAIRMENT: THE ROLE OF HIGHER ORDER EMOTION RECOGNITION."**
3. The following conditions should be considered:

3.1 The research should not have any financial implications for Limpopo Department of Education.

3.2 Arrangements should be made with the Circuit Office and the schools concerned.

3.3 The conduct of research should not anyhow disrupt the academic programs at the schools.

3.4 The research should not be conducted during the time of Examinations especially the fourth term.

3.5 During the study, applicable research ethics should be adhered to; in particular the principle of voluntary participation (the people involved should be respected).

3.6 Upon completion of research study, the researcher shall share the final product of the research with the Department.

4 Furthermore, you are expected to produce this letter at Schools/ Offices where you intend conducting your research as an evidence that you are permitted to conduct the research.

Request for permission to Conduct Research: I. Greyvenstein

CONFIDENTIAL

5 The department appreciates the contribution that you wish to make and wishes you success in your investigation.

Best wishes.

MUTHEIWANA NB
HEAD OF DEPARTMENT (ACTING)

18/02/2016
DATE

Request for permission to Conduct Research: I. Greyvenstein

CONFIDENTIAL

APPENDIX F

(ii) GAUTENG DEPARTMENT EDUCATION APPROVAL LETTER

For administrative use only:
Reference no: D2017 / 116
enquiries: Diane Buntting 011 843 6503

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GDE RESEARCH APPROVAL LETTER

Date:	**30 June 2016**
Validity of Research Approval:	**30 June 2016 to 30 September 2016**
Name of Researcher:	**Greyvenstein I.**
Address of Researcher:	**P.O. Box 1873; Mookgophong; Limpopo; 0560**
Telephone / Fax Number/s:	**074 148 3902**
Email address:	**innekegreyvenstein@yahoo.com**
Research Topic:	**The identification of higher order emotions by children with, and without, a severe visual impairment**
Number and type of schools:	**THREE Primary and EIGHT LSEN Schools**
District/s/HO	**Ekurhuleni North; Ekurhuleni South; Gauteng East; Gauteng North; Johannesburg East; Johannesburg South and Johannesburg West.**

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved. A separate copy of this letter must be presented to the Principal, SGB and the relevant District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted. However participation is VOLUNTARY.

The following conditions apply to GDE research. The researcher has agreed to and may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

CONDITIONS FOR CONDUCTING RESEARCH IN GDE

1. *The District/Head Office Senior Manager/s concerned, the Principal/s and the chairperson/s of the School Governing Body (SGB.) must be presented with a copy of this letter.*

2016/07/01

Office of the Director: Education Research and Knowledge Management ER&KM)
9th Floor, 111 Commissioner Street, Johannesburg, 2001
P.O. Box 7710, Johannesburg, 2000 Tel. (011) 355 0506

2. *The Researcher will make every effort to obtain the goodwill and co-operation of the GDE District officials, principals, SGBs, teachers, parents and learners involved. Participation is voluntary and additional remuneration will not be paid;*
3. *Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal and/or Director must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.*
4. *Research may only commence from the second week of February and must be concluded by the end of the THIRD quarter of the academic year. If incomplete, an amended Research Approval letter may be requested to conduct research in the following year.*
5. *Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.*
6. *It is the researcher's responsibility to obtain written consent from the SGB/s; principal/s, educator/s, parents and learners, as applicable, before commencing with research.*
7. *The researcher is responsible for supplying and utilizing his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institution/s, staff and/or the office/s visited for supplying such resources.*
8. *The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research title, report or summary.*
9. *On completion of the study the researcher must supply the Director: Education Research and Knowledge Management, with electronic copies of the Research Report, Thesis, Dissertation as well as a Research Summary (on the GDE Summary template). Failure to submit your Research Report, Thesis, Dissertation and Research Summary on completion of your studies / project – a month after graduation or project completion - may result in permission being withheld from you and your Supervisor in future.*
10. *The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned;*
11. *Should the researcher have been involved with research at a school and/or a district/head office level, the Director/s and school/s concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.*

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

.....

Dr David Makhado

Director: Education Research and Knowledge Management

DATE: 2016/07/01

Office of the Director: Education Research and Knowledge Management ER&KM)
9th Floor, 111 Commissioner Street, Johannesburg, 2001
P.O. Box 7710, Johannesburg, 2000 Tel: (011) 355 0506

APPENDIX G
PRINCIPAL PERMISSION LETTER

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Humanities

The Principal (name): _____

(School name and address): _____

Dear _____ (name of principal),

Re: Permission to conduct a research study at your school/institution

Date:

Personal introduction:

My name is Inneke Greyvenstein. I am currently enrolled for a PhD degree in Augmentative and Alternative Communication (AAC) at the University of Pretoria. The title of my study is *"Higher order emotion identification: Comparing children with blindness to typically developing peers".* The aim of the study is the exploration of the emotional development of children aged 8-11 years with blindness. Specifically, I want to determine how their ability to identify higher order emotions in other people compares to that of children without a disability.

I have been granted permission by the Department of Education of your province to access particular schools/institutions in order to carry out the above research. Please see attached copy of this permission letter.

I would be much obliged if you would permit me to include your school

_____ (name of school) in this study.

Rationale for the study:

A greater understanding of the emotional processes of the child with a severe visual impairment and the identification of possible difficulties they experience in interacting with others, can help researchers develop programs that can assist children with difficulties in their daily interactions such as play, friendships and relationships. This will result in an improvement in their general quality of life by increasing the depth and richness when attempting to form meaningful relationships with others. Furthermore, optimizing emotion regulation has the long-term benefit of assisting these children to become adults who have the ability to create and utilize career opportunities more effectively, thereby strengthening their independence and self-sufficiency.

It can also inform sighted individuals and/or teachers on improving communication with children with visual impairments, thereby creating a more conducive learning environment.

What will be expected of the school?

Should you give permission, your participation and assistance will be much appreciated regarding the following:

1. I would like to approach teachers teaching learners in the age range of 8 – 11 years to assist with nominating suitable learners and by distributing information letters and consent forms to the nominated learners to pass to their parents.
2. Once parental consent has been obtained, I will ask the class teachers to assist me in completing a biographical information sheet for each of the participating learners. This will occupy 15 - 20 minutes of their time.
3. I would like to request a suitable time and venue to conduct data collection at the school with the identified children in their individual capacity. This process will take approximately 45 minutes with each child. I will appreciate it if you could provide me with a quiet room such as the library or any other appropriate available venue during the information collection process. I estimate to be busy for 3 hours per day for approximately 10 days (but this can be adapted according to your convenience).

What will be expected of the learners participating in the study?

Participation is voluntary. Should parents/guardians agree to the participation of their child,

the learner's assent will be obtained and video recorded. Upon agreement to participate, the learner will be occupied for approximately 45 minutes over two sessions. During the first session a short screening test, including a screening hearing test and a brief cognitive assessment, will be conducted. During the second session, the learner will participate in a voice task measuring the accuracy of higher order emotion identification.

Higher order emotions refer to more complex emotions such as *"disappointment", "jealousy", "amusement",* etc. This task will be completed with the assistance of the researcher. The learner will be requested to listen to audio clips of unknown speakers stating short sentences and then the learner will be asked to choose the most applicable word for the feeling expressed by the speaker by picking one from a provided response card with four possible options.

The following ethical principles will be upheld within this study:

- Permission has been obtained from the Department of Education of your province (see attached).
- Written consent from all participants' parents and verbal and/or written assent from the participants themselves will be obtained prior to conducting the study
- All participants will be made aware of their right to withdraw from the study at any point in time without any negative consequences to themselves.
- The recordings which are made during the study will be accessed only by the researcher and her supervisors.
- All information will be kept confidential from those external to the study. Any identifying information will be removed prior to the data analysis (e.g. names of people and places will not be captured). No individual or school names will be mentioned in any published data.

Who will have access to the results of the study?

The research will be stored in both hard copy and electronic format at the University of Pretoria in the Centre for Augmentative and Alternative Communication for 15 years. The data obtained from the research will be used for writing a PhD thesis, writing scientific

papers and for presentation at professional conferences and seminars. A summary of the results will be made available for any interested staff or parents.

What are the risks and the benefits?

At no time during the participation in the research will the learners be at risk of any harm. Great care will be taken to ensure that these research activities will take place during a time that is least disruptive to the child's academic involvement. The information gathered in this study will help to gain a better understanding of the nature of emotional development of children with blindness thereby assisting teachers involved with these children to facilitate an optimal learning environment for the child while helping us understand teachers' challenges and needs.

Thanking you in advance for your consideration and time spent on this matter. It is only through the vital insights of teachers that we can hope to understand children better and, ultimately attempt to improve the quality of life of children with disabilities and impairments.

Please feel free to contact me or my supervisor if you have any questions about this study. I look forward to receiving your response.

Kind regards,

_____ _____

Inneke Greyvenstein Date

Email:

Cell:

_____ _____

Dr. Kerstin Tönsing Date

Centre for Augmentative and Alternative Communication

Email:

Office tel: (012) 420 2001

Principal Permission: Reply Slip

Name of principal: _____

Name of School: _____

Project title: Higher order emotion identification: Comparing children with blindness to typically developing peers.

Researcher: (Inneke Greyvenstein, Ph.D candidate, Centre for AAC)

I, _____, (name and surname)

(please tick box that applies)

☐ give permission to Inneke Greyvenstein to recruit learners from the school/institution named above for possible participation in the study entitled *"Higher order emotion identification: Comparing children with blindness to typically developing peers"*. This permission is voluntary and I understand that I may withdraw from it at any time. I understand that participating learners will be video recorded. I understand that the data will be stored for 15 years at the CAAC and that all data will be treated confidentially. I understand that the data may be re-used for analysis. I understand that the data may be used for a scientific article and for conference presentations. I understand that all information used and obtained in this study will be treated as confidential.

OR

☐ do not give permission to Inneke Greyvenstein to recruit learners from the school/institution named above for possible participation in the study entitled *"Higher order emotion identification: Comparing children with blindness to typically developing peers".*

Principal Signature: _____ Date: _____

If applicable: I herewith declare that _____ (name and surname) has the authority to provide consent for learners to participate in the study in lieu of parental consent.

Principal signature: _____

Date: _____

School Stamp

APPENDIX H

TEACHER INFORMATION LETTER

Faculty of Humanities

Date: _____

Dear Teacher,

Re: Assistance in a research study about higher order emotion identification in others by children with blindness and children without disabilities

Personal introduction:

My name is Inneke Greyvenstein. I am currently enrolled for a PhD degree in Augmentative and Alternative Communication (AAC) at the University of Pretoria. The title of my study is *"Higher order emotion identification: Comparing children with blindness to typically developing peers"*. The aim of the study is the exploration of the emotional development of children aged 8-11 years with blindness. Specifically, I want to determine how their ability to identify higher order emotions in other people compares to that of children without a disability.

Rationale for the study:

A greater understanding of the emotional processes of the child with blindness and the identification of possible difficulties they experience in interacting with others, can help researchers develop programs that can assist children with difficulties in their daily interactions such as play, friendships and relationships. This will result in an improvement in their general quality of life by increasing the depth and richness when attempting to form meaningful relationships with others. Furthermore, optimizing emotion regulation has the long-term benefit of assisting these children to become adults who have the ability to create and utilize career opportunities more effectively thereby strengthening their independence and self-sufficiency. It can also inform sighted individuals and/or teachers on improving

communication with children with visual impairments thus creating a more conducive learning environment.

What will be expected of me should I assist?

The study is aimed at teachers who are teaching children with, or without, blindness that are currently aged between eight and eleven years and have no other diagnosed co-morbid disability. Should this apply to you and should you consent to take part in the study, I would then request an appointment with you during which we will complete a biographical information sheet pertaining to each learner qualifying to participate in the study. This should take about 15-20 minutes of your time. Your assistance will also be appreciated in identifying possible learners that would qualify to participate.

What are my rights?

Participation in the study is voluntary. You may withdraw from the study at any point in time and all data you contributed will be immediately destroyed. The responses to the survey will be anonymous, meaning that your name will not appear on any documentation. All data will be reported in a way that neither your name nor the institution's name will be made known in the published data.

Who will have access to the results of the study?

The data will be stored as both hard copy and in electronic format at the University of Pretoria for 15 years. The data obtained from the research will be used for a scientific article and conference presentations. The data may be used for further analyses. Results will be made available to the Department of Education and to any participating educator or principal from participating schools who expresses an interest.

What are the risks and benefits?

The study does not pose any threat or potential harm to you or the learners you work with. The information gathered in this study will help to gain a better understanding of the nature of emotional development of children with blindness, thereby assisting teachers involved with

these children to facilitate an optimal learning environment for the learner while helping us understand teachers' challenges and needs.

I would greatly appreciate your consideration of this request. Should you be willing to participate in the study, I would appreciate if you could complete the attached reply slip. Please contact me should you have further questions.

Kind regards,

Inneke Greyvenstein	Date	**Dr. Kerstin Tönsing**	Date
Email:		Centre for Augmentative and Alternative Communication	
Mobile:		Email:	
		Office tel: (012) 420 2001	

APPENDIX I

PARENT/GUARDIAN CONSENT LETTER

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Humanities

Date: _____

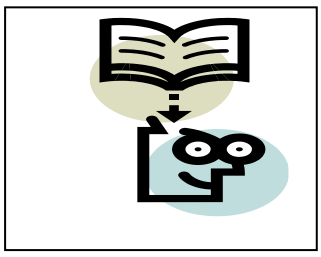
Dear parent/guardian

Re: Permission for your child to participate in a research study conducted at their school

Personal introduction:

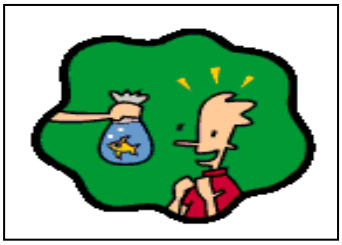
My name is Inneke Greyvenstein. I am currently completing my PhD degree at the Centre for Augmentative and Alternative Communication at the University of Pretoria. I have an interest in investigating the emotional development of children with disabilities/impairments, and, in particular, children with blindness. Understanding the emotional processes of a child with blindness can help professionals develop future programmes assisting children and adolescents in their daily interactions, i.e., play, friendships and relationships. We are hoping that in future, this will improve the quality of life of these children and their families as well as assisting educators to better facilitate optimal emotional development in children with blindness. Without your valuable participation, we will not be able to gain such knowledge and contribute our small bit in helping these children smile wider. Without your insight, we have no vision!

Title of the study: Higher order emotion identification: Comparing children with blindness to typically developing peers.

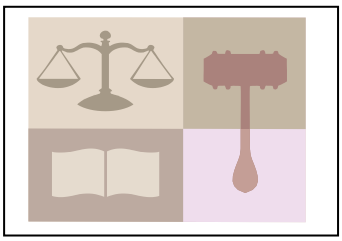


Aim of the study: The study will aim to explore how children with blindness identify higher order emotions in others.

W**hat will be expected of my child and I:** A brief screening test will be conducted to determine if your child is eligible for participation. I will also ask your child's teacher to complete a biographical information sheet about your child. If needed, I would also like to call you to obtain some additional background information about your child. I will then meet with your child at school for ± 45 minutes of participation. Great care will be taken to cause the least possible disruption to your child's academic involvement. The study will require that your child listens to pre-recorded audio statements after which they will identify the emotion expressed by the speaker.



Benefits and risks of participation: No form of reward will be offered to your child upon participation or in order to convince your child to do so. However, a token of acknowledgement (e.g., a badge) will be given. The research findings will assist a better understanding of the emotional development of children with blindness. Your child stands no risk of harm during participation in this study.



What are my child's rights: Participation in this study is voluntary. Your child also has the opportunity to decide whether s/he wants to participate in this study and his/her verbal assent will be video recorded. Your child may withdraw at any time during the study without him/her being penalised in any way.

Confidentiality: All information obtained during the session will remain confidential. Neither your, nor your child's identity will be made known to others. The researcher will be glad to share the research findings with you, should you request so. The results will be archived at

the Centre for Augmentative and Alternative Communication, University of Pretoria, for a period of 15 years. The research findings will be written up for publication in a thesis, as scientific journal articles and also used for conference presentations.

Kindly complete the reply slip on the next page to indicate whether or not you allow your child to participate in this study. If you do consent, kindly also provide me with a contact number and when a convenient time would be to contact you. Please return the reply slip to the school. Should you have any questions or require further information, please feel free to contact me:

Inneke Greyvenstein - Tel: Email:

You may also contact my supervisor:
Dr. Kerstin Tönsing – Tel: Email:

I look forward to receiving your response.

Kind regards,

Inneke Greyvenstein	Date	**Dr. Kerstin Tönsing**	Date
Email:		Centre for Augmentative and Alternative	
Mobile:		Communication	
		Email:	
		Office tel: (012) 420 2001	

Parent/Guardian Informed Consent: Reply Slip

Name of Child: _____

Name of Parent/Caregiver: _____

Project title: Higher order emotion identification: Comparing children with blindness to typically developing peers.

Researcher: Inneke Greyvenstein
PhD Candidate
Centre for AAC
Cell:

Supervisor: Dr. Kerstin Tönsing
Centre for AAC
Email:
Office tel: (012) 420 2001

I, _____ (Name and surname)

(please tick box that applies):

☐ give consent for my child to participate in this study. My consent is voluntary and I understand that I may withdraw my child's participation from the study at any time. I understand that the data will stored for 15 years at the CAAC and that all data will be treated confidentially. I understand that the data may be re-used for analysis. I understand that the sessions will be video recorded for data collection purposes and may be used for training and conferences. I understand that all information used and obtained in this study will be treated as confidential.

OR

☐ do not give consent for my child to participate in this study.

_____ _____

Parent/Caregiver Signature Date

Please complete the following only if consent is given:

Contact number*:* _____

Convenient time to contact me *(please tick appropriate)*:

Office hours: ☐ Weekends: ☐ Weekday evenings: ☐

APPENDIX J

PARTICIPANT ASSENT SCRIPT

Instructions: To be read aloud to the participant prior to the screening and research process commencing. Participants' verbal responses will be video recorded.

Introduction:

I am going to explain to you the things we are going to do together today and after that I will ask you a few questions. Remember when the principal introduced me, he/she explained who I am and why I will be visiting your school for the next few weeks? I am a student from the University of Pretoria and I would like to know more about how children at your school think and feel about some things. So, this is a bit like some of the projects you sometimes do at your school where different people help each other to finish it.

Why is it important for you to take part in this study?

It will help me to better understand children's feelings. Understanding these feelings can teach us how to help children to do some things better, like making friends and playing together.

What will you have to do if you take part?

Remember some time ago I sent a letter home to your family, asking if you may spend time with me and be a part of this project? Well, if you are here with me today, it means that your parents have agreed that you may help me with this project if you want to. There are some very important things I want you to know about helping me, so let me tell you about them. In the time we spend together, we will listen to some short sentences said by people whom you have never met before. I will play the sentence on a laptop and afterwards I will ask you to choose one feeling the speaker was feeling from a list of four feelings on a card that I will show you. I will explain everything we do every step of the way so that you clearly understand what will happen next. You may stop me at any time to ask a question if you do not understand something. It is not a test and you just have to give the answer you think best. Nobody else will know what answers you gave to the questions.

Once you and I have finished our time together, you may go back to your class. If, at any time, for whatever reason, you feel that you don't want to talk to me anymore, you may tell

me and you can stop immediately. Should this happen, you do not have to worry that you will get into trouble or get punished in any way. Nobody will be angry with you.

Child Assent Form: Children with blindness

Note: *This form was provided to the participants in uncontracted and contracted Braille. Participants were asked which format they preferred. The researcher read questions and possible responses out loud to participant as s/he follows on a Braille version of the assent procedure response card and provided verbal responses.*

Do you understand everything I explained to you? **YES** **NO**
Do you understand that it is your choice to help me today? **YES** **NO**
Do you understand that you can stop anytime you want to? **YES** **NO**
Do you understand that I will be videotaping you today? **YES** **NO**
Do you have any questions? **YES** **NO**
Are you happy with the way your questions were answered? **YES** **NO**
Do you want to work with me today? **YES** **NO**

On a separate card placed in front of the child:
Sensory guides which the potential participant can use to answer

Yes

Patch of cotton wool

No

Patch of sanding paper with fine grid

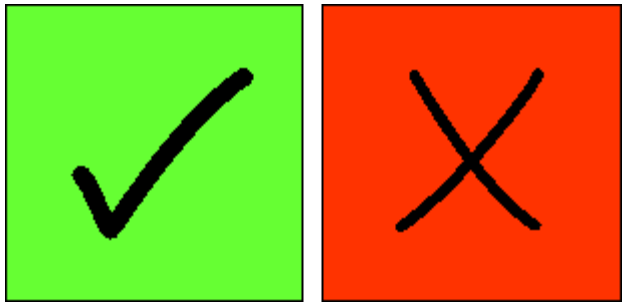
Child Assent Form: Typically Developing Children

	**Do you understand everything I explained to you?** **YES** **NO**
	**Do you understand that it is your choice to help me today?** **YES** **NO**
	**Do you understand that you can stop anytime you want to?** **YES** **NO**
	**Do you understand that I will be videotaping you today?** **YES** **NO**
	**Do you have any questions?** **YES** **NO**
	**Are you happy with the way your questions were answered?** **YES** **NO**
	**Do you want to work with me today?** **YES** **NO**

On a separate card placed in front of the child:

Picture symbols which the potential participant can use to answer

Yes No



APPENDIX K

GROUP EQUIVALENCE: PARTICIPANT MATCHING

Table K.1

Matched Pairs of Cohort 1 and 2 Participants in the Age Group 8;0 – 8;11

Participant[a] ***Criterion***	**1.1**	**2.1**	**1.2**	**2.2**	**1.3**	**2.3**	**1.4**	**2.4**	**1.5**	**2.5**	**1.6**	**2.6**	**1.7**	**2.7**	**1.8**	**2.8**	**1.9**	**2.9**
Age	8;0	8;1	8;0	8;1	8;1	8;7	8;1	8;1	8;2	8;9	8;3	8;9	8;4	8;1	8;7	8;8	8;8	8;0
Sexr[b]	M	M	M	M	F	F	M	M	F	F	M	M	M	M	M	M	F	F
Race[c]	B	B	B	B	B	B	C	C	W	W	B	B	B	B	W	W	B	B

[a]Participant numbers commencing with '1' describe participants in Cohort 1. Participant numbers commencing with '2' describe participants in Cohort 2; [b]M=Male & F=Female; [c]B=Black, W=White, C=Coloured

Table K.2

Matched Pairs of Cohort 1 and 2 Participants in the Age Group 9;0 – 9;11

Participant[a] ***Criterion***	**1.10**	**2.10**
Age	9;6	9;6
Sex[b]	M	M
Race[c]	W	W

[a]Participant numbers commencing with '1' describe participants in Cohort 1. Participant numbers commencing with '2' describe participants in Cohort 2; [b]M=Male & F=Female; [c]B=Black, W=White, C=Coloured

Table K.3

Matched Pairs of Cohort 1 and 2 Participants in the Age Group 10;0 – 10;11

Participant[a] ***Criterion***	**1.11**	**2.11**	**1.12**	**2.12**	**1.13**	**2.13**	**1.14**	**2.14**	**1.15**	**2.15**	**1.16**	**2.16**	**1.17**	**2.17**	**1.18**	**2.18**
Age	10;0	10;10	10;2	10;2	10;5	10;4	10;5	10;11	10;6	10;11	10;8	10;8	10;8	10;2	10;11	10;3
Sex[b]	F	F	F	F	M	M	F	F	F	F	F	F	M	M	M	M
Race[c]	C	C	B	B	B	B	C	C	B	B	B	B	B	B	W	W

[a]Participant numbers commencing with '1' describe participants in Cohort 1. Participant numbers commencing with '2' describe participants in Cohort 2; [b]M=Male & F=Female; [c]B=Black, W=White, C=Coloured

Table K.4

Matched Pairs of Cohort 1 and 2 Participants in the Age Group 11;0 – 11;11

Participant[a] ***Criterion***	**1.19**	**2.19**	**1.20**	**2.20**
Age	11;5	11;1	11;10	11;11
Sex[b]	F	F	F	F
Race[c]	B	B	C	C

[a]Participant numbers commencing with '1' describe participants in Cohort 1. Participant numbers commencing with '2' describe participants in Cohort 2; [b]M=Male & F=Female; [c]B=Black, W=White, C=Coloured

APPENDIX L
WILLIAMS INTELLIGENCE TEST FOR CHILDREN WITH DEFECTIVE VISION (WIT):
ITEM ADAPTATIONS (From Williams, 1956)

Test Item	Original Item Content	Item Adaptation
29	**A pair of stockings**	**A box of chocolates**
32	**…a pipe, …**	**…a pipe for smoking…**
34 (c)	**…a fine day…**	**…a sunny day…**
35 (b)	**Santa Claus**	**Father Christmas**
36 (a)	**ought**	**should**
39	Ted; Kate; Jane; Tom; Billy	Sipho; Mpho; Tumi; Tshego; Joe
40 (a)	gentleman	man
(b)	**Walter**	**Kabelo**
41 (a)	sparrow	bird
(b)	**violin**	**guitar**
42 (c)	**meadow**	**garden**
43 (a)	Rosie	Rose
(b)	**Sally**	**Precious**
44 (d)	**wolves**	**lions**
47 (a)	…twirling a brand new walking stick…	…waving his brand new umbrella around…
(b)	10 Pounds…Telegram…	100 Rand…send me a message…
(d)	**…grain…horse…**	**…mealies…donkey…**
52	Town schools Fancy marching Folk dancing **80 pounds**	Primary schools Reciting poems Traditional dancing **800 Rand**
54 (a)	…coat…trousers….	…jacket…pants…
(b)	Ship, boat, bus, steamer, barge	Bus, taxi, boat, car, bike
(c)	**treacle**	**peanut butter**

Test Item	Original Item Content	Item Adaptation
56	**…grocer…baker's….**	**…shop…post office…**
58 (b)	**Why there should be plenty of *road maps* in the *British Isles.***	**Why should there be plenty of taxis going to different places?**
59 (a)	1915 . . . British Isle	1990 . . . South Africa
60	**…burgled…5 o'clock…**	**…broken into…3 o'clock**
62 (e) **(g)**	Comrade **Steed (horse)**	Tjommie **Vehicle (car)**
63 (a) **(d)**	sparrow penny	bird **coin**
67	**(See item 47)**	**(See Item 47)**
70 (c)	**undertake**	**do**
72	**Tight rope walker. . . 800 feet . . . 300 feet.**	Tight rope walker (but explain: "Someone that's walking on a rope fastened at the ends and hags high above the ground"). . . 250 metres . . . 100 metres . . .
73	**Bayford Wood**	**the soccer field**
74 (a) **(b)**	We like to make? Toffee…chestnuts **Abraham Lincoln**	We like to make *pap*….roast *chicken*… **Nelson Mandela**
78	…pints . . . cans . . .	. . . litres . . . buckets
83	**thistles**	**thorn bush**
86	**(See item 78)**	**(See item 78)**
87 (a) **(b)** **(c)**	**Well** **Port** **Grasp**	**River** **Harbour** **catch**
92	**miles**	**kilometers**

APPENDIX M

PRIMARY EMOTION IDENTIFICATION SCREENER

VOICE CLIP VALIDATION: PRINCIPAL PERMISSION LETTER

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Humanities

The Principal (name): _____

(School name and address): _____

Dear _____ (name of principal),

Re: Permission to conduct a research study at your school/institution

Date:

Personal introduction:

My name is Inneke Greyvenstein. I am currently enrolled for a PhD degree in Augmentative and Alternative Communication (AAC) at the University of Pretoria. The title of my study is *"Higher order emotion identification: Comparing children with blindness to typically developing peers".* The aim of the study is the exploration of the emotional development of children aged 8-11 years with blindness. Specifically, I want to determine how their ability to identify higher order emotions in other people compares to that of children without a disability.

I have been granted permission by the Department of Education of your province to access particular schools/institutions in order to carry out the above research. Please see attached copy of this permission letter.

I would be much obliged if you would permit me to include your school

_____ (name of school) in this study.

Rationale for the study:

A greater understanding of the emotional processes of the child with a severe visual impairment and the identification of possible difficulties they experience in interacting with others, can help researchers develop programs that can assist children with difficulties in their daily interactions such as play, friendships and relationships. This will result in an improvement in their general quality of life by increasing the depth and richness when attempting to form meaningful relationships with others. Furthermore, optimizing emotion regulation has the long-term benefit of assisting these children to become adults who have the ability to create and utilize career opportunities more effectively, thereby strengthening their independence and self-sufficiency. It can also inform sighted individuals and/or teachers on improving communication with children with visual impairments, thereby creating a more conducive learning environment.

What will be expected of the school?

Should you give permission, your participation and assistance will be much appreciated regarding the following:

4. I would like to approach teachers teaching learners in the age range of 8 – 11 years to assist with nominating suitable learners and by distributing information letters and consent forms to the nominated learners to pass to their parents.
5. Once parental consent has been obtained, I will ask the class teachers to assist me in providing basic biographical information of the child which will require approximately 5 minutes of their time.
6. I would like to request a suitable time and venue to conduct data collection at the school with the identified children in their individual capacity. This process will take approximately 15-20 minutes with each child. I will appreciate it if you could provide me with a quiet room such as the library or any other appropriate available venue during the information collection process. I estimate to be busy for 3 hours per day for approximately 5 days (but this can be adapted according to your convenience).

What will be expected of the learners participating in the study?

Participation is voluntary. Should parents/guardians agree to the participation of their child, the learner's assent will be obtained and video recorded. Upon agreement to participate, the learner will be occupied for approximately one session of 15-20 minutes. During the

second session, the learner will participate in a voice task measuring the accuracy of primary emotion identification. Higher order emotions refer to more complex emotions such as *"happy", "angry", "sad",* etc. This task will be completed with the assistance of the researcher. The learner will be requested to listen to audio clips of unknown speakers stating short sentences and then the learner will be asked to choose the most applicable word for the feeling expressed by the speaker by picking one from a provided response card with four possible options.

The following ethical principles will be upheld within this study:

- Permission has been obtained from the Department of Education of your province (see attached).
- Written consent from all participants' parents and verbal and/or written assent from the participants themselves will be obtained prior to conducting the study
- All participants will be made aware of their right to withdraw from the study at any point in time without any negative consequences to themselves.
- The recordings which are made during the study will be accessed only by the researcher and her supervisors.
- All information will be kept confidential from those external to the study. Any identifying information will be removed prior to the data analysis (e.g. names of people and places will not be captured). No individual or school names will be mentioned in any published data.

Who will have access to the results of the study?

The research will be stored in both hard copy and electronic format at the University of Pretoria in the Centre for Augmentative and Alternative Communication for 15 years. The data obtained from the research will be used for writing a PhD thesis, writing scientific papers and for presentation at professional conferences and seminars. A summary of the results will be made available for any interested staff or parents.

What are the risks and the benefits?

At no time during the participation in the research will the learners be at risk of any harm. Great care will be taken to ensure that these research activities will take place during a time that is least disruptive to the child's academic involvement. The information gathered in this study will help to gain a better understanding of the nature of emotional development of children with blindness thereby assisting teachers involved with these children to facilitate an

optimal learning environment for the child while helping us understand teachers' challenges and needs.

Thanking you in advance for your consideration and time spent on this matter. It is only through the vital insights of teachers that we can hope to understand children better and, ultimately attempt to improve the quality of life of children with disabilities and impairments.

Please feel free to contact me or my supervisor if you have any questions about this study. I look forward to receiving your response.

Kind regards,

_____ _____

Inneke Greyvenstein Date

Email:

Cell:

_____ _____

Dr. Kerstin Tönsing Date

Centre for Augmentative and Alternative Communication

Email:

Office tel: (012) 420 2001

Principal Permission: Reply Slip

Name of principal: _____

Name of School: _____

Project title: Higher order emotion identification: Comparing children with blindness to typically developing peers.

Researcher: (Inneke Greyvenstein, Ph.D candidate, Centre for AAC)

I, _____, (name and surname)

(please tick box that applies)

☐ give permission to Inneke Greyvenstein to recruit learners from the school/institution named above for possible participation in the study entitled *"Higher order emotion identification: Comparing children with blindness to typically developing peers"*. This permission is voluntary and I understand that I may withdraw from it at any time. I understand that participating learners will be video recorded. I understand that the data will be stored for 15 years at the CAAC and that all data will be treated confidentially. I understand that the data may be re-used for analysis. I understand that the data may be used for a scientific article and for conference presentations. I understand that all information used and obtained in this study will be treated as confidential.

OR

☐ do not give permission to Inneke Greyvenstein to recruit learners from the school/institution named above for possible participation in the study entitled *"Higher order emotion identification: Comparing children with blindness to typically developing peers".*

Principal Signature: _____ Date: _____

If applicable: I herewith declare that _____ (name and surname) has the authority to provide consent for learners to participate in the study in lieu of parental consent.

Principal signature: _____

Date: _____

School Stamp

APPENDIX N

PRIMARY EMOTION IDENTIFICATION SCREENER VOICE CLIP VALIDATION: TEACHER INFORMATION LETTER

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Humanities

Date: _____

Dear Teacher,

Re: Assistance in a research study about higher order emotion identification in others by children with blindness and children without disabilities

Personal introduction:

My name is Inneke Greyvenstein. I am currently enrolled for a PhD degree in Augmentative and Alternative Communication (AAC) at the University of Pretoria. The title of my study is *"Higher order emotion identification: Comparing children with blindness to typically developing peers"*. The aim of the study is the exploration of the emotional development of children aged 8-11 years with blindness. Specifically, I want to determine how their ability to identify higher order emotions in other people compares to that of children without a disability.

Rationale for the study:

A greater understanding of the emotional processes of the child with blindness and the identification of possible difficulties they experience in interacting with others, can help researchers develop programs that can assist children with difficulties in their daily interactions such as play, friendships and relationships. This will result in an improvement in their general quality of life by increasing the depth and richness when attempting to form meaningful relationships with others. Furthermore, optimizing emotion regulation has the long-term benefit of assisting these children to become adults who have the ability to create and utilize career opportunities more effectively thereby strengthening their independence and self-sufficiency. It can also inform sighted individuals and/or teachers on improving communication with children with visual impairments thus creating a more conducive learning environment.

What will be expected of me should I assist?

The study is aimed at teachers who are teaching children with, or without, blindness that are currently aged between eight and eleven years and have no other diagnosed co-morbid disability. Should this apply to you and should you consent to take part in the study, I would then request an appointment with you during which we will complete a biographical information sheet pertaining to each learner qualifying to participate in the study. This should take about 15-20 minutes of your time. Your assistance will also be appreciated in identifying possible learners that would qualify to participate.

What are my rights?

Participation in the study is voluntary. You may withdraw from the study at any point in time and all data you contributed will be immediately destroyed. The responses to the survey will be anonymous, meaning that your name will not appear on any documentation. All data will be reported in a way that neither your name nor the institution's name will be made known in the published data.

Who will have access to the results of the study?

The data will be stored as both hard copy and in electronic format at the University of Pretoria for 15 years. The data obtained from the research will be used for a scientific article and conference presentations. The data may be used for further analyses. Results will be made available to the Department of Education and to any participating educator or principal from participating schools who expresses an interest.

What are the risks and benefits?

The study does not pose any threat or potential harm to you or the learners you work with. The information gathered in this study will help to gain a better understanding of the nature of emotional development of children with blindness, thereby assisting teachers involved with these children to facilitate an optimal learning environment for the learner while helping us understand teachers' challenges and needs.

I would greatly appreciate your consideration of this request. Should you be willing to participate in the study, I would appreciate if you could complete the attached reply slip. Please contact me should you have further questions.

Kind regards,

Inneke Greyvenstein	Date	**Dr. Kerstin Tönsing**	Date
Email:		Centre for AAC	
Mobile:		Office:	Email:

APPENDIX O

PRIMARY EMOTION IDENTIFICATION SCREENER VOICE CLIP VALIDATION: PARENT/GUARDIAN CONSENT LETTER

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Humanities

Date: _____

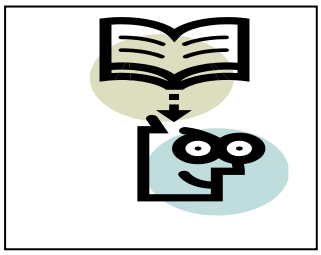
Dear parent/guardian

Re: Permission for your child to participate in a research study conducted at their school

Personal introduction:

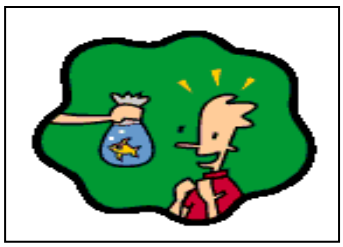
My name is Inneke Greyvenstein. I am currently completing my PhD degree at the Centre for Augmentative and Alternative Communication at the University of Pretoria. I have an interest in investigating the emotional development of children with disabilities/impairments, and, in particular, children with blindness. Understanding the emotional processes of a child with blindness can help professionals develop future programmes assisting children and adolescents in their daily interactions, i.e., play, friendships and relationships. We are hoping that in future, this will improve the quality of life of these children and their families as well as assisting educators to better facilitate optimal emotional development in children with blindness. Without your valuable participation, we will not be able to gain such knowledge and contribute our small bit in helping these children smile wider. Without your insight, we have no vision!

Title of the study: Higher order emotion identification: Comparing children with blindness to typically developing peers.

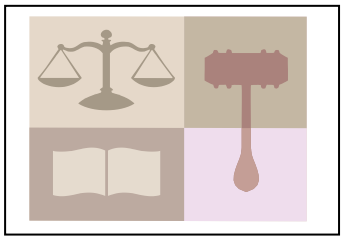


Aim of the study: The study will aim to explore how children with blindness identify higher order emotions in others.

W**hat will be expected of my child and I:** A brief screening test will be conducted to determine if your child is eligible for participation. I will also ask your child's teacher to complete a biographical information sheet about your child. If needed, I would also like to call you to obtain some additional background information about your child. I will then meet with your child at school for ± 45 minutes of participation. Great care will be taken to cause the least possible disruption to your child's academic involvement. The study will require that your child listens to pre-recorded audio statements after which they will identify the emotion expressed by the speaker.



Benefits and risks of participation: No form of reward will be offered to your child upon participation or in order to convince your child to do so but a token of acknowledgement (e.g., a badge) will be given. The research findings will assist a better understanding of the emotional development of children with blindness. Your child stands no risk of harm during participation in this study.



What are my child's rights: Participation in this study is voluntary. Your child also has the opportunity to decide whether s/he wants to participate in this study and his/her verbal assent will be video recorded. Your child may withdraw at any time during the study without him/her being penalised in any way.

Confidentiality: All information obtained during the session will remain confidential. Neither your, nor your child's identity will be made known to others. The researcher will be glad to share the research findings with you, should you request so. The results will be archived at the Centre for Augmentative and Alternative Communication, University of Pretoria, for a period of 15 years. The research findings will be written up for publication in a thesis, as scientific journal articles and also used for conference presentations.

Kindly complete the reply slip on the next page to indicate whether or not you allow your child to participate in this study. If you do consent, kindly also provide me with a contact number and when a convenient time would be to contact you. Please return the reply slip to the school. Should you have any questions or require further information, please feel free to contact me:

Inneke Greyvenstein - Tel: Email:

You may also contact my supervisor:
Dr. Kerstin Tönsing – Tel: Email:

I look forward to receiving your response.
Kind regards,

Inneke Greyvenstein	Date	**Dr. Kerstin Tönsing**	Date
Email:		Centre for Augmentative and Alternative Communication	
Mobile:		Email:	
		Office tel: (012) 420 2001	

Parent/Guardian Informed Consent: Reply Slip

Name of Child: _____

Name of Parent/Caregiver: _____

Project title: Higher order emotion identification: Comparing children with blindness to typically developing peers.

Researcher: Inneke Greyvenstein
PhD Candidate
Centre for AAC
Cell:

Supervisor: Dr. Kerstin Tönsing
Centre for AAC
Email:
Office tel: (012) 420 2001

I, _____ (Name and surname)

(please tick box that applies):

☐ give consent for my child to participate in this study. My consent is voluntary and I understand that I may withdraw my child's participation from the study at any time. I understand that the data will stored for 15 years at the CAAC and that all data will be treated confidentially. I understand that the data may be re-used for analysis. I understand that the sessions will be video recorded for data collection purposes and may be used for training and conferences. I understand that all information used and obtained in this study will be treated as confidential.

OR

☐ do not give consent for my child to participate in this study.

_____ _____

Parent/Caregiver Signature Date

Please complete the following only if consent is given:

Contact number*:* _____

Convenient time to contact me *(please tick appropriate)*:

Office hours: ☐ Weekends: ☐ Weekday evenings: ☐

APPENDIX P

ADMINISTRATOR EMOTION WORDS DEFINITION LISTS

Primary Emotion Words:

Emotion	Definition	Simple definition
Afraid	To feel frightened, to have a feeling of fear.	To be scared.
Angry	To feel extremely displeased, annoyed or hostile.	To feel anger, a strong feeling that makes you want to argue and fight.
Bossy	To order others about.	To tell others to do what you want them to.
Disgusted	To be severely offended by something or someone, to find something very unpleasant and distasteful.	To feel something is very nasty or unpleasant.
Fine	To feel satisfied with oneself and one's life.	To feel okay or quite good.
Happy	To feel pleasure.	Feeling good about something; to be pleased.
Kind	To act in a friendly manner, to be considerate of others, thoughtful.	Being nice to people; helping them.
Sad	To feel unhappy or sorrowful.	Feeling bad about something; unhappy.
Silly	To feel that you've done or said something embarrassing; to feel foolish.	To be a little bit stupid; to get things wrong.
Surprised	To feel unexpectedly amazed or shocked.	When something not expected happens.

Higher Order Emotion Words:

Emotion	Definition	Simple definition
Affectionate	To express fondness and tenderness toward something or someone.	To feel kind and caring towards someone or something.
Amused	To find something funny; be entertained.	To think something is funny.
Annoyed	To feel irritated or displeased, slightly angered.	To be a little angry or irritated.
Ashamed	To feel bad or embarrassed about yourself or your actions.	To feel shy, sorry, awful or guilty.
Asking	To try to get something by saying you want it.	Trying to get something by saying you want it.
Bored	To feel uninterested because something or someone is dull or unstimulating.	To find something not interesting.
Bossy	To order others about.	To tell others to do what you want them to.
Bothered	To feel disturbed or worried about something.	To be troubled by others and to worry a little about it.
Cheeky	To be rude and disrespectful but in a playful manner.	To insult or badmouth someone but in a teasing or playful way.
Complaining	expressing dissatisfaction or unhappiness with something.	To moan or whine about something.
Curious	To have a strong desire to know more about something.	Eager to learn about something.
Decided	To be settled on a definite choice.	To be sure about a choice you made.
Delighted	Feeling great pleasure.	When you feel very good and happy about something.
Disappointed	To feel let down, to feel someone or something has not met one's expectations or hopes.	To feel let down, someone didn't do what they said they would do, or

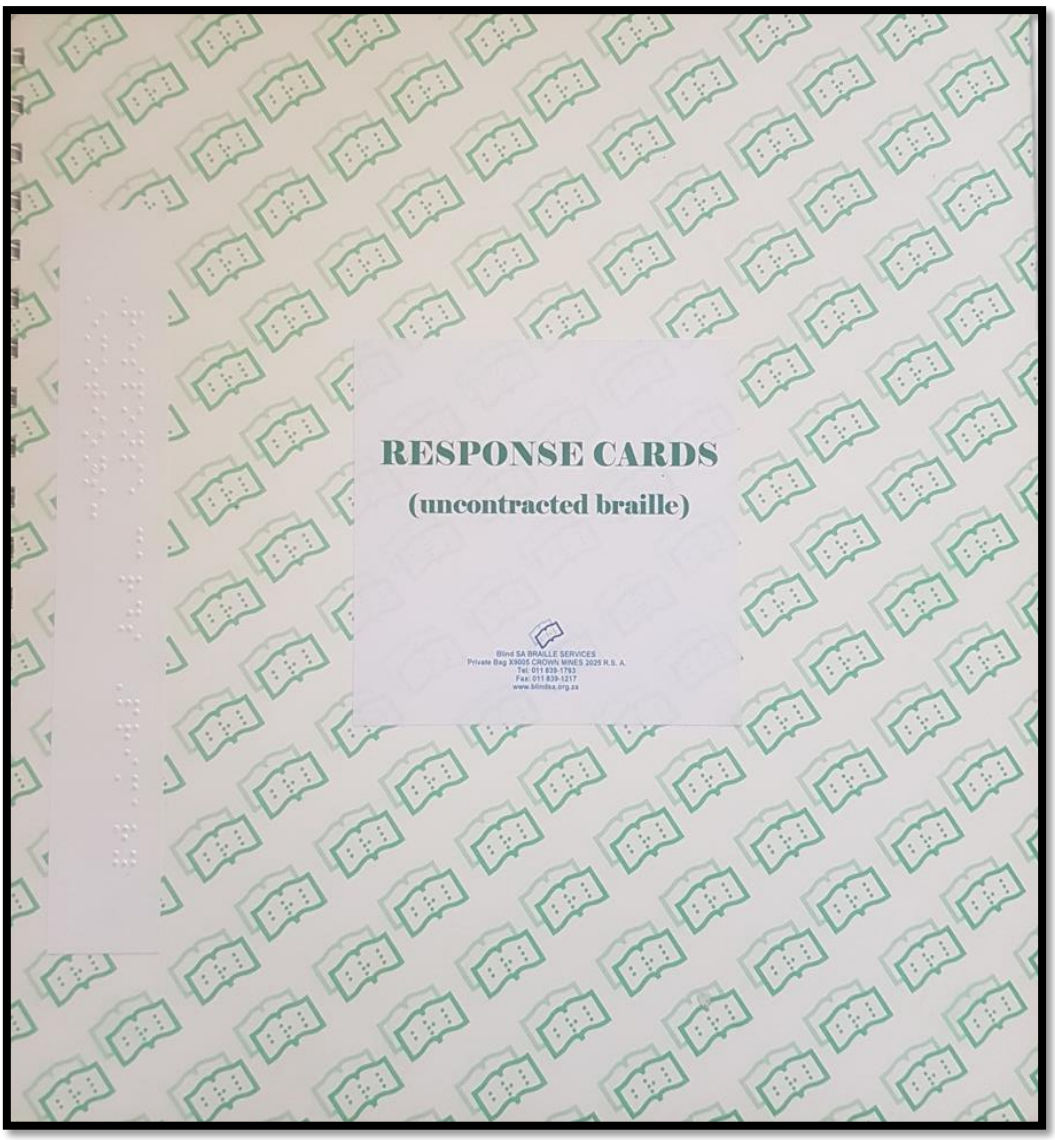
Emotion	Definition	Simple definition
		something didn't turn out the way you thought.
Disbelieving	Thinking something is untrue.	To think something is not true.
Disliking	To find something or someone disagreeable and unpleasant.	To not like someone or something.
Embarrassed	To be made to feel self-conscious and shy, often in a social situation.	To feel shy in front of others.
Excited	To feel happy and enthusiastic.	You want to do something or want something to happen very much; being eager.
Grateful	To feel thankful, appreciate.	Feeling you want to say thank you, when someone has done a nice thing.
Grumpy	To feel in a bad mood.	To be in a bad mood.
Honest	To be truthful about something.	To tell the truth, no lies.
Hopeful	To think something one wants to happen will happen.	To think that you will get what you want or need.
Hostile	To show opposition, dislike or aggression.	To show dislike of someone or something.
Hurt	To feel upset or in pain.	To be upset by something.
Impressed	To have an extremely positive view of something or someone.	When you think something is very good indeed.
Interested	To have one's attention held by something or someone.	Wanting to know about something.
Jealous	To want what others possess.	To feel someone is better or luckier than you.
Liked	To be appealing to others; others are fond of you.	Feeling other people think you are nice, or want to be with you.
Loving	Feeling fondness and affection.	Having lots of warm feelings.
Mysterious	To behave in a curious manner that others cannot comprehend.	When you don't want people to know what you are doing or thinking.
Nervous	To feel in a state of anxiety; to be in a tense and worried state.	To feel a bit afraid and worried about something.
Patient	To feel and remain calm even when there is a difficulty or annoyance.	To be able to stay calm and wait even when it is hard or frustrating.
Proud	To feel happy and satisfied by one's own self-worth.	When you feel you have done something very well.
Relaxed	To feel calm and happy and not have any worries or anxieties.	When you feel good and you don't worry.
Shocked	To feel very offended or surprised by a comment or action from someone else.	Feeling surprised in a bad way.
Shy	To feel nervous around others and to lack self-confidence.	Feeling it is hard to talk to other people.
Sneaky	To behave in a secret or deceptive way; trying not to let others know you are doing something.	To do something without people knowing, when you shouldn't.
Sure	To feel that something is definitely right or certain	To feel you are right.
Teasing	Making fun of someone else in a cruel way to annoy them.	Making fun of someone; having a joke; playing.
Tempting	Acting in such a way as to attract someone or persuade them to do something, particularly something they shouldn't be doing.	Inviting or convincing someone to do something that they probably should not be doing.
Terrified	To become scared or panicked.	To be filled with fear.
Thinking	To be engaged in reasoning, considering possibilities.	To use your mind, to work something out or remember something.
Tired	To feel that you are sleepy or need a rest.	Feeling you need a rest from something.
Touched	To feel happy because of a particular kind action of someone else.	Feeling someone has done a very nice thing; feeling good.

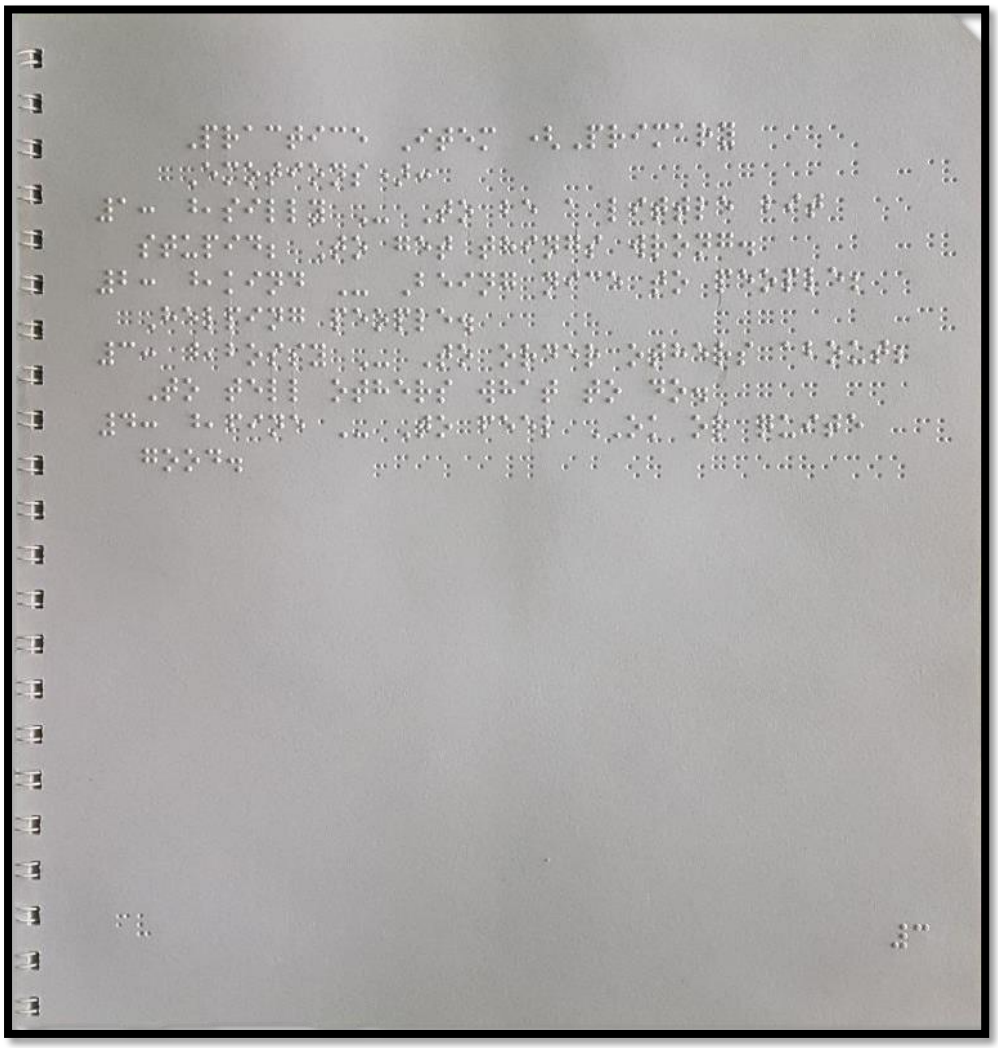
Emotion	Definition	Simple definition
Troubled	To feel worried or concerned by something; slightly disturbed.	To feel uneasy or worried; unsettled.
Undecided	To have not made a decision or choice.	Not sure about which choice to take or what decision to make about something.
Unfriendly	To show disregard for someone or be unkind to them.	Not being nice to someone, or being nasty to someone.
Unimpressed	To feel unmoved or not very interested in something or somebody.	To not admire someone or something.
Unsure	To not feel confident or certain about something or someone.	To feel you don't know.
Wishful	To have a hopeful longing for something.	Hoping something will happen.

APPENDIX Q

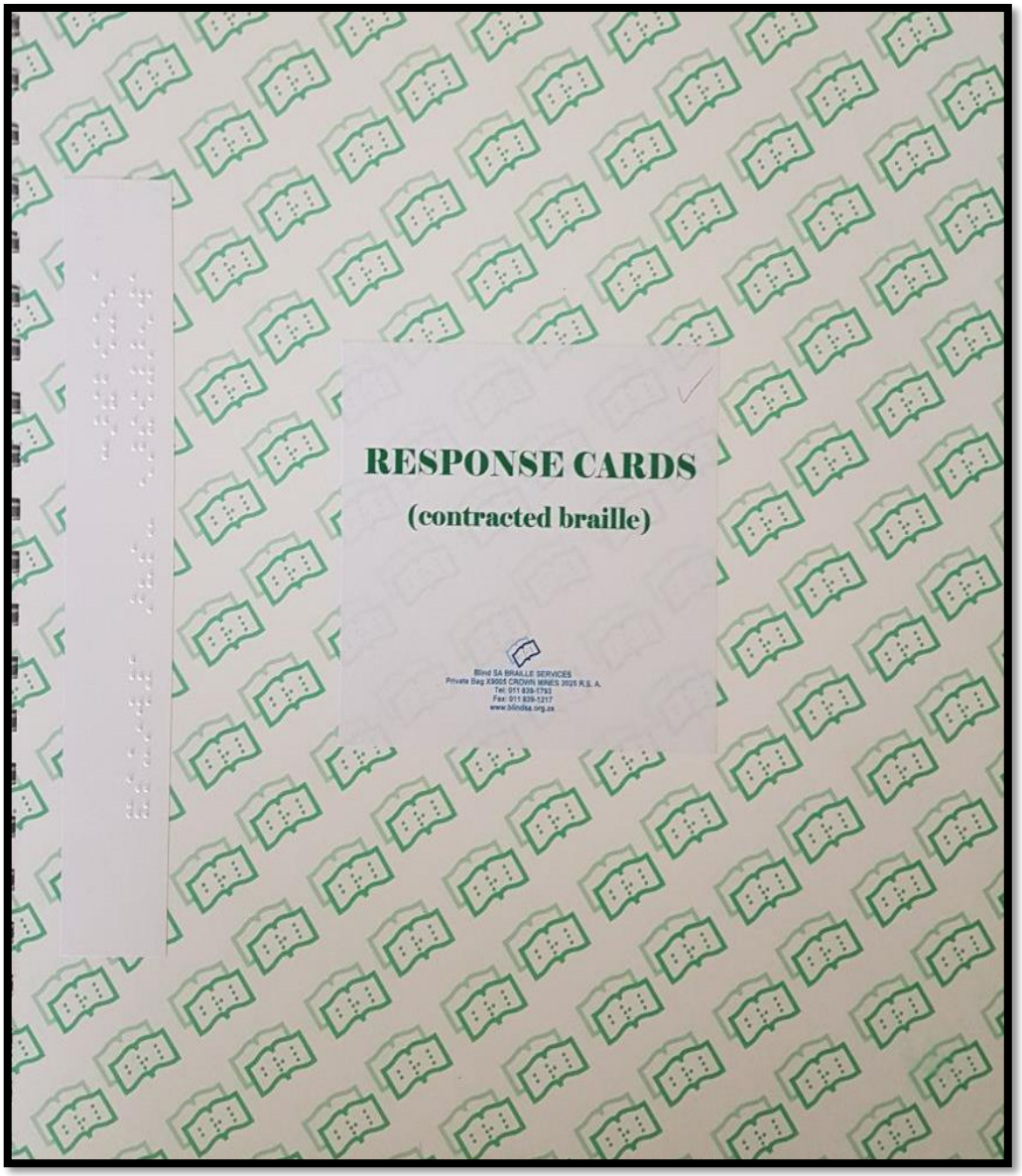
RESPONSE CARDS: BRAILLE

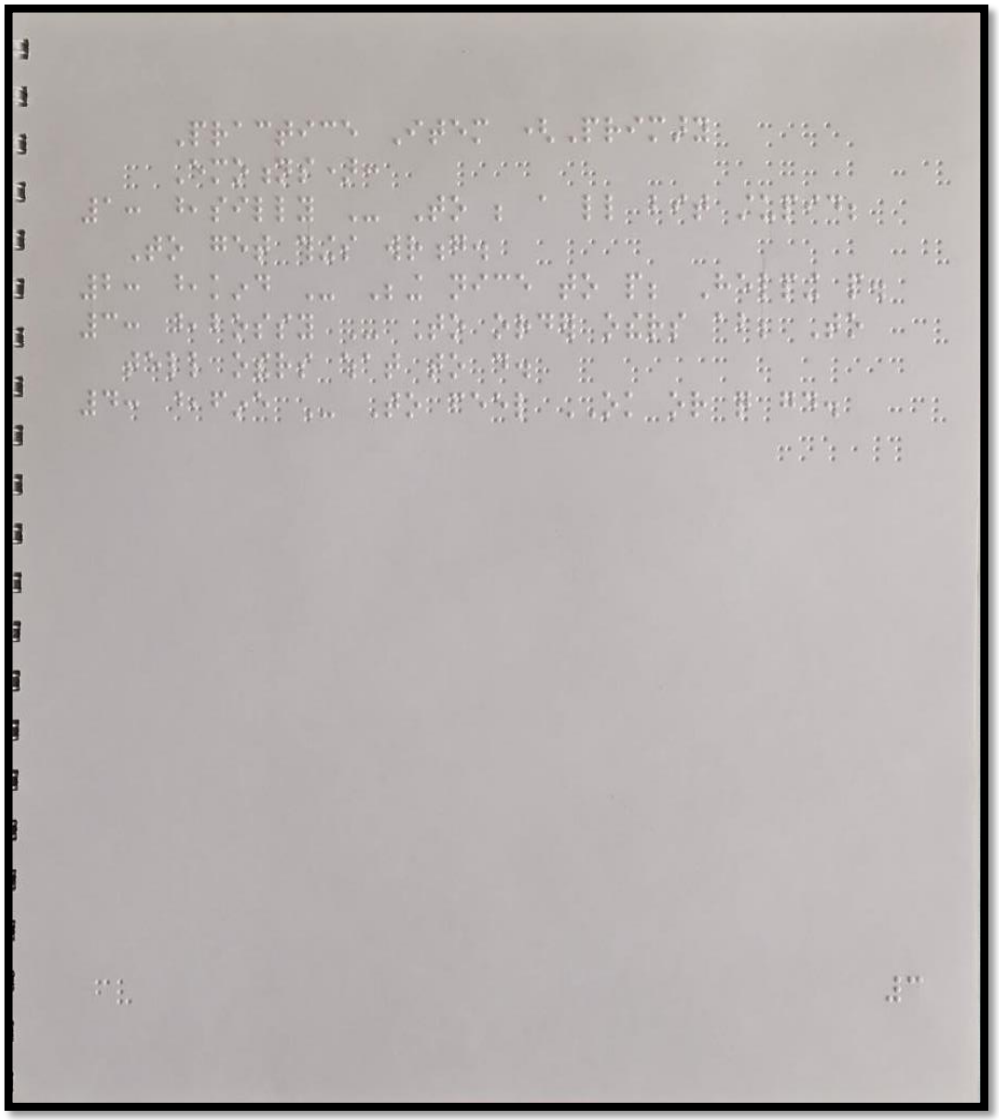
Uncontracted (Grade 1) Braille





Contracted (Grade 2) Braille

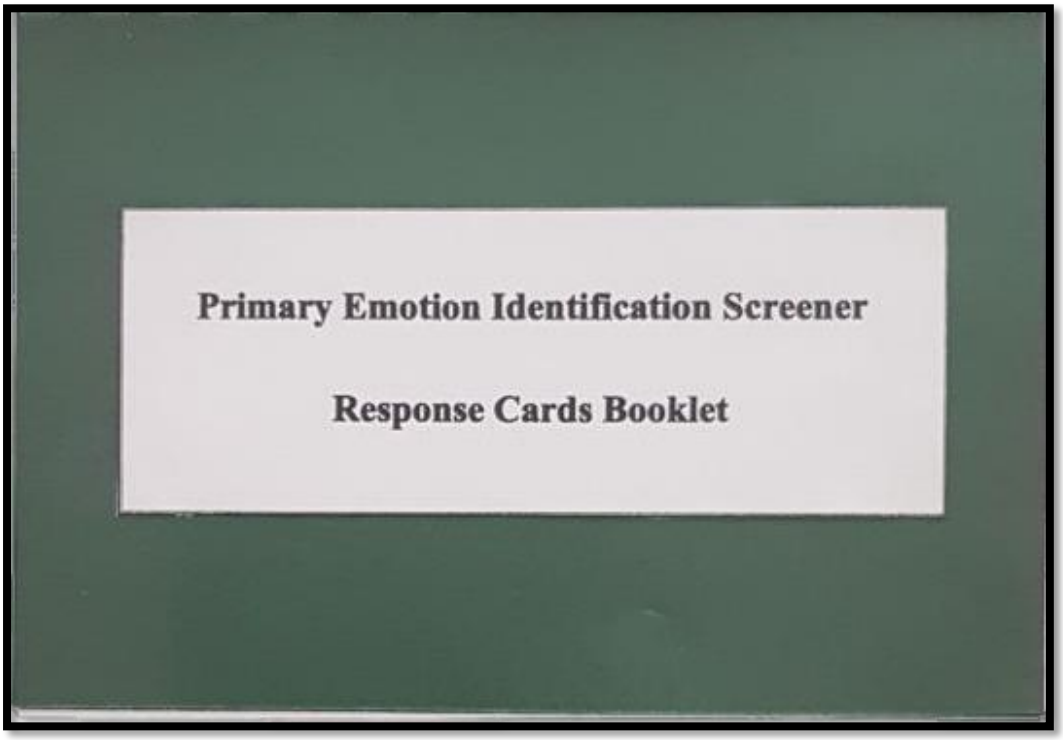




APPENDIX R

RESPONSE CARDS: TRADITIONAL ORTHOGRAPHY

Primary Emotions Identification Screener Response Cards



Primary Emotions:

Practice Item (Primary Emotions):

1	2	3	4
silly	**kind**	**bossy**	**fine**
To be a little bit stupid; To get things wrong.	Being nice to people; Helping people.	To order others about; To tell others what to do.	To feel OK or quite good.

Item 1:

1	2	3	4
disgusted	**sad**	**angry**	**happy**
To feel something is very nasty or unpleasant.	Feeling bad about something; unhappy.	To feel anger, a strong feeling that makes you want to argue and fight.	Feeling good about something; to be pleased.

Item 2:

1	2	3	4
happy	**afraid**	**sad**	**surprised**
Feeling good about something; to be pleased.	To be scared.	Feeling bad about something; unhappy.	When something not expected happens.

Item 3:

1	2	3	4
surprised	**angry**	**disgusted**	**happy**
When something not expected happens.	To feel anger, a strong feeling that makes you want to argue and fight.	To feel something is very nasty or unpleasant.	Feeling good about something; to be pleased.

Item 4:

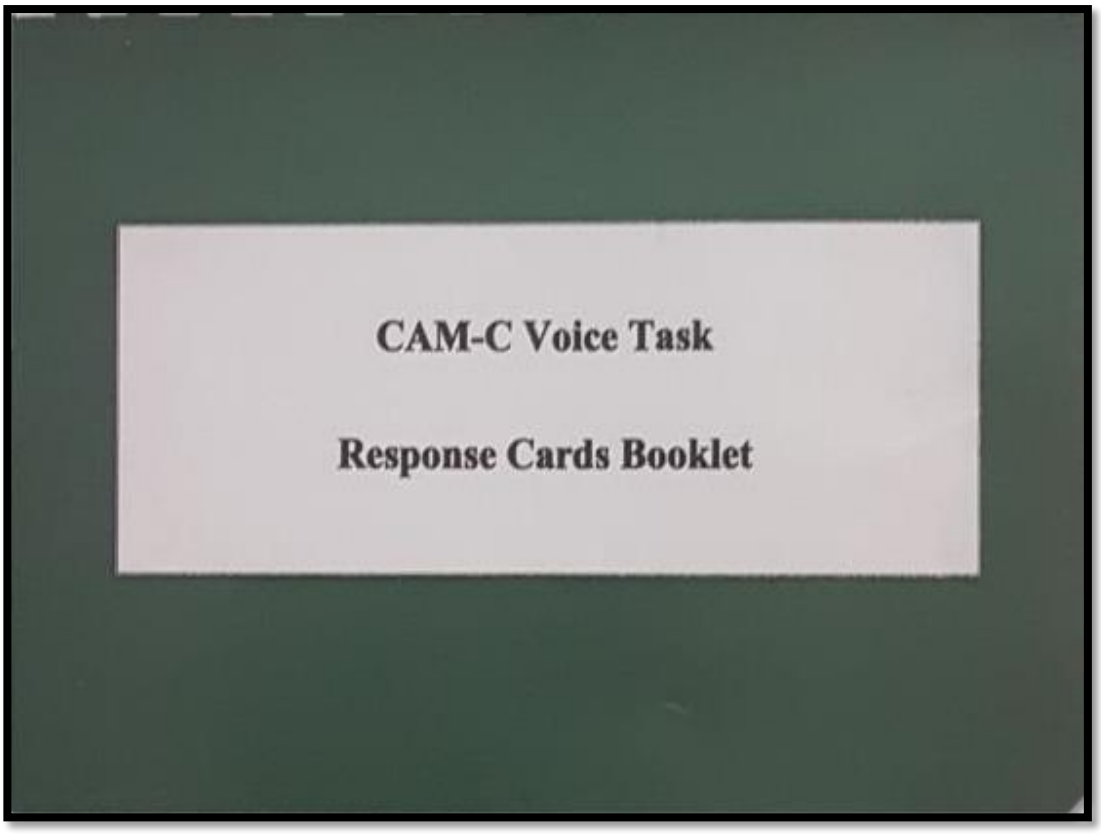
1	2	3	4
disgusted	**happy**	**angry**	**afraid**
To feel something is very nasty or unpleasant.	Feeling good about something; to be pleased.	To feel anger, a strong feeling that makes you want to argue and fight.	To be scared.

Item 5:

1	2	3	4
angry	**afraid**	**sad**	**surprised**
To feel anger, a strong feeling that makes you want to argue and fight.	To be scared.	Feeling bad about something; unhappy.	When something not expected happens.

Item 6:

1	2	3	4
happy	**angry**	**surprised**	**sad**
Feeling good about something; to be pleased.	To feel anger, a strong feeling that makes you want to argue and fight.	When something not expected happens.	Feeling bad about something; unhappy.



CAM-C Voice Task (Higher Order Emotions):

Practice Item (HOEs):

1	2	3	4
amused	**embarrassed**	**hostile**	**jealous**
To think something is funny.	To feel shy in front of others.	To show dislike of someone or something.	To feel someone is better or luckier than you.

Item 01:

1	2	3	4
unsure	**amused**	**thinking**	**interested**
To feel you don't know.	To think something is funny.	To use your mind, to work something out or remember something.	Wanting to know about something.

Item 02:

1	2	3	4
unimpressed	**mysterious**	**undecided**	**curious**
To not admire someone or something.	When you don't want people to know what you are doing or thinking.	Not sure about which choice to take or what decision to make about something.	Eager to learn about something.

Item 03:

1	2	3	4
loving	**relaxed**	**delighted**	**decided**
Having lots of warm feelings.	When you feel good and you don't worry.	When you feel very good and happy about something.	To be sure about a choice you made.

Item 04:

1	2	3	4
teasing	**jealous**	**proud**	**sure**
Making fun of someone; having a joke; playing.	To feel someone is better or luckier than you.	When you feel you have done something very well.	To feel you are right.

Item 05:

1	2	3	4
afraid	**hopeful**	**asking**	**embarrassed**
To be scared.	To think you will get what you want or need.	Trying to get something by saying you want it.	To feel shy in front of others.

Item 06:

1	2	3	4
surprised	**undecided**	**sneaky**	**bothered**
When something not expected happens.	Not sure about which choice to take or what decision to make about something.	To do something without people knowing, when you shouldn't.	To be troubled by others and to worry a little about it.

Item 07:

1	2	3	4
disbelieving	**bothered**	**liked**	**impressed**
To think something is not true.	To be troubled by others and to worry a little about it.	Feeling other people think you are nice, or want to be with you.	When you think something is very good indeed.

Item 08:

1	2	3	4
complaining	**bored**	**delighted**	**loving**
To moan or whine about something.	To find something not interesting.	When you feel very good and happy about something.	Having lots of warm feelings.

Item 09:

1	2	3	4
bothered	**affectionate**	**troubled**	**patient**
To be troubled by others and to worry a little about it.	To feel kind and caring towards someone or something.	To feel uneasy or worried; unsettled.	To be able to stay calm and wait even when it is hard or frustrating.

Item 10:

1	2	3	4
jealous	**disappointed**	**proud**	**thinking**
To feel someone is better or luckier than you.	To feel let down, someone didn't do what they said they would do, or something didn't turn out the way you thought.	When you feel you have done something very well.	To use your mind, to work something out or remember something.

Item 11:

1	2	3	4
interested	**cheeky**	**unfriendly**	**excited**
Wanting to know about something.	To insult or badmouth someone but in a teasing or playful way.	Not being nice to someone, or being nasty to someone.	You want to do something or want something to happen very much; being eager.

Item 12:

1	2	3	4
disgusted	**nervous**	**excited**	**touched**
To feel something is very nasty or unpleasant.	To feel a bit afraid and worried about something.	You want to do something or want something to happen very much; being eager.	Feeling someone has done a very nice thing; feeling good.

Item 13:

1	2	3	4
touched	**disliking**	**embarrassed**	**surprised**
Feeling someone has done a very nice thing; feeling good.	To not like someone or something.	To feel shy in front of others.	When something not expected happens.

Item 14:

1	2	3	4
proud	**touched**	**disbelieving**	**disappointed**
When you feel you have done something very well.	Feeling someone has done a very nice thing; feeling good.	To think something is not true.	To feel let down, someone didn't do what they said they would do, or something didn't turn out the way you thought.

Item 15:

1	2	3	4
bossy	**angry**	**hurt**	**jealous**
To tell others to do what you want them to.	To feel anger, a strong feeling that makes you want to argue and fight.	To be upset by something.	To feel someone is better or luckier than you.

Item 16:

1	2	3	4
embarrassed	**wishful**	**decided**	**annoyed**
To feel shy in front of others.	Hoping something will happen.	To be sure about a choice you made.	To be a little angry or irritated.

Item 17:

1	2	3	4
disappointed	**angry**	**sad**	**ashamed**
To feel let down, someone didn't do what they said they would do, or something didn't turn out the way you thought.	To feel anger, a strong feeling that makes you want to argue and fight.	Feeling bad about something; unhappy.	To feel shy, awful, sorry or guilty.

Item 18:

1	2	3	4
grateful	**loving**	**sure**	**honest**
Feeling you want to say thank you, when someone has done a nice thing.	Having lots of warm feelings.	To feel you are right.	To tell the truth, no lies.

Item 19:

1	2	3	4
unsure	**disgusted**	**bothered**	**amused**
To feel you don't know	To feel something is very nasty or unpleasant.	To be troubled by others and to worry a little about it.	To think something is funny.

Item 20:

1	2	3	4
excited	**tempting**	**amused**	**impressed**
You want to do something or want something to happen very much; being eager.	Inviting or convincing someone to do something that they should probably not be doing.	To think something is funny.	When you think something is very good indeed.

Item 21:

1	2	3	4
undecided	**bothered**	**interested**	**disbelieving**
Not sure about which choice to take or what decision to make about something.	To be troubled by others and to worry a little about it.	Wanting to know about something.	To think something is not true.

Item 22:

1	2	3	4
impressed	**afraid**	**excited**	**amused**
When you think something is very good indeed.	To be scared.	You want to do something or want something to happen very much; being eager.	To think something is funny.

Item 23:

1	2	3	4
grumpy	**sure**	**disappointed**	**hurt**
To be in a bad mood.	To feel you are right.	To feel let down, someone didn't do what they said they would do, or something didn't turn out the way you thought.	To be upset by something.

Item 24:

1	2	3	4
unfriendly	**disgusted**	**sure**	**hurt**
Not being nice to someone, or being nasty to someone.	To feel something is very nasty or unpleasant.	To feel you are right.	To be upset by something.

Item 25:

1	2	3	4
unsure	**asking**	**nervous**	**shocked**
To feel you don't know.	Trying to get something by saying you want it.	To feel a bit afraid and worried about something.	Feeling surprised in a bad way.

Item 26:

1	2	3	4
tired	**unfriendly**	**shy**	**teasing**
Feeling you need a rest from something.	Not being nice to someone, or being nasty to someone.	Feeling it is hard to talk to other people.	Making fun of someone; having a joke; playing.

Item 27:

1	2	3	4
terrified	**sad**	**interested**	**nervous**
To be filled with fear.	Feeling bad about something; unhappy.	Wanting to know about something.	To feel a bit afraid and worried about something.

APPENDIX S

CAMBRIDGE MINDREADING FACE-VOICE BATTERY FOR CHILDREN

(CAM-C) VOICE TASK: RESPONSE RECORD SHEETS

First sequence administration response form:

Item	Voice clip file name	Answers (correct answers for each item appears in the file name):								Response
PI	00hostile	1.	amused	2.	embarrassed	3.	hostile	4.	jealous	
1	01amused	1.	unsure	2.	amused	3.	thinking	4.	interested	
2	02undecided	1.	unimpressed	2.	mysterious	3.	undecided	4.	curious	
3	03loving	1.	loving	2.	relaxed	3.	delighted	4.	decided	
4	04jealous	1.	teasing	2.	jealous	3.	proud	4.	sure	
5	05embarrassed	1.	afraid	2.	hopeful	3.	asking	4.	embarrassed	
6	06undecided	1.	surprise	2.	undecided	3.	sneaky	4.	bothered	
7	07bothered	1.	disbelieving	2.	bothered	3.	liked	4.	impressed	
8	08loving	1.	complaining	2.	bored	3.	delighted	4.	loving	
9	09bothered	1.	bothered	2.	affectionate	3.	troubled	4.	patient	
10	10jealous	1.	jealous	2.	disappointed	3.	proud	4.	thinking	
11	11unfriendly	1.	interested	2.	cheeky	3.	unfriendly	4.	excited	
12	12nervous	1.	disgusted	2.	nervous	3.	excited	4.	touched	
13	13embarrassed	1.	touched	2.	disliking	3.	embarrassed	4.	surprised	
14	14disappointed	1.	proud	2.	touched	3.	disbelieving	4.	disappointed	
15	15jealous	1.	bossy	2.	angry	3.	hurt	4.	jealous	
16	16embarrassed	1.	embarrassed	2.	wishful	3.	decided	4.	annoyed	
17	17disappointed	1.	disappointed	2.	angry	3.	sad	4.	ashamed	
18	18loving	1.	grateful	2.	sure	3.	loving	4.	honest	
19	19bothered	1.	unsure	2.	disgusted	3.	bothered	4.	amused	
20	20amused	1.	excited	2.	tempting	3.	amused	4.	impressed	
21	21undecided	1.	undecided	2.	bothered	3.	interested	4.	disbelieving	
22	22amused	1.	impressed	2.	afraid	3.	excited	4.	amused	
23	23disappointed	1.	grumpy	2.	sure	3.	disappointed	4.	hurt	
24	24unfriendly	1.	unfriendly	2.	disgusted	3.	sure	4.	hurt	
25	25nervous	1.	unsure	2.	asking	3.	nervous	4.	shocked	
26	26unfriendly	1.	tired	2.	unfriendly	3.	shy	4.	teasing	
27	27nervous	1.	terrified	2.	sad	3.	interested	4.	nervous	

Reverse sequence administration response form:

Item	Voice clip file name	Answers (correct answers for each item appears in the file name):								Response
PI	00hostile	1.	amused	2.	embarrassed	3.	hostile	4.	jealous	
27	27nervous	1.	terrified	2.	sad	3.	interested	4.	nervous	
26	26unfriendly	1.	tired	2.	unfriendly	3.	shy	4.	teasing	
25	25nervous	1.	unsure	2.	asking	3.	nervous	4.	shocked	
24	24unfriendly	1.	unfriendly	2.	disgusted	3.	sure	4.	hurt	
23	23disappointed	1.	grumpy	2.	sure	3.	disappointed	4.	hurt	
22	22amused	1.	impressed	2.	afraid	3.	excited	4.	amused	
21	21undecided	1.	undecided	2.	bothered	3.	interested	4.	disbelieving	
20	20amused	1.	excited	2.	tempting	3.	amused	4.	impressed	
19	19bothered	1.	unsure	2.	disgusted	3.	bothered	4.	amused	
18	18loving	1.	grateful	2.	sure	3.	loving	4.	honest	
17	17disappointed	1.	disappointed	2.	angry	3.	sad	4.	ashamed	
16	16embarrassed	1.	embarrassed	2.	wishful	3.	decided	4.	annoyed	
15	15jealous	1.	bossy	2.	angry	3.	hurt	4.	jealous	
14	14disappointed	1.	proud	2.	touched	3.	disbelieving	4.	disappointed	
13	13embarrassed	1.	touched	2.	disliking	3.	embarrassed	4.	surprise	
12	12nervous	1.	disgusted	2.	nervous	3.	excited	4.	touched	
11	11unfriendly	1.	interested	2.	cheeky	3.	unfriendly	4.	excited	
10	10jealous	1.	jealous	2.	disappointed	3.	proud	4.	thinking	
09	09bothered	1.	bothered	2.	affectionate	3.	troubled	4.	patient	
08	08loving	1.	complaining	2.	bored	3.	delighted	4.	loving	
07	07bothered	1.	disbelieving	2.	bothered	3.	liked	4.	impressed	
06	06undecided	1.	surprised	2.	undecided	3.	sneaky	4.	bothered	
05	05embarrassed	1.	afraid	2.	hopeful	3.	asking	4.	embarrassed	
04	04jealous	1.	teasing	2.	jealous	3.	proud	4.	sure	
03	03loving	1.	loving	2.	relaxed	3.	delighted	4.	decided	
02	02undecided	1.	unimpressed	2.	mysterious	3.	undecided	4.	curious	
01	01amused	1.	unsure	2.	amused	3.	thinking	4.	interested	

APPENDIX T
CAMBRIDGE MINDREADING FACE-VOICE BATTERY FOR CHILDREN (CAM-C) VOICE TASK: SCRIPTED PRIMER

1. Understanding of the construct "feeling" (emotion).

Instructions:

i) Say the following statement and record the participant's response below: *"Today we are going to talk about, and do, an activity about people's feelings. With 'feelings' I mean how people feel inside, for example, they may feel happy, or they may feel sad. Can you think about some other examples of how people can feel inside? They can feel happy, sad, or…?"*

---

ii) Should the participant struggle with the meaning of the construct 'feeling', help the participant understand the construct by reading the short vignette provided as an explanatory example of a feeling. Then discuss identifying the emotion elicited.

- *"If you walk into a yard and a big dog comes rushing at you barking loudly, how would you feel?"*

2. Introduction to the task

Say: *"I am now going to play you some short sentences that people are saying. After each sentence, I will stop the recording ask you to choose the word from four different words that best describes how the speaker is feeling. If you feel that more than one word is correct, please choose the word which you consider to be the best one. This is how it is going to work:*

Before I play the voice clip, I will read you the four words from which you have to choose the best one as well as an explanation of what each word means. You will also be able to read the possible answers on the response card which I will place I front of you. If you can't remember the meaning of a word you can find it on the response card or just ask me."

NOTE - For children with blindness ask the following and select the set of applicable response cards: *"Do you prefer uncontracted (grade 1) or contracted (grade 2) Braille?"*

3. **The Higher Order Emotion Practice Item**

i) Place the response card for the audio clip in front of the participant;
ii) Read each emotion word and its definition out loud to the participant;
iii) Play the audio clip;
iv) Ask the participant to choose one of the four emotion words (may say word or number, or point to an option);
v) Record the participant's response in the column provided on the response sheet.

Say: *"We are now going to do a practice sentence together. Remember to choose the word that best describes how the speaker is feeling. Are you ready?"*

The Practice Item:

➡ Play HOE practice item: *"We don't need you anymore".*

➡ Now ask: *"Which word best describes how the speaker is feeling?"*

1. Amused	2. Embarrassed	3. Hostile	4. Jealous

Should the child give an incorrect response, help the participant self-correct his or her response. Then proceed to administer the CAM-C Voice Task items 1-27.

4. The CAM-C Voice Task: Higher Order Emotions

Instructions: Follow the same procedure as for the practice item.

APPENDIX U

PROCEDURAL INTEGRITY CHECKLIST

Main data collection: I. Greyvenstein (Ph.D Candidate)

Project Title: Higher order emotion identification: Comparing children with blindness to typically developing peers.

Participant Code: _____

General Procedures:

	Procedural step	Compliance (Tick if procedure was complied with)	Comment
1.	**Introduction & Rapport:**		
1.1	The researcher introduced herself to the participant.		
1.2	The researcher clearly explained the purpose of her visit.		
1.3	Sufficient rapport was established with the participant.		
1.4	The session ended with proper closure and some grounding of the participant.		
2.	**Research Setting:**		
2.1	No auditory or visual distractions were present.		
2.2	The participant was at ease.		

CAM-C Administration:

Item (depending on sequence version administered)	Researcher presents four response options on card	Researcher reads each response option to, or together with, the participant	Researcher plays audio clip twice	Researcher requests response from participant	If necessary - researcher repeats audio clip and/or reads response options again	Researcher records response on response form	Researcher indicates that the next item will be introduced
1 or 27							
2 or 26							
3 or 25							
4 or 24							
5 or 23							
6 or 22							
7 or 21							
8 or 20							
9 or 19							
10 or 18							
11 or 17							
12 or 16							
13 or 15							
14 or 14							
15 or 13							
16 or 12							
17 or 11							
18 or 10							
19 or 9							
20 or 8							
21 or 7							
22 or 6							
23 or 5							
24 or 4							
25 or 3							
26 or 2							
27 or 1							

Checklist completed by: _____ Occupation: _____

Position: _____ HLOE: _____

Signature: _____ Date: _____

Any Comment(s) (If applicable): _____

APPENDIX V

CAMBRIDGE MINDREADING FACE-VOICE BATTERY FOR CHILDREN (CAM-C) VOICE TASK: VOICE CLIP TRANSCRIPTIONS

Primary Emotions

Item no	Audio Clip File Name	Emotion being tested	Transcription
PI.	000kind	kind	'Come and sit down here.'
1.	001angy	angry	'Why didn't you tell me?'
2.	002afraid	afraid	'What's that noise?'
3.	003disgusted	disgusted	'Ugh, what's that smell?'
4.	004sad	sad	'I really miss him.'
5.	005happy	happy	'We're going to the beach!'
6.	006Surprised	surprised	'Where did you find it?!'

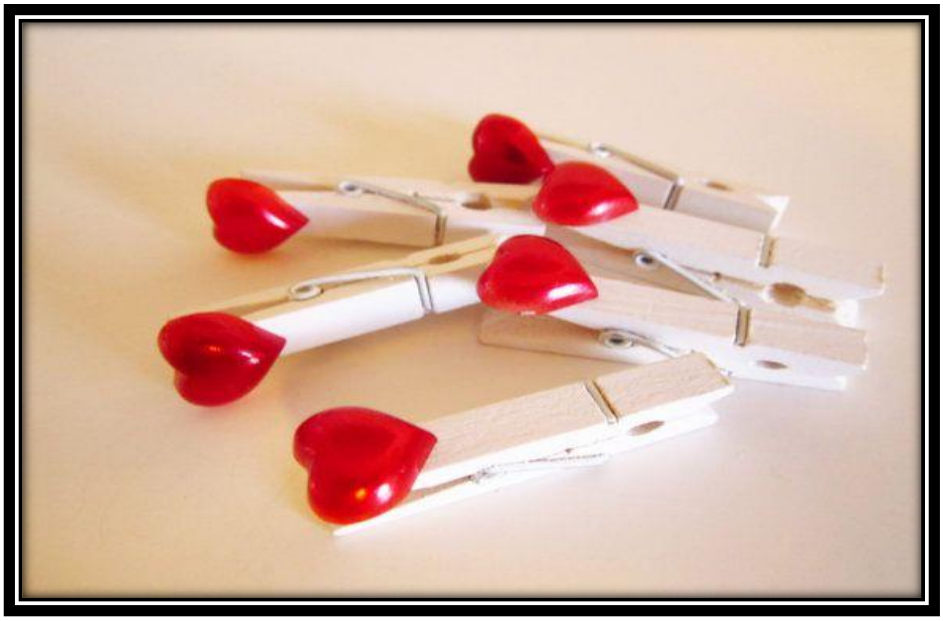
Higher Order Emotions

Item no	Audio Clip File Name	Emotion being tested	Transcription
PI.	00hostile	hostile	'We don't need you anymore'.
1.	01amused	amused	'You've done it again'.
2.	02undecided	undecided	'I might go next week'.
3.	03loving	loving	'Whatever you'd like'.
4.	04jealous	jealous	'I can do better than you'.
5.	05embarrassed	embarrassed	'Do you think anyone, eh, saw me?'
6.	06undecided	undecided	'Maybe I will'.
7.	07bothered	bothered	'I wish I didn't have to do it'.
8.	08loving	loving	'I missed you so much'.
9.	09bothered	bothered	'Don't put that near me!'
10.	10jealous	jealous	'She always gets what she wants'.
11.	11unfriendly	unfriendly	'Who do you think you are?'
12.	12nervous	nervous	'Don't put that near me'.
13.	13embarrassed	embarrassed	'I know my shoes are old'
14.	14disappointed	disappointed	'Aah, you've done it again'.
15.	15jealous	jealous	'I deserve that car more than him'.
16.	16embarrassed	embarrassed	'Oh, I wish it hadn't happened'.
17.	17disappointed	disappointed	'I should've won'.
18.	18loving	loving	'I'll always be here for you'.
19.	19bothered	bothered	'What are you doing here?'
20.	20amused	amused	'Imagine that!'
21.	21undecided	undecided	'I need to think about it'.
22.	22amused	amused	'Look at his face'.
23.	23disappointed	disappointed	'I tried so hard!'
24.	24unfriendly	unfriendly	'There's not enough room'.
25.	25nervous	nervous	'How many people are out there?'
26.	26unfriendly	unfriendly	'I'm not interested'.
27.	27nervous	nervous	'Is anyone home?'

APPENDIX W

PARTICIPANT TOKENS OF ACKNOWLEDGEMENT

Token for children with blindness:



Token for typically developing children: