DISPOSITIONAL TRAITS, MOTIVATION, AND PERFORMANCE STRATEGIES OF SOUTH AFRICAN NATIONAL DEFENCE FORCE SOLDIERS: DEVELOPING A DESCRIPTIVE PSYCHOLOGICAL PERFORMANCE MODEL

by

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Dedication

"Blessed be the Lord, my Rock, who trains my hands for war, my fingers for battle." – Psalm 144:1

This thesis is dedicated to all those serving in the SANDF who proudly call themselves soldiers.

Declaration

I, D. J. Schoeman, declare that this thesis, “Dispositional Traits, Motivation, and Performance Strategies of South African National Defence Force Soldiers: Developing a Descriptive Psychological Performance Model”, is my own work and that all sources I have used have been indicated and acknowledged by means of complete references.

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D. J. Schoeman

August 2022

Abstract

The individual's ability to cope and thrive in a demanding military environment is of crucial importance as mission success might be dependent thereon. Literature from the military and sport environments indicates numerous psychological characteristics that can lead to combat readiness and individual performance enhancement in strenuous environments. A comprehensive investigation of performance psychology characteristics as displayed by South African National Defence Force (SANDF) personnel would pave the way for development of applications that could potentially enhance individual and organisational functioning. Data collection was conducted through the administration of standardised assessments measuring dispositional traits, motivation, and performance strategies. The quantitative research process involved the use of descriptive and inferential statistical analysis methods and confirmatory factor analysis (CFA) through structural equation modelling (SEM). The findings are presented through a comparison of the performance-related psychological characteristics of the SANDF with applicable samples, as well as a comparison of the performance-related psychological characteristics between airborne- and non-airborne-qualified military personnel. Through applied CFA and SEM, two separate descriptive psychological models were developed. These models are inclusive of specific psychological characteristics that are categorised as potential enhancers or inhibitors of performance. The developed models are discussed in conjunction with relevant literature which provides theoretical substantiation for the findings. Suggestions are proposed for future research areas that could be built on the current study's results and findings. The current study's findings highlight the practical applications of applied training and interventions that could potentially hold significant performance-enhancing benefits for individual functioning and the SANDF as an organisation.

Keywords: Military, fortigenesis, positive psychology, performance, SANDF

List of Abbreviations

ARSOF	Army Special Operations Forces
AU	African Union
BAS	Behavioural Approach System
BIS	Behavioural Inhibition System
BMSQ	Bull's Mental Skills Questionnaire
BRUMS	Brunel Mood Scale
BSRS	Brief Sailor Resiliency Scale
CERQ	Cognitive Emotion Regulation Questionnaire
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CHA	Concurrent Health Assessment
CHS	Cognitive Hardiness Scale
CSF	Comprehensive Soldier Fitness
DRS	Dispositional Resilience Scale
ERQ	Emotion Regulation Questionnaire
FFFS	Fight-Flight-Freeze System
GFI	Goodness-of-Fit Index
HIIT	High-Intensity Interval Training
MTI	Mental Toughness Index
MWMS	Multidimensional Work Motivation Scale
POMS	Profile of Mood States
PTSD	Post-Traumatic Stress Disorder
RMSEA	Root Mean Square Error of Approximation
SADC	Southern African Development Community
SANDF	South African National Defence Force
SDT	Self-Determination Theory

SEM	Structural Equation Modelling
SMS	Sport Motivation Scale
SMTQ	Sport Mental Toughness Questionnaire
SRMR	Standardised Root Mean Square Residual
TMD	Total Mood Distress
TOPS	Test of Performance Strategies
UK	United Kingdom
UN	United Nations
US	United States

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Chapter 1: Overview and Rationale of the Study

1.1 Introduction

This introductory chapter explains the rationale and purpose of the study. It discusses the research aim along with objectives, paradigmatic perspective and research design.

1.2 Rationale

South Africa as a member state of the United Nations (UN), African Union (AU) and Southern African Development Community (SADC) effectuates certain continental and regional responsibilities. Consequently, South Africa is often called upon to take the lead with regard to military operations (O'Neil & O'Neil, in press). South Africa is looked upon to promote and provide stability in the SADC region in order to obtain a peaceful environment that would allow for a stable economic climate. Therefore, it is predicted that the South African National Defence Force (SANDF) future battle space will be mainly on the African continent where the government aims to promote at least a stable, and preferably peaceful, environment and market (Heinecken, 2020; Le Roux, 2008; Republic of South Africa (RSA), 2015; Shinga, 2016). As a leader on the African continent and member of the UN, AU and SADC, South Africa has, and will be, increasingly called upon to deploy its military forces in a variety of operations (Mphofu & Van Dyk, 2016). This is evidenced by the SANDF's involvement in peacekeeping and peace-enforcement operations as part of the UN and AU in Sudan, the Democratic Republic of Congo and Burundi. Peacekeeping missions have become a reality for South African soldiers and often place great demands on the individual as a result of operation-related stressors (Koopman & Van Dyk, 2012). The recent SADC deployment to Mozambique illustrates the role that South Africa is expected to play as a promoter of peace and stability in the SADC region. To achieve this goal in the SADC region

and on the continent of Africa, the South African military needs to function as a capable and cohesive force.

The South African Defence Review (RSA, 2015) points out that the current global security environment is dynamic and constantly changing. Africa is becoming more complex and unstable as conflicts have been on the rise over the past few years. From a military perspective, being the focal point of operational involvement for the SANDF, Africa holds unique challenges for deploying military personnel (Bester & Du Plessis, 2014; Grundlingh, 2016). The African battle space is a complex confluence of factors that impact on the performance of military personnel during operations (Grundlingh, 2016). These include: the physical terrain; socio-economic development; political instability and governance; climate change; cultural, tribal, and religious diversity; extremism; ambiguous mandates; and a varied and diverse nature of operations (O'Neil & O'Neil, in press). The operations range from purely humanitarian, low-intensity peacekeeping to full-blown conventional operations and unconventional counter-insurgency campaigns that place different demands on the SANDF and its personnel. Also within the African battle space, SANDF military personnel could be expected to function in numerous different capacities within their military careers, such as providing humanitarian aid in Mozambique after a natural disaster, exercising border-control and anti-poaching activities, conducting anti-piracy operations in the Indian Ocean, jungle warfare operations in the Democratic Republic of Congo as part of the UN Force intervention Brigade and controlling crowds within South Africa's borders. The increase in non-traditional military tasks regularly performed by the army's soldiers has further underlined the risky, challenging, dangerous, complex and adverse environments to which soldiers are exposed (Gilmore, 2016). Whatever the type of military operation, the human factor will always be present to fulfil a role through completion of specific tasks (Tossell et al., 2016). The future African battle space, therefore, seems to require that SANDF military personnel will be placed in increasingly complex situations with an uncertain and varying nature of conflict and force required.

Serving in the military is arguably one of the most stressful occupations (De Visser et al., 2016). South African National Defence Force military personnel and commanders at technical, tactical and operational levels are engaged in operations in extreme environments where the expected strain of operations is amplified through the complexity of the African battle space (O'Neil & O'Neil, in press). Consequently, the complexities and demands of the modern-day African battle space places an additional burden on SANDF military personnel and the importance of how the individual will perform in challenging circumstances is critical to mission success. Combat readiness of military personnel pertains to the level of preparedness, both psychologically and physically, through training and interventions aimed at enhancing an individual's capability to execute specific military tasks successfully (Shinga, 2016). According to Masole and Van Dyk (2016), military personnel need to develop competencies that will allow them to function effectively within these roles and environments. Within the changing security environment and higher demand for involvement of the SANDF (Kalamdien, 2016) and coupled with a lack of resources, the focus on optimisation of the resources at hand has, perhaps, never been more important. Optimisation of human factor performance is just as essential, or perhaps even more so, than other resources to ensure the successful completion of whatever task is at hand (Matthews & Schnyer, 2019).

The focus on human performance is evident with one of the most common questions faced by militaries being how to select and, most importantly, train soldiers to become the optimum soldier they envision (Krueckel et al., 2020). The diverse demographics and new demands of modern-day warfare serve as rationale for the investigation of the role of positive psychological constructs (De Beer & Van Heerden, 2014). Matthews (2014) stated that to achieve optimal results from soldiers and systems, the military needs to aggressively integrate state-of-the-art psychology into all facets of its missions. Predicting successful adaptations in arduous deployment conditions holds both occupational and operational combat readiness benefits for military personnel (Nindl et al., 2018). The increased focus on performance amid the changing battle space has led to a focus on psychological

characteristics such as hardiness and resilience, which have become increasingly important in the development of a high-performing soldier (Krueckel et al., 2020). The shortcoming of traditional psychology is its focus on the treatment of pathology; consequently, for many people, it does very little to improve performance (Cornum et al., 2011). Positive psychology with a focus on performance potentially holds the key to facilitation of the successful adaptation and functioning of military personnel amidst demanding circumstances.

Within the SANDF, airborne-qualified military personnel are often called upon to be at the frontline where they deal with conflicts and face unexpected challenges in extreme situations. They are, therefore, often referred to as the “tip of the spear” and are viewed as elite soldiers performing at high levels. In 2013, a group of approximately 200 SANDF military personnel, most of who were airborne-qualified, battled a well-armed Seleka rebel force of several thousand in the Central African Republic. The battle was described as one of the hardest-fought actions that the South African military had ever experienced, and the soldiers fought well, even exceptionally (Heitman, 2013). Owing to the nature of their work and the severe physical and mental challenges that individuals in the airborne environment are often exposed to, certain performance-related dispositional traits have been studied in this cohort. Hardiness (Bartone et al., 2008), grit (Maddi et al., 2012) and mental toughness (DeWiggins et al., 2010), amongst others, have been investigated in relevant international samples. These investigations pertained mostly to profiling, screening, selection and developing future training opportunities, with most studies focusing on one or two performance-related aspects. However, limited extensive studies incorporating the many performance-related dispositional traits have been conducted (De Beer & Van Heerden, 2014). The high attrition rate of candidates attempting selections in order to become part of this elite fraternity also raises the question as to what makes successful candidates differ from those who fail. In other words, what potential psychological attributes differentiate individuals who overcome the challenges from those who succumb to them? The evaluation

of the role of motivation and coping resources in terms of possible predictive utility could potentially profit the SANDF (De Beer & Van Heerden, 2014).

A review of the relevant South African literature indicated an uptake of positive psychology research within the SANDF, however, there was limited research that investigated dispositional traits, motivation, and strategies pertaining to individual performance. The ever-changing global security environment emphasises the need for continuous research into the uniqueness of the African battle space, with reference to human factor performance within this demanding environment. With an increased onus on performance and in consideration of the identified literature gap, a comprehensive study of individual performance psychology characteristics applicable to the SANDF military personnel would not only contribute academically but also practically. The results obtained through the investigation of potential performance-related characteristics could be used in the selection context and/or focused training interventions to enhance individual functioning and the overall combat readiness of the SANDF.

1.3 Research Aim and Objectives

The first aim of this study was to investigate the performance-related psychological characteristics (dispositional traits, motivation, and performance strategies) of military personnel in the SANDF. The dispositional traits included mental toughness, grit, psychological hardiness, resilience and personality. Motivational characteristics included mood and motivation. Performance strategies included emotion regulation techniques, imagery, concentration, and psychosomatic and foundation skills.

The second aim was to determine significant differences in the performance-related psychological characteristics (dispositional traits, motivation, and performance strategies) between airborne- and non-airborne-qualified military personnel.

The third aim was to develop a descriptive psychological model of military personnel in the SANDF.

To achieve these aims, the following objectives were identified as part of the research:

- To describe the profile of dispositional traits, motivation, and performance strategies of military personnel in the SANDF
- To identify significant differences in dispositional traits, motivation, and performance strategies between airborne-qualified military personnel and non-airborne-qualified military personnel in the SANDF through applied descriptive and inferential statistical techniques
- To develop a descriptive psychological model of military personnel in the SANDF using SEM

1.4 Paradigm and Perspective

The theoretical point of departure for this study is rooted in the psychology subfield of positive psychology. Definitions of positive psychology emphasise the link between conditions and processes that lead to optimal human functioning (Gable & Haidt, 2005; Peterson, 2006). The field of positive psychology emphasises positive states, positive traits and positive institutions (Matthews, 2008b). Since inception, positive psychology has created a paradigm shift in terms of looking at human psychological strengths and, thereafter, designing intervention programmes to optimise those strengths for improved functioning in different facets of the individual's life (Singh, 2018). Thus, positive psychology is about successful adaptation and excellence in all domains of life.

The advances made in the field of positive psychology that have found application in the military environment include selection, clinical therapy, training, and social applications (Boe, 2016; Cornum et al., 2011; Reivich et al., 2011). Research indicates that positive psychology-derived constructs may offer considerable enhancements across the field of military psychology, such as facilitating selection and training of elite combat units, and teaching soldiers to better regulate affective states, the awareness and ability to capitalise

on their own individual character strengths (Matthews, 2008b). The envisioned outcome is for psychological health to become as embedded in the soldier ethos as physical fitness is for effective performance. This has led to the numerous positive psychology applications in the military environment (Cornum et al., 2011).

A more focused description, is that the study flows from a fortigenesis perspective. Fortigenesis (fortis equates to strong) refers to a process of developing strengths at a variety of end points other than health alone, for instance, work, marriage and parenthood (Strümpher, 2006b). Fortigenesis focuses on the strengths and resources that a human being requires to successfully function and cope better with the demands of life in numerous roles and situations. Strümpher (1995) pointed out the existence of certain psychological processes that lead to positive characteristics underlying better performance. To ensure a comprehensive investigation of potential strengths underlying individual functioning, several prominent psychological characteristics from the fields of sport and performance psychology were identified and included in this study. The concept of human performance has been discussed in the arena of sport psychology but one can argue that that it also falls under the paradigm of positive psychology (Salama-Younes, 2011).

It is from a fortigenic perspective that this study investigated selected dispositional traits, motivation, and performance strategies of SANDF military personnel. In conclusion, the study falls under the overarching umbrella of positive psychology applied in the military environment.

1.5 Research Design

The study used a quantitative cross-sectional design. There were once-off data collections with relevant sample groupings using standardised, existing questionnaires. The following questionnaires were included in the study: Reinforcement Sensitivity Theory Personality Questionnaire (RST-PQ), Sport Mental Toughness Questionnaire (SMTQ), Dispositional Resilience Scale-II (DRS-II), Short Grit Scale (Grit-S), Bull's Mental Skills

Questionnaire (BMSQ), Multidimensional Work Motivation Scale (MWMS), Brunel Mood Scale (BRUMS), Brief Sailor Resiliency Scale (BSRS) and the Emotion Regulation Questionnaire (ERQ).

Quantitative data from the administered questionnaires were analysed using inferential and descriptive statistical methods. Following the use of SEM, the results provided a profile of the dispositional traits, motivation, and performance strategies characteristic of military personnel in the SANDF. Statistically significant differences between airborne- and non-airborne-qualified individuals were also examined through independent samples t-tests. To develop performance-related descriptive psychological models of military personnel in the SANDF, SEM was employed. The research design and data collection methods will be discussed in detail in Chapter 4.

1.6 Summary and Overview of Chapters

This study investigated the performance-related psychological characteristics of military personnel in the SANDF, leading to the development of descriptive psychological models. It is organised into seven chapters. Chapter 1 has provided an introduction and background to the study as well as defining the research aims and objectives.

Chapter 2 provides an overview of the theoretical base from which the study was conducted. Chapter 3 reviews local and international literature and research findings on applicable performance psychology characteristics. Chapter 4 provides an overview of the methodology used. It includes descriptions of the research design, sampling strategy, data collection and instruments used, and data analysis procedures. Chapter 5 discusses the results obtained and analysis of the relevant instruments used in the study through confirmatory factor analysis (CFA). Chapter 6 starts with descriptive results for the study sample compared with other relevant samples and is followed by the significant differences between airborne- and non-airborne-qualified individuals. Chapter 6 also provides an overview of the SEM conducted and the development of descriptive psychological models of

SANDF military personnel. Chapter 7 discusses the results obtained along with explanations and conclusions drawn from the results. Finally, recommendations stemming from the study findings, along with specific limitations of the study, are highlighted.

1.7 Conclusion

The current chapter provided the rationale and background, aims, objectives and research design of the study. The next chapter will provide an overview of the theoretical base from which the study was conducted.

Chapter 2: Theoretical Overview

2.1 Introduction

The principles of psychology have long been implemented in the South African military environment (Naidoo, 2009). Although the onus of psychological research and application has mostly focused on counselling and clinical aspects, the scope of psychology in the military stretches much further. Positive psychology principles have been incorporated into numerous applications within the military environment such as selection, clinical therapy, training and social interventions (Boe, 2016; Cornum et al., 2011; Reivich et al., 2011).

2.2 Positive Psychology and Fortigenesis

The theoretical point of departure for this study is rooted in the branch of positive psychology. Positive psychology focuses on those aspects that allow individuals and groups to perform optimally and discusses how negative influences can be minimised (Arendse, 2020; Kim et al., 2018). The traditional focus of psychology on illness and suffering was exposed by Seligman (1999) who framed positive psychology as a remedy to this shortcoming and provided a new approach that would seek to understand what works well in human psychology. Strümpher (2005) further exposed the pathogenic interest of the health and social sciences and highlighted the preoccupation with why humans fall ill. Positive psychology was envisioned to catalyse a change in psychology from a preoccupation with repairing the worst to building the best qualities in life (Seligman, 2005). Seligman (2005) stated that the focus of positive psychology is to discover human strengths that act as buffers against mental illness, which implies a proactive approach to enhancing mental well-being. Stemming from the positive psychology perspective, Peterson and Seligman (2004) classified 24 character strengths and grouped them under six virtues, namely courage, wisdom and knowledge, humanity, justice, temperance, and transcendence. The researchers focused on what is right with people and what strengths of character make a

good life possible (Peterson & Seligman, 2004). Although the boundaries and constructs of positive psychology were still unclear (Coetzee & Viviers, 2007), the movement of positive psychology provided an alternative approach to traditional psychopathological approaches (Van Wijk & Waters, 2008).

Since Seligman (1999) introduced positive psychology, the field has expanded rapidly around the world in a number of different applications and contexts (Rhein & McDonald, 2022). Clinical therapy is one of the contexts in which positive psychology has had an impact over the past few years. Positive psychotherapy focuses on identifying and developing the individual's character strengths as well as resolving symptoms of mental illness (Rhein & McDonald, 2022). In 2006, the first handbook on positive clinical psychology by Wood and Johnson was published. Since then, positive psychology has spurred alternative conceptions to the traditional clinical model, while questioning several underlying assumptions (Wood et al., 2021). Apart from positive psychotherapy, other forms of therapeutic approaches employing positive psychology principles have been developed, such as mindfulness, well-being and quality-of-life therapy (Wood et al., 2021).

In an academic and educational context, numerous positive psychology books, academic journals and regional positive psychology networks and conferences have emerged (Seligman, 2005). Kim et al. (2018) reviewed 863 academic articles from 63 countries across five continents that were published between 1999 and 2016. This indicates the global interest and impact that the field of positive psychology has had all over the world. Locally, there has also been an uptake in published research as well as the introduction of conferences, with the first conference on national wellness having been held in 2000 and the first conference on positive psychology having been held in 2006 (Coetzee & Viviers, 2007).

With the onus on the enhancement of individual well-being and optimal functioning, performance and individual productivity, it is of no surprise that numerous positive psychology applications have emerged in the workplace (Rhein & McDonald, 2022). One such application is coaching, which is aimed at facilitating goal achievement and enhancing

well-being and positive change at different aspects of the individual's life (Madden et al., 2011). Despite the popularity of positive psychology coaching, Van Zyl et al. (2020) pointed out the ambiguity regarding the positive psychology coaching model and what it should encompass. They proposed an eight-component model that focuses on using goal setting, approaches to facilitating growth, well-being, optimal functioning and actualisation of potential (Van Zyl et al., 2020). A focused individual development approach has indicated numerous organisational and individual benefits, such as an increase of talent retention, employee engagement, self-confidence, life satisfaction and improved performance (Peláez et al., 2020). Rhein and McDonald (2022) pointed out that the focus on individual well-being has begun to stretch even further beyond an organisational level, with certain countries officially prioritising the well-being of their citizens and including it as part of their countries' constitutions (Snyder et al., 2021). From the discussion above, it is clear that positive psychology and the applications thereof have emerged across different levels, from individual to international policy and in many different contexts. Consequently, positive psychology has had a transformative effect on schools, the workplace, and other institutions such as militaries (Weitzman, 2021).

Despite its rise in popularity, numerous criticisms have also risen against positive psychology. Seligman (2019) indicated three major criticisms which he takes seriously and for which he has provided responses. First, positive psychology provides nothing that was not known before. In response, Seligman (2019) quoted numerous articles, pointing out that he did not know these things before positive psychology came along.

Secondly, positive psychology is actually nothing new as the humanistic psychology movement had already described it decades before. For example, Robins (2008) described positive psychology as merely an offshoot from humanism. Seligman (2019) acknowledged that positive psychology retains some humanistic ideas, although, he argued, it uses conventional, rigorous scientific methods. Rhein and McDonald (2022) have provided support for this statement through their research which indicates clear differences between

positive and humanistic psychology pertaining to ontology, epistemology and therapeutic applications.

Thirdly, positive psychology is unnecessary and individual well-being follows when all that is bad has been cured. In response, Seligman (2019) built an argument to illustrate that the absence of bad does not equate to good and arriving at good is a lot more than just eliminating bad. The emphasis of positive psychology on good has, perhaps, led to the criticism that positive psychology adopts a positive-only focus, although, in reality, negatives and positives cannot be separated (Wong & Roy, 2017). Furthermore, Ryff (2022) argued that positive psychology has neglected a category of negative characteristics that may be connected to current societal problems such as greed and indifference.

Another critique of positive psychology is that most positive psychology research stems from participants who are westernised, educated, industrialised, rich and democratic (Henrich et al., 2010). A review of published research by Kim et al. (2019) indicated that although 70% of the articles were from westernised countries, positive psychology research has seen an increase in new regions and countries, with articles stemming from 24 different countries. However, the need for culturally responsive research, along with the development of assessments and interventions that are grounded in the context of the region, was highlighted (Kim et al., 2019). Ryff (2022) supported this by noting that positive psychologists should take societal changes into account, and studies should look at socio-demographic variables such as socio-economic status. Although there is a clear uptake in positive psychology research and applications that stem from different countries, those involved in such applications across diverse cultures should be aware of the ethnic, culture, socio economic, historical and political context of their participants (Hendriks & Graafsma, 2019). Appiah (2022) caution those involved with cross-cultural research and the implementation of positive psychology intervention programs not to blindly implement programs across social contexts without taking into account potential adaptations such as, cultural values of the target population, as well as the needs, capacities and circumstances of the participants.

Taking these aspects into account could potentially enhance the efficacy of the intervention and ensure that the envisaged outcome is achieved.

Criticisms and shortcomings of positive psychology, as highlighted above, have led to Wong and Roy (2017) proposing a more balanced and inclusive approach by integrating the interactions between the negatives and positives to optimise positive outcomes across situations and cultures. This approach incorporates the existence of negatives and acknowledges the potential complementary nature thereof in achieving a positive outcome.

Fortigenesis is rooted under the overarching field of positive psychology and can be viewed as an expansion of salutogenisis. The term salutogenisis was introduced by Antonovsky in 1979. It describes how individuals maintain health and wellness. Antonovsky's (1979) focus was on the study of health instead of disease. Central to salutogenisis is a sense of coherence. Antonovsky described sense of coherence as a way to view the world both cognitively and emotionally, and he associated this with effective coping, health enhancement and better social adjustment (Strümpher & Mionzi, 2001). Strümpher (1995), on the other hand, argued that the onus of Antonovsky's work was centred on the sources of health, although Antonovsky struggled with a more encompassing problem, namely sources of strength in general. Strümpher (1995) stated that Antonovsky pointed to other related origins of strength needed for effectiveness at other end points of human functioning and that this should also be acknowledged. Strümpher (1995) then introduced fortigenesis as a more embracing, more holistic term.

Fortigenesis stems from the Latin word for strong, *fortis*. It refers to a process of developing strengths at a variety of end points other than health only, and includes, for instance, work, marriage and parenthood (Strümpher, 2006b). Fortigenesis focuses on strengths and resources that enable the individual to cope better with the demands of everyday life and stress (Strümpher, 1995). However, fortigenesis does not deny the negative experiences of life; instead, it views it as sometimes being central in the development of strengths (Strümpher, 2005). Although Strümpher (1995) did not provide a

definition of strength, he stated that the metaphor of strength is found in a number of other researched constructs, such as hardiness, potency, stamina, learned resourcefulness, self-efficacy, locus of control, and physical toughness. He further pointed out that a combination of physical strength coupled with psychological processes leads to positive characteristics of better performance, such as emotional stability and stress tolerance, even when engaged in complex tasks.

Strümpher (2006a) highlighted themes that seem to characterise fortigenic thinking, namely subjective well-being, quest for meaning, thriving or flourishing, and interpersonal flourishing. Stemming from this, it is apparent that fortigenesis focuses on the strengths and resources that human beings require to successfully function and cope with the demands of life in numerous roles and situations. It also provides an understanding of why and how some individuals find the strength to withstand and overcome the pressures towards ever-increasing disorder (Strümpher, 1995). Fortigenesis is also relevant in a military context. Strümpher (1995) stated that the same fortigenic processes occur in a military environment as those functioning in a normal work environment, even though there is a greater risk applicable in the military context. He alluded to the beneficial nature of answering fortigenic-related questions that the military environment poses, such as those related to the coping process in which stress and trauma can be used for growth, and how those processes can be facilitated. Strümpher (2006b) described four assumptions that underline fortigenesis:

- The existence of two distinct continua, one related to mental health and the other to mental illness. Ascending or descending on these continua in the process of fortigenesis moves the individual in the direction of increasing or diminishing strength.
- Challenge, exertion, struggling and suffering due to disproportionate demands are integral part of to the human condition.

- There are resources of strength that enable the individual not only to endure but also harness these demands for personal growth. Eventually these strengths can lead to thriving and attainment of greater personal heights.
- The prevalence of purely positive experiences exists and these can bring joyfulness, provide meaning and stimulate growth and flourishing.

The fortigenesis assumptions above were not specific to any context or role, although one can argue that the second and third points could be highly applicable to the military environment. Challenge, suffering and exertion are often part of functioning in the military (Arthur et al., 2015) and resources of strength that eventually lead to thriving and the achievement of greater individual heights are highly beneficial for coping and performance. Thus, the integration of a fortigenic outlook and other positive psychology principles have been integrated and applied in the military environment.

2.3 Positive Military Psychology

According to Nemeth and Wiskoff (1984), military psychology can be considered a microcosm of the entire field of psychology as it integrates almost every subfield of psychology into applications within the military environment. Matthews (2008a) pointed out that the uses of positive psychology are of great value in assisting the majority of military personnel to achieve greater satisfaction, adapt more effectively to challenging situations, and develop a sense of existential meaning. Certain virtues identified by Peterson and Seligman (2004) are also highly valued in the military, for example, courage is essential for every military officer when leading soldiers into dangerous situations (Matthews, 2014). Specifically, Matthews (2008b) discussed unique applications stemming from positive psychology for training and clinical applications as well as in terms of providing assistance to military families. Furthermore, Matthews (2008b, p. 296) suggested numerous other potential applications, such as:

- Developing pre-deployment training to enhance resilience to combat-related stress

- Using a positive psychology approach to facilitate the reintegration of soldiers after deployment
- Examining the interaction between character strengths and cognitive factors to facilitate tactical, operational and strategic decision-making
- Aiding the selection and training approaches of specific combat units
- Assessing the efficacy of positive psychology-based interventions in the treatment of post-traumatic stress disorder (PTSD) and related pathology
- Educating governmental and health care organisations on the potential merit of positive psychology in working with their target group
- Carry out research in order to identify best practices for application to military families
- Investigating the magnitude and nature of post-traumatic growth that may succeed exposure to combat or calamitous situations

Consequently, positive psychology principles have been integrated into selection, training, clinical and social aspects such as assistance of military families (Boe, 2016; Cornum et al., 2011; Matthews, 2008b; Reivich et al., 2011).

The US (United States) Army recognised the potential benefits of positive psychology principles and instituted the Comprehensive Soldier Fitness (CSF) programme with the aim of increasing psychological strength and positive performance and reducing the occurrence of maladaptive responses (Cornum et al., 2011). The CSF programme was rolled out, not as a replacement of their traditional response to treatment of mental illness but in a complementary, proactive effort to empower soldiers with a resilience skillset to be utilised when encountering hardships. The programme embraced four pillars:

1. *Assessment.* A comprehensive assessment tool was developed that focused on the domains of emotional, social, family and spiritual fitness. Initial assessment and reassessment of individuals allows for continuous psychological monitoring of the whole defence force.

2. *Universal Training.* From the stage of initial entry, soldiers receive mental and physical skills training to enhance resilience when faced with challenges, irrespective of their personal or professional roles.

3. *Individual Training.* Coupled with the results from the assessment, individuals are provided with a range of self-development opportunities for improvement in identified domain(s).

4. *Master Resilience Trainers*. These refer to senior, non-commissioned officers who are identified and trained to provide resiliency training within their units. These individuals have direct interaction with unit members and can, therefore, make an impact beyond attending of formal courses.

These pillars employ positive psychology principles in an effort to address the shortcomings of traditional psychology, which focuses on the treatment of pathology but with limited interventions to improve the performance of large numbers of individuals (Cornum et al., 2011). Recently, there has been criticism regarding the efficacy of the CSF programme in dealing with the experience of trauma. Koch (2019) argued that the essence of the programme is to shield against the effects of trauma, but the existence of trauma exposes a theoretical limitation to positive psychology and, consequently, the CSF programme. As the focus of positive psychology is on the positive in situations, trauma and human suffering caused by violent experiences exposes a theoretical limitation. According to Koch (2019), the CSF programme perpetuates problematic ideas of mental illness and is over-reliant on questionable assumptions regarding human development. Finally, Koch (2019) contended that the idea held by positive psychologists that psychological growth follows a linear trajectory is challenged by the very experience of trauma.

Integration of positive psychology principles in the SANDF has been used previously. In their 2008 study, Van Wijk and Waters (2008) incorporated a salutogenic approach as part of annual mental health assessments conducted on submariners. Over the past few

years, there has been an increasing trend in published research in the South African military environment that incorporates aspects of positive psychology. This has focused on topics such as the psychosocial well-being of students (Arendse, 2020), resilience assessment (Van Wijk & Martin, 2019), psychosocial support for military families (Kalamdien, 2016), determinants of success for military students (Dodd et al., 2020), motivational and coping resources in a Special Forces' selection (De Beer & van Heerden, 2014), positive organisational behaviours (Mahlelehlele et al., 2020) and post-traumatic growth pertaining to SANDF personnel (Mashatola & Bester, 2020).

This study expands the integration of positive psychology principles into the SANDF through the investigation of psychological characteristics that are considered to be performance-related strengths from a fortigenic perspective. In accordance with a fortigenic perspective, one would be short-sighted not to acknowledge the contributions from the fields of performance psychology and sport psychology in which numerous functioning and performance-related aspects have been researched. Sport psychology is concerned with understanding the behaviour, mental processes and well-being of individuals who are involved in sport and exercise (Salama-Younes, 2011). A fortigenic perspective is clearly applied in this field with the focal point being sport and exercise roles. Although the sport and performance psychology fields have sometimes been focused on particular environments, it is argued that they still fall under the umbrella of positive psychology (Salama-Younes, 2011). However, It is evident that there is an existing overlap of the sport and military environments and, consequently, also an overlap in the application of sport psychology aspects in the military.

2.4 Overlap of Sport and Military Environments

Numerous competitive sports, especially Olympic sports, originated from elementary military tasks. Basic elements of warfare are demonstrated in a variety of sport disciplines, for example: shooting (pistol, archery, skeet and trap), traversing physical barricades and

obstacles (pole vault, high jump, hurdles, steeplechase), navigation (orienteering, sailing), running (sprint and long distance track items), and physical combat (karate, boxing, wrestling, judo) (Goodwin, 2008) According to Ward et al. (2008), team sports and small-unit combat operations have similar challenges requiring individuals to (1) function and perform in an intricate and changing environment, (2) use a combination of perceptual, cognitive and motor skills, (3) acquire an upper hand over their adversary, (4) act upon incomplete or ambiguous information, (5) effectively function as individuals and as a team, and (6) operate under demanding conditions. Research with high-performing athletes has suggested that these individuals possess a distinctive set of psychological skills that consequently improve their physical performance (Hammermeister et al., 2010). Therefore, aspects of mental training which are common in sport psychology can be useful in a military training environment such as marksmanship training during sniper courses (Krueckel et al., 2020). In the operational high-stress environments in which military personnel are required to function, the mental skills and strategies used to improve athletic performance may also be beneficial for military personnel in order to enhance their performance, specifically the use of imagery and self-talk as coping strategies in demanding situations (Tenenbaum et al., 2008).

Literature clearly indicates an overlap between the environments and that certain sport psychology characteristics and the optimisation of performance have already found application in the military training and operational environment.

2.5 Performance Psychology

A clear description of performance in the context of the current study is essential as the term is broadly used to describe the behaviour of humans, animals, machines and entities such as countries and organisations across different environments and situations.

The psychological perspective on human performance is characterised with regard to the scope of performance psychology, the structure of performance orientation, and the

characteristics of peak performance (Nitsch & Hackfort, 2016). Performance psychology refers to the mental components of superior performance in circumstances and settings where excellence is a principal element (Hays, 2012). Portenga et al. (2017) defined performance psychology as the study and application of performance psychology principles to assist individuals to perform in the uppermost part of their competency level. In order to perform successfully requires the development and mastery of knowledge, skills and expertise, and the competence to deliver consistently at the required time (Aoyagi & Portenga, 2010). Therefore, it is the psychological processes, states and traits that are considered to be fundamentally related to action that leads to performance (Nitsch & Hackfort, 2016). Performance usually entails working towards an accomplishment or outcome, which is measured against a standard of attainment. This leads to an expectation of how the knowledge, skills and abilities are put in place and the execution thereof is evaluated by the performer and others (Portenga et al., 2017). The descriptions above indicate that performance is, therefore, coupled to a standard and the outcome is influenced by certain psychological characteristics linked to ability or capacity of the individual.

These psychological capacities are the drivers of performance and, although performance can be viewed as an outcome, it is the drivers that ultimately influence the level and standard thereof and underlie the outcome. From a fortigenic paradigm perspective, one can view these as the strengths that enable human functioning at a specific end point and level (Strümpher, 2006b). These strengths are the psychological processes that Strümpher (1995) pointed out would lead to positive characteristics of better performance.

Militaries encompass an extensive range of work capacities, roles and functions across different environments and within different contexts, so a myriad of skills are required for a military to function and perform well. Individuals have to display different behaviours and execute different tasks to achieve different outcomes within their appointment. Therefore, to research individual performance in this study, it was approached through an investigation of psychological characteristics that influence potential performance behaviour.

The focus was on the evaluation of the psychological processes, states and traits that are considered to be fundamentally related to action, which leads to performance (Nitsch & Hackfort, 2016). In accordance with the fortogenic perspective, the focus was placed on the strengths that enhance human functioning at a variety of end points (Strümpher, 2006b).

2.6 Performance Psychology in the Military

The US military has attempted to employ psychological characteristics to enhance performance for a number of years. Their Centre for Enhanced Performance, established in 1989, has developed programmes to improve performance in military training (Zinsser et al., 2004). The focus on performance is evident as militaries have increased their efforts to select and train the higher functioning personnel that they envisage (Krueckel et al., 2020). Zinsser et al. (2004) stated that military personnel can maximise their performance by acquiring thinking habits and emotional and physical states along with incorporating relevant training methods that stems from sport psychology.

Benefits are evident, as soldiers who measure higher on psychological skills have been reported to perform better on the US Army Physical Fitness Test than their lower-scoring peers (Hammermeister et al., 2010). The implementation of mental skills-training focused on cognitive training for soldiers completing basic combat training and potential British Army Para recruits has yielded positive results, with significant improvements in individual performance amongst the Para recruits (Adler et al., 2015; Fitzwater et al., 2018). The increased focus on performance has led to characteristics such as hardiness and resilience becoming increasingly important in the process and development of high performance (Krueckel et al., 2020).

2.7 Airborne Military Personnel of the SANDF

Airborne-qualified personnel are often viewed as higher performing and, consequently, are described as elite personnel (Fitzwater et al., 2018). Many airborne units across the world have rigorous selection and training standards. Although criteria are

different across defence forces, airborne units generally share elite attitudinal, cultural and philosophical traits such as tenacity of purpose, finding no mission too daunting, and disdain for those outside the group (Jordaan, 2012). The same applies in the SANDF as, in order to become airborne-qualified, an individual has to pass through a strenuous physical and psychological selection process which is followed by specialised parachute training. In the SANDF, qualified airborne military personnel comprise three different groups. The first group is known as the paratroopers. This group encompasses members from different units and work fields but all have completed the standardised selection and training. Those who successfully pass selection are allowed to take the basic static-line parachute course, which they need to complete successfully.

The pathfinders form the second group. They are individuals who have undergone more specialised and advanced training. Individuals who have completed their basic static-line qualification can nominate themselves for selection to become a pathfinder. Thus, only existing paratroopers can nominate themselves. Candidates who successfully pass pathfinder selection start the pathfinder training cycle which is almost nine months in duration.

The third group, Special Forces operators, receive the most advanced training. Any potential candidate who wishes to attempt the Special Forces selection will nominate themselves and undergo a paper screening, conduct a pre-assessment fitness test, and need to successfully complete a 12-week, pre-selection course. Candidates who successfully complete selection will then start the basic operator training cycle which spans 12 to 15 months. All three groups share a common element – they have all been trained to conduct parachute operations and are deemed airborne-qualified.

2.8. Psychological Characteristics Related to Performance

A myriad of associated and seemingly closely related psychological characteristics aimed at optimising human function have been researched (Arthur et al., 2015). Mental

toughness (Arthur et al., 2015; Fitzwater et al., 2018), psychological hardiness (Bartone et al., 2008; Carston & Gardner, 2009), sense of coherence (De Beer & Van Heerden, 2014), grit (Maddi et al., 2012), locus of control (De Beer & Van Heerden, 2014), and resilience (Bartone, 2006; Fletcher & Sarkar, 2012; Krueckel et al., 2020), amongst others, have been studied in military and civilian samples. As literature indicates numerous characteristics, the following considerations were applied by the researcher in the selection of characteristics for the current study:

- A review of existing sport, military and performance psychology related literature indicated prevalent characteristics that were relevant and imperative in order to enhance performance.
- Potential for application or current application in the military environment.
- Although the characteristic displayed promise for research and application in the military context, there was a lack of existing research. The incorporation thereof in the current study could provide novel insight and application.
- In order to achieve a comprehensive investigation, and the development of a comprehensive model, characteristics from different psychological domains must be selected.

Selected psychological characteristics related to performance, which are assessed in the current study, are discussed in the following chapter.

2.9 Conclusion

This chapter has provided an overview of the theoretical departure point from which the research was conducted. It illustrated how positive psychology has already been integrated into numerous military applications and highlighted the benefits of applied sport and performance psychology principles in the military and in diverse military cohorts.

Chapter 3 will provide a comprehensive literature review of performance-related psychology characteristics in the fields of sport and performance psychology.

Chapter 3: Literature Review

3.1 Introduction

Military personnel are faced with a myriad of challenges in today's dynamic military space and the performance-enhancing effect of specific psychology characteristics has found application in the military environment. Numerous dispositional traits, motivational states and performance strategies, all relevant to performance, have been identified in the literature. This chapter provides an overview of some of those psychological characteristics and illustrates the rationale for their inclusion in the study.

3.2 Mental Toughness

3.2.1 Definition and Attributes

Mental toughness has been a subject under discussion in the performance and sport psychology arenas for a while now, yet it seems that there is still a lack of consensus pertaining to the components, understanding, and accurate measurement of mental toughness. Mental toughness has even been described as one of the most popular phrases in sport psychology, although it is the least understood (Jones et al., 2007).The most accepted and agreed upon definition emanates from studies conducted by Jones et al. (2002) which are derived from interviews with international-level athletes. These researchers regard mental toughness as an essential psychological attribute in achieving performance excellence. Their definition places the onus on the athlete having a psychological edge that enables better coping and enhanced performance under high pressure situations. They highlighted the athlete's ability to be more consistent and superior than their opponents in remaining determined, focused, confident and in control under pressure. Through their research, Jones et al. (2002) identified 12 attributes that were deemed important for the ideal mentally tough performer. The top ranked attribute emphasised the individual's unwavering self-belief in their own ability to achieve established competition goals. Secondly, was the

ability to rebound from performance set-backs due to increased willpower to succeed. Thirdly, the individuals' unshakable self-belief that they possess unique qualities and abilities that makes them superior to other competitors. Fourthly, the ability to remain focused on the task at hand despite of competition distractions (Jones et al., 2002). The other eight attributes highlight individual resources and ability to cope and maintain performance in order to succeed amidst demanding competition, training and personal circumstances.

Bull et al. (2005) expanded on these attributes and conducted a study of mental toughness in elite cricketers in which they aimed to identify how cricketers develop their mental toughness. Examination and comparison of the global themes identified in their study overlap with Jones et al.'s (2002) attributes of mental toughness. Furthermore, findings from their study displayed clear similarities, specifically those applicable to self-belief and/or self-confidence, desire and motivation to succeed, dealing with pressure and anxiety, and an ability to remain focused (performance- and lifestyle-related). Fourie and Potgieter (2001) described an individual as being mentally tough when they had the acquired skills in thinking, believing and visualisation that enabled them to effortlessly access empowering emotions during competition. However, their description discounted the link with performance, thereby placing the onus on the individual's internal resource state.

Jones et al. (2007) validated their definition of mental toughness in a 2007 study with participating Olympic or world champion athletes, coaches and sport psychologists. The researchers identified 30 essential attributes and clustered them into four dimensions to provide an overall framework of mental toughness. The framework contained a general dimension (attitude–mindset) and three time-specific dimensions (training, competition and post-competition). These were further broken down into subcomponents with specific areas that could be focused on to enhance mental toughness.

A review of the literature shows that researchers generally agree that mental toughness is a multidimensional construct comprising values, attitudes, emotions and cognitions which enable people to successfully pursue their goals and perform consistently

well, regardless of obstacles or adversity (Bull et al., 2005; Hardy et al., 2014; Jones et al., 2002). Recently, Gucciardi et al. (2015) proposed a definition of mental toughness as a one-dimensional characteristic that is an aggregation of several personal resources. They derived this conceptualisation from their findings which showed a considerable amount of overlap in dimensions that assists individuals to deliver consistent objective and subjective performance regardless of situational demands. Their perspective emphasises the role of different situations and the effect on performance. This raises the question of the stability of mental toughness as a trait due to the display of certain state-like properties.

Military action requires individuals to perform under extreme pressure in highly demanding settings that are characterised by fear, fatigue, and anxiety that is largely attributable to the perception of risk to one's life (Arthur et al., 2015). Arthur et al. (2015) identified the importance that mental toughness plays in performance and the applicability thereof pertaining to the military environment. Based on their research, they developed and validated the Military Training Mental Toughness Inventory which measures the degree to which the individual is able to maintain a high level of personal performance under six different conditions. In a military context, the ability to maintain goal focus and high levels of performance in the face of different stressors can lead to mission success or failure with the direct implication of lives being saved or lost. Therefore, one can deduce that the development of mental toughness in military personnel can yield significant positive operational benefits.

Based on the reviewed literature, it can be concluded that mental toughness displays certain state- and trait-like properties. As with personality, mental toughness reflects trait-like qualities that will manifest strongly in certain situations and environments, so an individual may have a naturally higher degree of mental toughness. However, a number of other intra-individual and situation-specific factors may influence the overall impact on a performance outcome. Therefore, one can argue that mental toughness has state-like properties.

3.2.2 Development of Mental Toughness

As seen from the literature reviewed above, there appears to be conflicting opinions regarding mental toughness as a stable trait. Some regard mental toughness as a relatively stable coping related construct that is unlikely to change quickly over time (Hardy et al., 2014). Gucciardi et al. (2015) emphasised the role of different situations and its effect on performance, which also raises the question of the stability of mental toughness as a trait because it appears to fluctuate across different situations. Jones et al. (2007) found that athletes' responses alluded to a development and fluctuation of mental toughness during their careers. Researchers thus espouse a difference of opinion regarding the stability of mental toughness.

Support for the view of mental toughness as a dynamic, state-like psychological characteristic and the overall influence on performance has been well documented in a study with elite young cricketers. The results provided support for the effectiveness of the mental toughness intervention designed to improve performance under pressure in elite young cricketers (Bell et al., 2013). The researchers stated that, to their knowledge, theirs was the first study on mental toughness intervention to show significant and meaningful effects that could be differentiated from the effects of general psychological skills training. The principal feature of the intervention was repeated exposure to punishment-conditioned stimuli in the training environment. This relates very closely to a military training environment where individuals are exposed to numerous consequences when they are out of line with expected standards during training. Most of these consequences take the form of a physical exercise, which clearly indicates that the use of physical activities is a significant factor for improving overall mental toughness levels and the regulation of other aspects such as thought control, motivation and emotion regulation (Bahari et al., 2016).

3.2.3 Mental Toughness and Performance

The concept of mental toughness and its impact on performance has been highlighted by different authors (Gucciardi et al., 2015; Jones et al., 2002). As indicated below, studies investigating this relationship have been conducted across a broad spectrum of environments and sports. Newland et al. (2013) found that performance increased for male basketball players as mental toughness increased. Jones and Parker (2017) indicated a small- to moderate-sized negative relationship between mental toughness and standardised personal best times amongst triathletes, while controlling for gender differences and the number of triathlons completed. A mental toughness training intervention implemented with a group of professional football players compared to a control group of players in the same team yielded results indicating an increase in optimism and a positive impact on performance over the following season (Steinfort, 2015). Research investigating the link between mental toughness and how survivors of a high-altitude mountaineering disaster coped indicated that those perceived with lower mental toughness remained in a state of shock longer, were incapable to contribute to initial relief efforts, and required support and assistance from others (Swann et al., 2016). It appears, therefore, that mental toughness can be developed and may potentially yield increased performance across different sport disciplines and conditions.

Although there has been research on the association between performance and mental toughness, equivocal findings suggest a complex relationship. Several factors and contexts impact on performance, thus, including a standardised, objective measure of performance would be ideal (Newland et al., 2013). A thorough understanding of the positioning of mental toughness, among other psychological characteristics, and its relationship with optimal human functioning can be highly beneficial (Mahoney et al., 2013).

3.2.4 Mental Toughness and Other Related Concepts

The relationship between mental toughness and other performance- and well-being-related aspects have also been investigated. Outside the sport environment, findings have supported the conceptualisation of mental toughness as a positive psychological characteristic that has significant and positive associations with psychological well-being (Stamp et al., 2015).

Individuals with a high anxiety trait have been reported to have lower mental toughness (Hossein et al., 2016) whereas high behavioural regulation resulted in higher reported mental toughness amongst university student athletes (Bahari et al., 2016). The latter is especially important as behavioural regulation originates from motivation, which is seen as a driver of underlying performance. Mahoney et al. (2014) found mental toughness to be significantly positively correlated with positive affect and inversely correlated with negative affect in the race times of cross-country runners. The researchers also reported that mental toughness was directly related to psychological needs being satisfied, resulting in a higher degree of performance. Mental toughness has also been shown to have a positive correlation with resilience and a negative correlation with stress amongst competitive South African tennis players (Cowden et al., 2016). It is thus evident in the literature that mental toughness is interrelated with other psychological drivers of performance.

3.2.5 Measurement of Mental Toughness

The importance of mental toughness and its influence on performance has been highlighted in the military and in an array of different sports. The link between mental toughness and other characteristics has also been pointed out. Therefore, the accurate and psychometrically sound measurement thereof is imperative as it paves the way to providing a benchmark from which military personnel and athletes can be empowered to help face and overcome challenges that inhibit optimal performance (Madrigal et al., 2013).

A multitude of measurements have been developed over the past few years. The number and differences in instruments indicate the lack of consensus regarding the components and conceptualisation of mental toughness (Madrigal et al., 2013; Newland et al., 2013).

As mentioned, a multitude of measurements have been developed. Some of the better known instruments are the Mental Toughness Questionnaire (MTQ48) (Clough et al., 2002); the Australian football Mental Toughness Inventory (Gucciardi et al., 2009); the Cricket Mental Toughness Inventory (Gucciardi & Gordon, 2009); the Mental Toughness Scale (Madrigal et al., 2013); the Military Mental Toughness Inventory (MMTI) (Arthur et al., 2015); the Psychological Performance Inventory–Alternative (PPI-A) (Golby et al., 2007); the Mental Toughness Index (Gucciardi et al., 2015) and the SMTQ (Sheard et al., 2009).

Some instruments focus on assessing multiple components which load on a higher-order mental toughness score (PPI-A, SMTQ, MTQ48). Although there are differing components, the assessments do have some overlap and resulting higher-order mental toughness score correlations do exist, such as with the SMTQ and MTQ48 (Crust & Swann, 2011). A closer investigation of the components of these tests confirms the ambiguity regarding the composition of mental toughness as some of the overlapping components appear quite stable, such as confidence and self-belief (PPI-A, SMTQ, MTQ48), whilst others represent the use of a skill such as visualisation (PPI-A).

Instruments such as the Mental Toughness Index and Mental Toughness Scale measure mental toughness as a one-dimensional construct while others such as the MMTI focus on performance as the outcome, where the ability to maintain high performance under an array of stressful circumstances is assumed to be reflective of mental toughness. The MMTI is also unique in that it is not a self-report instrument but is designed to be completed by assessors or peers rating an individual's performance under various conditions.

The Australian football Mental Toughness Inventory and Cricket Mental Toughness Inventory offer sport-specific mental toughness measurements. These instruments were

developed to fit the context and, therefore, the questions are also contextually relevant. The array of instruments provides the researcher with many alternatives that would suit the specific research purpose and context.

3.3 Grit

3.3.1 Definition and Attributes

In its simplest terms, grit, can be described as a pursuit of long-term goals with sustained effort, perseverance and passion (Von Cullin et al., 2014). Therefore grit is more in line with how consistently an individual work in a direction towards long-term goal attainment and not about intensity of the input over a short span of time. According to this description, grit does not relate to short bursts of effort or an increase in performance, but consistency of effort over a span of time, thus potentially being an essential characteristic required to persevere and function in the military environment. The successful completion of specific military training courses and qualifications entails an extensive duration of sustained effort to be implemented even before selection has taken place. As the physical preparation required to succeed is gruelling, a degree of long-term, goal-directed focus needs to be exercised.

The concept of grit was originally coined by Duckworth et al. (2007), however, other researchers have also investigated the concept as part of their studies in sport and military contexts. Duckworth et al. (2007) suggested that grit may be as essential as IQ to high achievement; in particular, grit is emphasised as being more important for success than self-control or conscientiousness. Across several studies, individual differences in grit accounted for significant incremental variance in success outcomes over and beyond that explained by IQ, to which it was not positively related. Amongst students of the US Military Academy West Point, Duckworth et al. (2007) found grit to be a better predictor of retention than either self-control or a summary measure of cadet quality using the “whole candidate score”, which is based on past academic performance, leadership potential and physical ability and is used by the West Point admissions committee. Their study provided significant results on the

importance of non-cognitive aspects underlying success and how talent does not necessarily equate to it. Duckworth and Quinn (2009) confirmed these findings when they used the Grit-S with West Point cadets, with results indicating that those who scored a standard deviation higher than the average were 99% more likely to complete summer training. Locally, Mason (2018) investigated grit in a group of first-year university students and also found it positively associated with academic performance.

Maddi et al. (2012) also assessed West Point candidates but included hardiness as part of their study along with grit and the whole candidate score. Regression analysis showed that whole candidate score, hardiness and grit were each positive factors in retention. Grit had a greater effect on the results than the other two variables thus confirming the relationship between retention and grit as found in previous studies (Duckworth & Quin, 2009; Duckworth et al., 2007). Candidates who reported high levels of hardiness also reported high levels of grit, thus indicating a significant interaction between the two psychological characteristics. Although seemingly related, the impact that both hardiness and grit showed on retention seemed to differ with grit being related to retention and hardiness being related to candidates' first-year performance (Maddi et al., 2012). Furthermore, grit and psychological hardiness were identified as non-cognitive predictors of performance and military success in officer candidates (Kelly et al., 2014).

Duckworth and Gross (2014) argued that self-control, which is related to grit, is also an essential element in achieving success. Interestingly, although related, these characteristics are, in fact, distinct in that both self-control and grit entail aligning actions with intentions. However, they function in different ways pertaining to time. Grit involves the pursuit of a dominant higher-order goal, which may take years to achieve, whereas self-control relates more to the resolution of conflict between goals that are relevant in the moment. However, the association lies in the pursuit of these lower-order goals and how they give rise to effective actions that leads to progress and the attainment of the

overarching higher-order goal. Therefore, both aspects can be seen as necessary to achieve a successful outcome.

3.3.2 Development of Grit and Performance Connection

The development of grit through training still remains unclear. Steinfort (2015) attempted to increase the level of grit and optimism of professional football players through training. The results showed that the training elevated the level of optimism but not grit; however, the training improved performance over the following season.

Duckworth and Eskreis-Winkler (2013) stated that in their cross-sectional analysis, grit increased monotonically throughout adulthood and tentative links have been made between grit and a growth mindset, that is, a mindset that intelligence is malleable rather than fixed. Investigations into the relationship between grit and an optimistic explanatory thinking style has also showed an association, as novice teachers who were more optimistic rated themselves higher in grit and life satisfaction and subsequently also had higher assessed teacher effectiveness. The link with both growth mindset and optimistic thinking style does provide some potential avenues to explore in order to enhance performance and develop grit, however, as Steinfort (2015) found, the effects of a training intervention may not be the development of grit but rather accompanying factors.

Steinfort (2015) pointed out that researchers (Duckworth et al., 2007) have found that it was not the simple presence of grit that improved performance and subsequent achievements, but rather what grit made people do. Individuals who displayed higher levels of grit were more likely to do the toughest, least enjoyable activities during practice as result of the elevated passion for their work. This determination displayed during training is what could account for the high performance levels displayed.

Of specific relevance to the current study are the results of research done with soldiers who attempted an Army Special Operations Forces (ARSOF) selection course in the US (Eskreis-Winkler et al., 2014). The researchers examined the extent to which grit

predicted completion of an arduous, twenty-four-day, ARSOF selection course. Candidates were expected to complete time-limited land navigation courses carrying heavy loads of equipment, essentially the same tasks that form part of the SANDF paratrooper, pathfinder and Special Forces selections. Grit was assessed with the eight-item Grit-S (Duckworth & Quinn, 2009). Logistic regression analysis indicated that grit, general intelligence and physical fitness predicted candidate retention, however, the effect of grit on retention held when controlling for general intelligence and physical fitness, and subsequently candidates with higher grit had a better chance of successfully completing the selection.

Duckworth and Eskreis-Winkler (2013) pointed out that it is debatable whether more grit is always better, as there may be some cost to being gritty that must be traded off against its benefits. In certain contexts, individuals with high grit may be less open to information that opposes their existing beliefs and pursuits, or they may be handicapped by judgement and decision-making biases. A grittier individual may fail to seize new opportunities because they are fixated on their original goal. In the long run, the cost at which the achievement of the dominant goal may come can potentially outweigh the benefits of attainment, which suggests that associations between psychological characteristics and performance outcomes may not always reflect a linear relationship.

3.3.3 Measurement of Grit

Duckworth et al. (2007) developed the Grit Scale, which is a twelve-item questionnaire, measuring higher-order grit along with two sub-factors, namely consistency of interest and perseverance of effort. Duckworth and Quin (2009) refined the instrument and developed the Short Grit Scale (Grit-S) which retains the two-factor structure of the original Grit Scale but retained only eight items. It yielded improved psychometric properties over its predecessor. Therefore, the developers suggested the Grit-S as an economical measure of perseverance and passion for long-term goals.

3.4 Psychological Hardiness

3.4.1 Definition and Attributes

Hardiness is a personality style that has emerged as a composite of interrelated attitudes of commitment, control and challenge that are associated with resilience and high performance under a variety of stressful circumstances in both the civilian and military environment (Hystad et al., 2011; Maddi et al., 2009). In other words, hardiness can be viewed as a pattern of attitudes and skills that provide the courage, motivation and strategies to turn adverse circumstances from potential calamities into growth opportunities (Lo Bue et al., 2016; Maddi, 2007).

Hardiness emerged as the basis for resilience in a twelve-year experiment conducted between 1975 and 1987 at Illinois Bell Telephone (Maddi & Kobasa, 1984). Company employees who not only adapted to but also thrived in the midst of challenging and stressful times for the organisation were characterised as having the hardy attitudes of commitment, control and challenge. A possible explanation is the displayed association of hardiness with adaptive coping mechanisms and lower levels of distress, thus indicating a protective buffer against environmental stressors (Thomassen et al., 2022).

According to Bartone et al. (2012) and Maddi (2007), individuals who are high in commitment believe that in any circumstances, it is best to stay involved with the people and events occurring around them because that is the meaningful thing to do, thus displaying an attitude of abiding conviction that life is interesting and worth living. Potard et al. (2018) described commitment as remaining involved in experiences and being proactive rather than feeling alienated, no matter how bad things get. Individuals with a high level of control believe that it is always best to endure in an attempt to influence outcomes, thus having a belief that one can control or influence outcomes which enables the individual to make appropriate decisions amidst stressful circumstances (Bartone et al., 2012; Maddi, 2007; Potard et al., 2018). High-in-control individuals generally feel it is a waste of time and

capacity to surrender unto passivity and powerlessness, even in difficult circumstances, while high-in-challenge individuals believe that change is part of the status quo and provides an opportunity to learn from the resulting experiences (positive or negative). They feel it is naïve to wish for easy comfort and security. High-in-challenge individuals have an adventurous and exploring approach to living (Bartone et al., 2012; Maddi, 2007). People who are generally high in hardiness perceive the world as interesting and meaningful and they actively engage in events around them. They believe they can control and influence the course of events and, therefore, have a general self-belief in their own abilities. They are internally motivated and novel experiences and challenges are perceived as growth opportunities rather than stumbling blocks (Hystad et al., 2011).

3.4.2 Hardiness in the Military

Psychological hardiness is definitely a noteworthy characteristic associated with stress tolerance and effective performance in challenging and demanding occupations and can, therefore, be seen as especially relevant to military personnel working under stressful conditions (Krueckel et al., 2020; Maddi, 2007). Hystad et al. (2011) has deemed the personality style of hardiness to be distinctly relevant for training and selection applications in the military. They stated that effective coping and optimal functioning under stressful military circumstances is essential especially when lives are at stake, hardy individuals are more effective in stressful situations due to their active coping (Delahaij et al., 2010). Studies have shown hardiness as being negatively related to repressive (Maddi et al., 2006) and regressive (denial and avoidance) coping, but positively related to transformational (problem-solving) coping (Maddi & Hightower, 1999). These results affirm the theory that hardiness enhances coping in stressful circumstances.

Apart from assisting in coping, hardiness might act as a buffer and provide a protective element to the individual. Bartone (1999) studied military personnel in arduous circumstances in combat and peacekeeping missions. They found clear evidence that the

higher the hardy attitudes were before the personnel left on missions, the lower the probability that life-threatening stresses in military engagements abroad would lead to the occurrence of post-traumatic stress or affective disorders. These findings were supported amongst French police officers, with hardiness indicating a protective effect against PTSD symptoms (Potard et al., 2018). Findings from research conducted by Thomassen et al. (2018) suggest that the protective effect that hardiness provides stems from the reduction in the individual's use of avoidance coping styles. The findings above emphasise the stress tolerance that hardiness engenders in an individual.

Amongst soldiers in New Zealand, hardiness was not found to be associated with the building of adaptive coping strategies and did not mediate a positive pathway to stress (Carston & Gardner, 2009). Although, hardiness was found to mediate the negative pathway to stress, thus serving as a potential protective element. Furthermore, hardiness was found to be positively correlated with challenge appraisal and negatively correlated with threat appraisal, further supporting findings in the literature that hardy individuals are more likely to view challenging situations as potential growth opportunities rather than stumbling blocks (Carston & Gardner, 2009).

In a study conducted with a large cohort of US Army Special Forces candidates, where candidates had completed the DRS-15 (Bartone, 1995), it was found that successful graduates were significantly higher in psychological hardiness when compared with non-graduates (Bartone et al., 2008). The results also indicated that for each one-point increase in hardiness scores, the probability of graduating rose by approximately 3.3%. These findings confirm the importance of hardiness and successful performance in highly demanding occupations such as Special Forces.

Hardiness has also proved to be predictor not only of retention but also of physical performance among military trainees. Male trainees who enrolled in a 22-week basic training course to become soldiers in the Dutch Army were assessed at the beginning of their training. After they had been exposed to stressful self-defence exercises two months later,

the results showed that the highest achievers were also the highest in hardiness (Lo Bue et al., 2016). This supports the hypothesis that the hardier individuals are, the more likely they are to outperform their less hardy peers. Hardiness is, therefore, a relevant psychological characteristic associated with enhanced performance. Lo Bue et al. (2016) argued that because of the weighty physical and psychological challenges of the basic training, a new military trainee could experience it as a threat to their well-being and exhibit lower performance. The positive primary appraisal and active coping associated with hardiness may buffer that distress and explain why hardy candidates outperform those who are less hardy.

The performance-enhancing effects of hardiness appear to extend further than physical aspects. Maddi et al. (2012) assessed West Point candidates and investigated the predictive relationship between hardiness, grit, whole candidate score (based on past academic performance, leadership potential and physical ability) and the cadet performance score at the end of the first year of military training. Hardiness scores were uniquely predictive of or associated with performance scores at the end of their first year, beyond that of the whole candidate score. Hystad et al. (2011) conducted a similar study in Norway to determine if hardiness in applicants was a significant predictor of the success of their admission of Norwegian military officer schools. The researchers found that successful applicants scored significantly higher in hardiness than unsuccessful applicants, and hardiness significantly predicted admission into Norwegian military officer schools.

The ability to adjust and adapt quickly to rapidly evolving conditions is increasingly important in various occupations, particularly the military. Studies pertaining to the adaptability and hardiness amongst West Point first-year candidates showed that hardiness (commitment and control) was a predictor of leadership adaptability in officers measured seven years later (Bartone et al., 2013). This is in line with Bartone's (2006) evidence supporting the hypothesis that hardy leaders can generate increasingly hardy and positive shared interpretations of experience, thus enhancing resilience for those most vulnerable to

stress. In a military context, subordinates often consider leaders as their source of direction and support in life-threatening and highly demanding military training and operational situations.

Although hardiness is applicable and thoroughly researched in military samples, it has also been investigated in the sporting domain. A study with Iranian athletes showed that there is a positive correlation between hardiness and its components in terms of sport achievement and psychological well-being (Ramzi & Besharat, 2010). A study investigating the change of measured hardiness and high-intensity interval training (HIIT) indicated no changes across time or group differences for total hardiness or any of the three subscales. It appears that HIIT did not influence the hardiness levels of the participants. One of the potential reasons is that although HIIT is perceived as physically demanding and less pleasurable, it does not provide the psychological stress deemed necessary for the development of hardiness (Vezanni, 2015).

3.4.3 Development of Hardiness

Although an on-going debate exists regarding the extent to which hardiness can be taught, it seems undisputed that it can be trained (Krueckel et al., 2020). The results from the initial experiment at Illinois Bell Telephone alluded to hardiness being developed rather than inborn. Those individuals who thrived under the stressful circumstances described their early childhood as stressful and challenging. Albeit challenging their parents were supportive and encouraged their efforts to grow (Khoshaba & Maddi, 1999). With this support and encouragement, even under difficult circumstances, they developed and thrived and a “hardy” personality was fostered.

According to Maddi et al. (1998), training to develop hardiness with working adults yielded increased job satisfaction, constructive involvement with fellow employees, and even positive physiological changes. More recently, Dorodnov et al. (2021) investigated the development of hardiness through the incorporation of modern technologies. The

researchers found an essential part of hardiness development is the interpretation and meaning attached to a stressful or demanding situation. Their findings indicated that through relevant case studies and the utilisation of modern technologies, such as computer games, virtual and augmented reality glasses and helmets, hardiness can be developed. Their research also emphasised the role that leaders play in the development of hardiness amongst subordinates, thus providing confirmation of the potential for leaders to effectively increase hardiness and consequently providing resilience for a group in the face of adversity (Bartone, 2006).

The applicability of developing hardiness through training in the military context has translational implications for selection and intervention for military personnel working in stressful and challenging contexts.

3.4.4 Measurement of Hardiness

The majority of hardiness instruments that have been developed and revised over the years overlap in terms of the dimensions assessed. Some of the instruments used most often are the Dispositional Resilience Scale-15 (DRS-15) (Bartone, 1995); Cognitive Hardiness Scale (Nowack, 1990); Dispositional Resilience Scale-II (DRS-II) (Sinclair et al., 2003) and Personal Views Survey-IV (Maddi et al., 2009).

The DRS-15 and Personal Views Survey-IV both provide scores for the sub-dimensions of hardiness, namely control, commitment, challenge, and an overall hardiness score. The DRS-II not only provides scores for the sub-dimensions of control, commitment and challenge but includes powerlessness, alienation and rigidity. The Cognitive Hardiness Scale, however, only provides an overall hardiness score without any breakdown of the subcomponents.

All the instruments mentioned above have been applied in a military environment (Bartone et al., 2008; Carston & Gardner, 2009; Delahaij et al., 2010; Lo Bue et al., 2016; Maddi et al., 2012).

3.5 Resilience

3.5.1 Definition and Attributes

Resilience has often been described and defined in terms of the ability to bounce back or thrive and to withstand the effects of pressure (Connor & Davidson, 2003) and, although there is some debate regarding the term, most definitions have two aspects in common, positive adaptation and adversity (Fletcher & Sarkar, 2013). Resilience is the ability to maintain normal psychological and physiological functioning in the presence of high stress and trauma (Wu et al., 2013). Combat readiness of a soldier pertains not only to an absence of ill-health symptoms but to a state of well-being and an overall resilient state that enables the soldier to handle challenging and changing situations.

The concept of psychological resilience has been extensively investigated in sports and military environments. Fletcher and Sarkar (2012) adopted a grounded theory approach to investigate the phenomenon in 12 Olympic athletes. The results indicated that numerous psychological factors relating to a positive personality, motivation, confidence, focus, and perceived social support seemed to protect the Olympic athletes from the potential detrimental effect of stressors by influencing their challenge appraisal and metacognitions. The researchers concluded that these processes promoted facilitative responses that preceded optimal sport performance. Fletcher and Sarkar (2013) also conducted a review of the literature on resilience and emphasised that resilience is made up of several factors that enhance personal assets and shield individuals from the negative appraisal of stressors. Evidently resilience influences the stress and response process at various stages, the first being at the appraisal of stressors followed by the response to felt emotions and the selection of coping strategies. Wu et al. (2013) have a similar stance on resilience, stating that resilience is the individual's ability to maintain normal psychological and physiological functioning in the presence of high stress and trauma. A more resilient individual will,

therefore, have a higher level of protection against the potential negative effect of stressors, thus dealing better with adversity and recovering after a setback.

The description of resilience provided by Wu et al. (2013) not only emphasises psychological functioning but also the physiological functioning of the individual. Furthermore, the researchers indicated that genetics, epigenetics and neurochemical aspects play a role in the development of individual resilience beyond just the psychological aspects.

Rossouw (2015) argued that very few research studies have been conducted that focus on the biological markers of resilience – especially in the domain of the neural basis of emotional styles and resilience. Rossouw (2015) pointed out that the role and development of the amygdala is a key component in the development of resilience. Mindful control of anxiety is moderated by the strength of the connection between the prefrontal cortex and the amygdala (Nindl et al., 2018). Furthermore, trait anxiety is lower in individuals with a thicker fibre tract connection to the frontal cortex, the centre of psychological resilience (Kim & Whalen, 2009).

Nindl et al. (2108) highlighted five domains of resilience that can be targeted to enhance the individual functioning of soldiers, namely biology, body and mind, thermal, physical training, and gender differences. Stemming from the discussions above, it is clear that individual resilience is multifaceted and stretches beyond the psychology of the individual.

3.5.3 Resilience in the Military

For military personnel to be able to cope with the strenuous demands of modern military operations and other facets of a military career, the importance of psychological resilience cannot be overstated and should be developed to enable military personnel to overcome challenges beyond those related to combat (Bartone, 2006; Kamphuis et al., 2012). The increase in non-traditional military tasks regularly performed by an army's

soldiers has further underlined the risky, challenging, dangerous, complex and adverse environments that soldiers are exposed to in modern times (Gilmore, 2016). The threat to one's life and those around you evokes extreme stress and tests the resilience of any individual. Stress coping may be influenced by intrinsic resilience (Charney, 2003) prior to traumatic events (Brewin et al., 2000) or PTSD (Rubin et al., 2008).

The Canadian Armed Forces' definition of resilience places the onus to be resilient on the capacity of a soldier to recover, resist and potentially thrive amidst direct and/or indirect traumatic events and adverse situations in unit, training and operational environments (Hellewell & Cernak, 2018). The Australian Defence Force has a similar definition which emphasises the capacity of individuals, teams and the organisation to adapt, recover and thrive in circumstances characterised as dangerous, challenging, complex and hostile (Gilmore, 2016). Although similar to the Canadian Armed Forces' definition, the Australian Defence Force's definition includes teams and the organisation, thus taking a wider system perspective of resilience. The Australian Defence Force's definition thus links with the social support element that Fletcher and Sarkar (2013) described regarding elite athletes. Similarly Kamphuis et al. (2012) found that Dutch soldiers expressed feelings of connectedness on deployment that was related to resilience.

It is apparent that resilience encompasses a number of factors. This was also proposed by Kamphuis et al. (2012) when he identified a model that included 25 factors comprising five levels (Kamphuis et al., 2012). The five levels of the model are individual, home front, organisation, leadership and team. On an individual level, the following characteristics have been highlighted: self-efficacy, optimism, coping flexibility, pride, emotional stability, social skills, self-reflection and social skills. This model of resilience therefore emphasises the broader environmental support influences on individual resilience.

Although the demanding nature and adverse psychological effects of deployment cannot be ignored, there is a positive resilience-promoting aspect to deployment. Amongst Dutch soldiers, 54% reported that they felt better able to cope with difficulties, 52% reported

that they felt their lives had more value and 42% reported that they felt more connected to other people while on deployment (Kamphuis et al., 2012). The positive results reported, and specifically the increase in confidence to handle difficulties, provide some indication as to how resilience develops in the face of difficult circumstances. At the level of the individual, resilience might be a role player in the perceived effects and potential growth experienced by the individual as part of the deployment experience. Unfortunately, not all individuals experience positive effects and some struggle to cope afterwards with aggression, sleep disorders, alcohol- and/or drug-related abuse, chronic pain, suicidal behaviour and PTSD (Kamphuis et al. 2012, Larson et al., 2012).

Biomarkers have recently been discovered as a potential avenue to evaluate resilience amongst military personnel. In a study of Canadian Armed Forces personnel (Hellewell & Cernak, 2018), saliva biomarkers, along with other psychometrics, were used to evaluate resilience. The study indicated that a panel of saliva stress biomarkers could be a suitable tool in order to determine the risk of stress maladaptation, which could effectuate psychological and cognitive decline. The results indicated that those individuals in the category with most abnormalities at the onset of the research later showed a decrease in cognitive performance under pressure, that is, a deterioration of mental health during deployment and further indications of potential personal well-being that worsened upon return. As part of the study, the participants completed the Connor-Davidson Resilience Scale (CD-RISC), and on-deployment results indicated that individuals grouped in the low abnormalities category maintained their resilience as reported at pre-deployment. The participants assigned to the moderate and high levels of abnormal biomarker categories increased their self-perceived resilience. This alludes to the potential beneficial impact on resilience, as a result of a stressful environment that demands a heightened level of cognitive flexibility and social cohesion. On their return from deployment, the results indicated that in the moderate-abnormal biomarker category, soldiers retained a similar resilience level to that reported during deployment, whereas individuals grouped in the high-

and low-abnormal biomarker categories showed a decrease in resilience. These results suggested potential elevated anxiety related to reintegration along with a loss of sense of purpose and loss of close social support from fellow soldiers.

It has been argued that resilience plays a decisive role in achieving victory as a lack of resilience has been found to contribute to poor military results and performance (Gilmore, 2016). As airborne-qualified personnel are sometimes heading up the battle, a high level of resilience in them is of crucial importance to maintain a healthy and optimal functioning force. The importance of resilience pertains not only to the airborne fraternity but other specialisation fields have also seen its value. Van Wijk & Martin (2019) pointed out that specific operational environments faced by naval personnel can add additional layers of stressful circumstances for the individual and, therefore, enhanced resilience has been highlighted as particularly beneficial for naval personnel in tolerating demands associated with work and life in general. Van Wijk and Martin (2019) further highlighted the practical operational benefit of a resilience measurement in that individuals can be screened and combat readiness can be assessed prior to deployment. This would also pave the way for a basis on which resilience interventions can be instituted by the applicable military mental health practitioners for those individuals who appear to be experiencing fitness challenges in their respective domain(s).

3.5.4 Measurement of Resilience

Although it has been argued that resilience measures should take three components into account, namely adversity, positive adaptations and protective factors, most measurements have only focused on assessing the protective factors that an individual may have (Fletcher & Sarkar, 2013).

Numerous resilience measures have been developed over the years, including the CD-RISC (Connor & Davidson, 2003); Resilience Scale (Wagnild & Young, 1993); Predictive 6-Factor Resilience Scale (PR6) (Rossouw & Rossouw, 2016), and BSRS (Van Wijk &

Martin, 2019), which is an adapted form of the Comprehensive Airman Fitness instrument developed by Bowen et al. (2016).

Most assessments revolve around the protective factors of an individual (Fletcher & Sarkar, 2013), therefore the domains that are focused on overlap across most assessments. This is evident as all the instruments listed above evaluate a psychosocial domain of resilience, although the scales are worded differently for each instrument. On the PR-6, it is called collaboration; on the BSRS, it is called social fitness; on the CD-RISC, it is referred to as secure relationships; and on the Resilience Scale it is called existential aloneness. Most instruments generally include scales pertaining to a protective type of mental resource that the individual has, such as the ability to persevere or bounce back, and a spiritual aspect of resilience.

However, only the PR-6 and BSRS have a scale that evaluates a health domain. The BSRS refers to it as physical fitness and places the onus on the ability to adopt healthy behaviours to enhance and sustain performance (Van Wijk & Martin, 2019). In the military, the physical fitness required to function in a high-performance environment is essential and this domain of resilience is highly relevant. Resilience instruments, therefore, assess multiple domains linked with the multifaceted approach to the conceptualisation of resilience.

3.6 Revised Reinforcement Sensitivity Theory

3.6.1 Definition and Attributes

The revised Reinforcement Sensitivity Theory (r-RST) of personality attempts to provide an explanation for the neuropsychological regulation of behaviour, that is, how individual differences in neuropsychological systems manifest in personality (Krupić et al., 2015). Personality is strongly influenced by motivation systems that organise responses to rewards and punishments which, in turn, drive a behavioural approach and avoidance behaviour (Corr et al., 2013). The r-RST of personality provides a neurobiologically inspired approach to understanding motivation, emotion, personality and relevance to

psychopathology. The main premise of r-RST relates to particular systems that underlie individual behaviour. For example, avoidance systems relate to pure active avoidance and escape and also to passive avoidance and behavioural inhibition produced by goal conflict. On the other hand, approach systems relate to the actions of reward-seeking behaviour related to pleasure. The three major systems that drive motivation and emotion are comprised of the fight-flight-freeze system (FFFS), behavioural inhibition system (BIS) and behavioural approach system (BAS) (Corr & Cooper, 2016).

The BAS mediates reactions to all appetitive stimuli – conditioned and unconditioned. The BAS, which is viewed as the appetitive motivational system, generates hopeful emotion of anticipatory pleasure and hope. Therefore, its primary responsibility is to motivate approach behaviour (Mitchell et al., 2007). The associated personality comprises optimism, reward orientation and impulsiveness, which clinically maps onto addictive behaviours, varieties of high-risk, impulsive behaviour and possibly the appetitive component of mania (Pickering & Corr, 2008). The BAS is proposed as being responsible for all goal-focused approach behaviour by responding to rewarding stimuli in the environment.

The BIS is responsible for mediating reactions to conditioned aversive stimuli for the resolution of goal conflict between the BAS approach and FFFS avoidance and, in some cases, BAS–BAS and FFFS–FFFS conflicts. The BIS generates the emotion of anxiety in individuals and is seen as favourable to the FFFS when faced with goal conflict. By increasing arousal and attention, the engagement in risk assessment processes and the scanning of memory and the environment, the BIS helps resolve concurrent goal conflicts (Mitchell et al., 2007). The BIS is, therefore, punishment-sensitive whereas the BAS is seen as reward-orientated.

The primary responsibility of the FFFS is to motivate avoidance and escape behaviours in response to both conditioned and unconditioned aversive stimuli (Mitchell et al., 2007) and relates to the primary goal of a person to retreat from the situation (Gray & McNaughton, 2000). The FFFS mediates the emotion of fear and not anxiety, which is

mediated by the BIS. The associated personality factor, which is comprised of avoidance and proneness to fear, clinically maps onto disorders pertaining to phobia and panic (Pickering & Corr, 2008).

3.6.2 Performance and r-RST

Studies have investigated the relationship between performance and the potential neuropsychological substrates in military and civilian environments (Perkins et al., 2007). In Perkins et al.'s (2007) study, performance on a military training course showed that general punishment sensitivity, the BIS, was a significant negative predictor of combat scenario performance. Combat scenario performance relates to tactical judgement and the assessment of tactical judgement consists of combat estimate and order-extraction exercises. The combat estimate exercise in the study entailed an individual being placed in command of a platoon and provided with a relevant scenario with the instructions to present a detailed battle plan within a 30-minute time limit. Furthermore, the order-extraction exercises instructed individuals to prepare a set of orders which applied to a hypothetical combat scenario within 30 minutes where the complexity of their orders matched the intended audience. Exercises were constructed in the most realistic way possible and designed to engage a variety of cognitions that would be considered in an actual combat scenario. The best performance predictor in the r-RST model was reward sensitivity, the BAS. Also measured in the study were trait anxiety and fear which were also significant negative predictors of performance. Furthermore, the findings alluded to the importance of fearfulness as a personality trait and the effect it may have on performance in this particular setting (Perkins et al., 2007).

A neuropsychological model of mentally tough behaviour has also been explored using the r-RST in a sport context with cricket players (Hardy et al., 2014). Hardy et al. (2014) found that punishment sensitivity (BIS) had a significantly positive correlation to mental toughness when reward sensitivity (BAS) was low and a significantly negative

correlation to mental toughness when reward sensitivity (BAS) was high, although Delaney et al. (2015) found that the higher scoring, mentally tough undergraduates had low BIS and high BAS scores. Hardy et al. (2014) found punishment sensitivity (BIS) was positively related to early threat detection as can be expected from r-RST theory. Furthermore, the combination of high reward sensitivity (BAS) along with high punishment sensitivity (BIS) produced results associated with shorter processing times during decision-making, but significantly more decision-making errors. High reward sensitivity (BAS) with low punishment sensitivity (BIS) yielded the most favourable results with regard to decision-making errors. These results corroborated those found by Perkins et al. (2007) during combat scenario performance. The implications thereof are very important in a military environment where time and the quality of decisions can often lead to lives being lost or saved.

As mental toughness is a potential predictor of performance in certain settings, the relationship between r-RST constructs and performance in the military environment can potentially provide valuable insights into the neuropsychological regulation of individual behaviour in this environment. Of concern, though, are the implications related to the quality of decision-making and combat-related performance, because, based on their BIS scores, it appears that the most mentally tough individuals (Hardy et al., 2014) might not perform optimally (Perkins et al., 2007) and, therefore, SANDF-specific research is essential.

3.6.3 Measurement of r-RST

In accordance with r-RST, certain instruments were developed to assess the different aspects pertaining to the theoretical structure. Most instruments only differ in terms of what scores are provided as per the systems assessed.

The Jackson-5 questionnaire (Jackson, 2009) is composed of items that measure five scales: BAS, BIS, fight, freezing, and flight. Although the instrument showed promise, a number of problems regarding its theoretical trustworthiness have been pointed out (Corr, 2016). The BIS–BAS scales (Carver & White, 1994) are among the most popular measures

used; the instrument is postulated on the original version of Reinforcement Sensitivity Theory. This instrument includes one scale to measure the BIS, and three scales to measure BAS functioning (drive, reward responsiveness, fun seeking).

The Reinforcement Sensitivity Theory of Personality Questionnaire (RST-PQ) (Corr & Cooper, 2016) measures six factors, two unitary defensive factors, FFFS and BIS, and four BAS factors (reward interest, goal-drive persistence, reward reactivity, and impulsivity). The RST-PQ also provides a separate scale for defensive fight. A review of the instruments indicated that the RST-PQ was the most encompassing in terms of providing scores for respective domains of r-RST (Corr, 2016).

3.7 Mood and Emotion Regulation

3.7.1 Definition and Attributes

The terms emotion, mood and affect are frequently used interchangeably, but most researchers agree that the constructs they represent are closely related but distinct phenomena (Ruiz & Robazza, 2020). The reader should thus be cognisant that in the literature discussed below the original authors might have used the terms interchangeably. However, in terms of the current study, mood and emotion regulation in particular was assessed. A possible explanation for the interchangeable use of the terms may be derived from the perspective of an individual where emotion and a mood state may feel very much the same (Beedie et al., 2005). Mood and emotion are described as affect states, therefore, they are time-bound and reflect changing experiences (Beal et al., 2005).

Bleedie et al. (2005) investigated the distinctions between mood and emotion. The study included non-academic participants who provided answers to the question related to what they perceived the difference between mood and emotion to be. Themes elicited from their study were compared to relevant academic literature. The results indicated that academic and non-academic views were aligned with regards to emotion–mood differences

reported in their study. Table 3.1 provides a comparison of the qualitative distinctions between emotion and mood pertaining to certain criteria.

Table 3.1

Comparison between Emotion and Mood

Criterion	Emotion	Mood
Anatomy	Related to the heart	Related to the mind
Awareness of cause	Individual is aware of cause	Individual may be unaware of cause
Cause	Caused by a specific event or object	Cause is less well defined
Clarity	Clearly defined	Nebulous
Consequences	Largely behavioural and expressive	Largely cognitive
Control	Not controllable	Controllable
Display	Displayed	Not displayed
Duration	Brief	Enduring
Experience	Felt	Thought
Intensity	Intense	Mild
Intentionality	About something	Not about anything in particular
Physiology	Distinct physiological patterning	No distinct physiological patterning
Stability	Fleeting and volatile	Stable
Timing	Rises and dissipates quickly	Rises and dissipates slowly

Note. The table provides a comparison between emotion and mood. From “Distinctions between emotion and mood” by Beedie, C. J., Terry, P. C., Lane, A. M., 2005, *Cognition and Emotion, 19*(6), pp. 847-878 (http://doi.org/10.1080/02699930541000057). Copyright 2005 by Psychology Press Ltd.

More recent research appears to be in accordance with the above-mentioned, as Lischetzke (2014) described mood as a state which is diffused and unfocused, and thus not directed at a particular object, whereas emotions are states that are directed at particular objects and have a clearer origin of onset and dispersion. Recently, Mitchell (2021) investigated the shift between mood and emotion (or vice versa) and described moods as "crystalising" into emotions, and emotions as "diffusing" into moods. The relationship between mood and emotion appears evident, although, stemming from the discussion above, there are unique distinguishable characteristics.

3.7.2 Mood and Emotion: Connection to Performance

The influence that mood and emotion has on performance seems to be rather transparent. Beal et al. (2005) argued that just as the affect states within an individual change so the intrapersonal performance is affected. Thus, the ability to attain and maintain an optimal emotional state has a significant effect on performance (Ruiz & Robazza, 2020). Consequently, the type of tasks and performance expected should be kept in mind as it is influenced by the affect state. Furthermore, Beal et al. (2005) suggested that the management of momentary affective states will have a better organisational payoff than the management of more stable affect-related attitudes like job satisfaction. We can, therefore, deduce that mood states can systematically influence work motivation and hence performance and efficiency (Lane, 2007). Therani and Moleswroth (2014) argued that research surrounding the influence mood has on performance in everyday situations commonly reveals a mood–congruence relationship. Therefore, they set out to study the effect in a non-normal situation. Their study investigated whether induced mood (positive or negative) influenced performance during an unscheduled aircraft evacuation. Their results highlighted the performance-enhancing benefits of creating a positive atmosphere, as those participants who were exposed to a positive mood stimulus completed the evacuation in less

than half the time and made fewer mistakes than those individuals that were exposed to a negative mood stimulus.

Thus, the influence of mood and emotion on performance alludes to the importance of the ability to regulate internal states, as successful regulation could lead to increased performance (Wagstaff, 2014). Presumably, individuals with high levels of regulatory resources would have a superior competence in order to focus their cognitive resources and be more productive (Beal et al., 2005). Emotion regulation refers to the automatic or deliberate use of strategies to initiate, maintain, modify or display emotions (Gross & Thompson, 2007). Research suggests that emotion self-regulation impairment negatively affects performance, influences the way negative feedback is handled and may impact future performance (Raftery & Bizer, 2009; Wagstaff, 2014).

Two strategies of emotion regulation that have received attention are suppression and reappraisal (Gross & John, 2003, Nicolson et al., 2021; Raftery & Bizzer., 2009). According to Ginton et al. (2021), reappraisal refers to how individuals positively regulate their emotions to alleviate the psychological impact of the current situation. Gross & John (2003) reported that reappraisers employ specific strategies to negotiate stressful situations such as adopting an optimistic attitude, reinterpreting what they experience as stressful, and making deliberate efforts in order to repair negative moods. Behaviourally, reappraisers experience and express more positive emotion and less depressive emotion along with higher self-esteem and life satisfaction than those who reappraise their perspective less frequently (Gross & John, 2003). Findings from Nicolson et al. (2021) support this; their research indicated that participants who reappraised less exhibited more depressive and post-traumatic symptoms. Suppression relates to how an individual consciously hides their feelings and thoughts in an adaptive manner (Ginton et al., 2021). Contrary to reappraisal, individuals who use suppression experience more negative emotions, have poorer self-esteem, experience less life satisfaction, and report more depressive symptoms (Gross & John, 2003). Furthermore, suppressors seem to be less clear about what they are feeling,

less successful at mood repair, and view their emotions from a less favourable perspective (Gross & John, 2003).

3.7.3 Mood and Emotion in the Sport Environment

Sanchez et al. (2010) investigated the relationship between pre-performance and performance psychological states in an elite indoor climbing competition. Their results indicate that high levels of somatic anxiety correlated positively with positive affect, while both somatic anxiety and positive affect correlated positively with final performance score. Interestingly, the climbers who reported higher pre-performance levels of somatic anxiety climbed the most difficult part of the route more slowly but they were more successful overall, indicating the presence of both positive and negative emotions in relation to performance. The presence of anxiety, which may be perceived as a negative emotion, seems not to equate to detrimental performance. Woodman and Hardy (2003), who investigated cognitive anxiety, self-confidence and traditional sport performance, found that athletes achieved good performances when they were both anxious and self-confident, thus indicating the prevalence of positive and negative emotions in good performance results.

Results from the above studies are indicative of the moderating role that self-confidence plays in relation to emotions experienced and performance as portrayed by a strong negative correlation between cognitive anxiety and self-concept scores. These results are in accordance with findings from Muchsin et al. (2020) who also reported a negative relationship between anxiety and self-confidence amongst soldiers engaging in a shooting exercise.

Research surrounding the understanding of the emotion–performance relationship by investigating the effect of specific emotions on physical and cognitive aspects of sport performance showed that both performance and effort increased when hope was present but that only effort increased significantly when anger was present (Woodman et al., 2009). Anger does, however, influence performance positively although it seems to be related more

to the specific task to be completed. The results stemming from Woodman et al. (2009) indicated that performance on a physical task is significantly greater in the anger state when action can be exercised than with happiness and emotion-neutral conditions. The findings indicated, however, that anger has no significant influence on a cognitive task (Woodman et al., 2009). A retrospective study which investigated emotional experiences during a sporting event and the effect it had on attention, concentration and performance found that as happiness and excitement increased so did concentration and self-rated performance (Vast et al., 2010). There appears to be a difference in opinion amongst participants in the study conducted by Lane et al. (2011) regarding what impact particular emotions had on overall performance. Research amongst runners indicated that 15% believed that strategies to increase anxiety and/or anger were beneficial to their performance, whereas 85% reported that strategies to decrease the same emotions assisted their performance (Lane et al., 2011). The research above resonates with the hypothesis from Jekauc et al. (2021) that no universal relationship exists between emotional states and performance that is applicable to all sports and that performance is dependent on the physical and mental demands of a specific sport.

The literature suggests that a complex relationship exists between affect and performance in the sport domain, where the presence of negative emotions (anxiety, anger) might not hamper performance altogether (Sanchez et al., 2010; Woodman et al. 2009). In some circumstances, success might depend on a moderate prevalence of negative emotions, such as in the case where the indoor climbers with higher reported somatic anxiety exercised caution when climbing the most difficult part of the course, which ultimately led to the successful completion of the entire course (Sanchez et al., 2010).

It is evident that more extensive research surrounding emotion regulation in sport has been conducted over the past few years, as regulation capabilities play a pivotal role in understanding the emotion–performance relationship (Jekauc et al., 2021). Tamminen et al. (2021) argued that there is a wealth of evidence which indicates that athletes should employ

emotion regulation techniques for optimal performance and well-being. For example, the findings form Lane et al. (2012) found that athletes develop convictions about emotions and their association with optimal performance, consequently these convictions influence emotion regulation in a competition setting. Jekauc et al. (2021) stated that the use of regulation techniques determines the extent to which emotions develop and, consequently, influences athletic performance. Therefore, athletes will probably try to regulate an emotion that is believed to enhance their performance (Lane et al., 2012). Emotion regulation strategies are, in most cases, antecedent or response-focused. Antecedent strategies are aimed at preventing an emotional response whereas the latter is focused on regulating the emotional response directly.

Wagstaff (2014) studied the effects of effortful, emotional self-regulation manipulation on a familiar, physical endurance self-regulation task, that is, the performance of a 10 km cycling time trial. Under the experimental conditions, all the cyclists watched an upsetting video before performing the cycle task. Those who were instructed to suppress their emotional reactions to the video (suppression condition) completed the cycling task more slowly, generated lower mean power outputs, reached a lower maximum heart rate, and perceived greater physical exertion than those who were given no self-regulation instructions (non-suppression condition). The same findings were applicable when compared to those participants who received no video treatment (control condition). The results showed the impact of emotional dysregulation on performance and the importance of the ability to regulate responses related to emotional experiences in sport.

Lane et al. (2012) proposed that athletes should adopt strategies to influence their appraisal of the situation and create the most beneficial emotional climate for competition; a creation of emotion approach appears to be more effective than suppression. The findings stemming from Monelina et al.'s (2018) research support this. Their study indicated that appraisal should be related to positive affect which would stimulate self-efficacy and physical recovery of athletes. By contrast, they found that suppression was associated with a

negative affect and impairment of physical recovery. Jekauc et al. (2021) built on this, and stated that athletes should have already acquired regulating skills in the initial phases of their career development, which currently appears to develop over the duration of their careers.

3.7.4 Mood and Emotion Regulation in Military Samples

Mood and emotion variables have been extensively researched in military and civilian populations, and research, especially on anxiety, has been well documented (Van Wijk & Fourie, 2017; Vast et al., 2010; Woodman et al., 2009). Locally, a study of Navy personnel evaluated the anxiety levels of Navy clearance divers compared to those of civilian divers (Van Wijk, 2002). Van Wijk and Fourie (2017) investigated the injury risk of South African Navy diver trainees with the emphasis on weekly mood states, pre-course anxiety and sensation seeking. The findings did not indicate any significant link between assessed pre-course mood states and injury. Although, there emerged a link between injury and the combination of high pre-course trait anxiety coupled with lower sensation-seeking scores. Moreover, the participants reported high sensation-seeking scores and high fatigue in the week preceding injury. The use of psychological assessments in order to predict injury risk display promise for navy diving training and could, perhaps, also be relevant to the airborne population during preparation for selection.

The findings from research conducted by Wagstaff and Weston (2014) illustrated the intricate nature of emotion processes surrounding performance teams that function in, isolated, confined and extreme environments. Their study investigated the use of emotion regulation strategies by military personnel during the course of a two-month Antarctic mountaineering expedition. The researchers asked participants to indicate what emotion regulation strategies they had used, the perceived effectiveness of the strategies, and the impact of such strategies on team dynamics and performance. They found that the military personnel reported a similar frequency of use of adaptive and maladaptive emotion regulation strategies. However, two maladaptive strategies – acceptance and expressive

suppression – were rated as the most effective regulation strategies, in spite of their use also being positively correlated with negative intrapersonal and interpersonal outcomes. It appears that the social and environmental conditions most likely influenced individual perceptions of emotion regulation requirements and effectiveness. These results highlight the intricate social nature of the emotion process, the presence of affective connections amongst team members, and the importance of emotional contagion for intrapersonal and interpersonal outcomes The environment in which these individuals functioned should also be taken into consideration as the isolation, extreme physical aspects, duration and regulation strategies used influence intra- and interpersonal emotions and may differ vastly from individuals and teams not functioning in such conditions.

Lester et al. (2022) investigated the relationship between affect and award attainment within a large cohort of US military personnel. The researchers reported that positive affective well-being predicted which military personnel received performance and heroism awards. Furthermore, their results indicate that not only do elevated negative feelings interfere with performance, but elevated positive feelings may boost performance. These findings support the intentional management of affect states to boost performance in a military context. Lester et al. (2022) further pointed out the practical implication of well-being assessment being incorporated into the selection process prior to the appointment of individuals.

Lane et al. (2012) investigated emotions and emotion regulation in sport, work and life in general among novice military parachutists prior to completing their first jump. In the period leading up to their first jump, the results indicated that emotions and emotion regulation strategies varied significantly across situations and in that moment. The results indicated certain expected outcomes, such as participants reporting high anxiety levels in the hour before their first jump whilst prior to that they reported relatively high scores for pleasant emotions such as happiness and feeling energetic. However, the participants indicated the use of strategies that increased unpleasant emotions one hour ahead of the

parachute jump and reported high levels of anxiety, but low scores for other unpleasant emotions. Stemming from previous research which indicated the detrimental effect of high anxiety negatively on skilled performance (Ward et al., 2008), the adoption of emotion regulation strategies that reduce a potentially detrimental anxiety level is suggested.

Lane et al. (2012) concluded that the fundamental message originating from their study was that military personnel experienced intense emotions in a variety of dissimilar situations and that emotion regulation strategies differed. Practical implications pertaining to training follows from these findings. For example, instructors can encourage individuals to become mindful of emotions that assist performance and coach regulation strategies that can be implemented in order to generate these emotions. A greater awareness of their own beliefs and strategies will create recognition of similarities and differences between emotion regulation strategies used in different situations and the transferability of these to different contexts.

The use of emotion regulation training might, therefore, augment existing military training and may specifically encourage airborne-qualified SANDF personnel to anticipate the emotions that they are likely to experience before parachuting and begin to develop self-regulating strategies. Furthermore, the ability to regulate behaviour and attention can be a potential focus for selection purposes (Beal et al., 2005).

3.7.5 Measurements of Mood and Emotion Regulation

A range of instruments that assess mood and emotion are available. Some have been developed to measure specific mood states or emotions while others take a broader approach, measuring positive and negative affect. Instruments focused on assessing emotions place the onus on a particular point in time or in the context of a past, present or future event. Mood, which is seen as more stable over time, implies that assessments do not reference a particular event but rather a duration of time. Some of the well-known instruments are highlighted below.

The Profile of Mood States (POMS) (McNair et al., 1971) was originally developed for use with clinical populations and contains subscales assessing six mood states: anger, confusion, depression, fatigue, tension, and vigour. The POMS paved the way for the development of the BRUMS. When the BRUMS (Terry & Lane, 1999) was developed out of the POMS, the original subscales were retained but the instrument is fitting for a non-clinical population.

The Sport Emotion Questionnaire (Jones et al., 2005) focuses on evaluating the manifestations of emotions at a point in time by providing a list of 22 emotions and asking the respondent to indicate their prevalence in relation to an event or time. The scores for happiness, anger, dejection, excitement and anxiety are then computed based on the responses.

The Positive and Negative Affect Schedule developed by Watson, Clark and Tellegen (1988) incorporates a bi-dimensional theory of emotions which postulates that individuals experience a mixture of positive (e.g., enthusiastic) and negative (e.g., afraid) affects during a defined period of time. This instrument focuses on what is experienced at a point in time and acknowledges that the individual can experience positive and negative emotions at the same time. The overall result will, however, indicate if the individual's affect state is more positive or negative.

Pertaining to the measurement of emotion regulation, different approaches have been adopted. The focus areas of instruments differ as well as the orientation to time and events. The ERQ was developed to measure two aspects related to emotion control: reappraisal and suppression (Gross & John, 2003). The individual self-reports how they feel about a statement involving their emotional experience and the expression thereof; subsequently, a preferred strategy of emotion regulation is then computed. The Cognitive Emotion Regulation Questionnaire–-Short form (CERQ-S) (Garnefski, & Kraaij, 2006) focuses on measuring cognitive coping strategies and what people think after having experienced a negative or traumatic event. Cognitive coping strategies are defined as

strategies for cognitive emotion regulation that regulate the emotional responses to events, causing the individual emotional aggravation in a cognitive way (Thompson, 1991). For instance, the Emotion Regulation of Others and Self scale (Niven et al., 2011) assesses individual differences in the use of strategies to improve and worsen one's own and other people's affect (e.g., "I thought about my positive characteristics to try to make myself feel better", "I thought about my shortcomings to try to make myself feel worse"). Therefore, the focus does not lie only in the perception of self but also in the perception of others.

The array of approaches to assess mood, emotion and the regulation thereof indicates the contextual influences and complexity in the measuring of these characteristics, therefore, a researcher should be mindful of the most fitting instrument for the environment and research purpose.

3.8 Motivation

3.8.1 Definition and Attributes

Motivation concerns energy, direction, persistence, effort and equifinality. It has been a central and enduring topic in the field of psychology for it is at the core of biological, cognitive and social regulation (Ryan & Deci, 2000). To be motivated means to be moved to do something (Ryan & Deci, 2000). Studies in both the military and sport environment have been conducted to investigate the effects of motivation on performance and competence (Buch et al., 2015; Chantal et al., 1996). Workplace research indicates a direct link between motivation and employee performance (Kuswati, 2020). Motivation is highly valued because of the consequences and manifestations of behaviour driven by it and have, therefore, been seen as a driver underlying performance (Calvo et al., 2010). A lack of motivation in soldiers in a combat scenario creates potential for calamitous consequences (McGraw et al., 2012). Motivation can potentially be an essential driver pertaining to the successful functioning of military personnel regardless of role and environment. Two prevalent theories on motivation are discussed below.

3.8.2 Herzberg Dual-Factor Theory

The Herzberg dual-factor theory (1959) also known as the motivation–hygiene theory is a thoroughly researched theory on job satisfaction and workplace motivation (Dion, 2006). The main concept of this theory is the difference between the motivation and hygiene factors which have different effects on job satisfaction and motivation (Alshmemri et al., 2017). Herzberg hypothesised that satisfaction and dissatisfaction with a job were affected by two different sets of factors and that these cannot be measured on the same continuum (Malik & Naeem, 2013). Thus, certain factors lead to positive attitudes towards work while others lead to negative attitudes, and these factors are respectively referred to as motivation and hygiene. Hygiene factors are composed of interpersonal relationships, salary, work conditions, supervision, and policies and administration (Herzberg, 2008). Hygiene factors relate to the individual's need to avoid unpleasantness, whereas motivation factors relate to the individual's need for self-growth and self-actualisation. Motivation factors are composed of advancements, the work itself, possibility for growth, responsibility, recognition and achievement (Herzberg, 2008). Motivation factors increase job satisfaction, whereas hygiene factors work to reduce job dissatisfaction. The prevalence of motivation factors can produce job satisfaction and their absence leads to lack of satisfaction. The presence of poor hygiene factors can cause job dissatisfaction while an improvement of hygiene factors will cause less dissatisfaction, although it cannot cause job satisfaction (Herzberg, 2008). According to Robbins and Judge (2009), to motivate individuals one should focus on supplying motivation factors. In other words, the presence of good motivation factors leads to increased job satisfaction and the presence of good hygiene factors results in less dissatisfaction.

Khairiyah and Anissa (2013) pointed out that job satisfaction and work motivation are crucial aspects that influence work performance. Work motivation empowers the employee to work with all their effort and power (Manulang, 2002). According to Munir et al. (2016), job satisfaction refers to feelings of satisfaction that the individual has about their work, which drives motivation to work. The findings from Noviyati et al. (2019) confirmed that work

motivation and satisfaction significantly influence individual job performance. Research in general suggests that individual job performance shares a positive correlation with job satisfaction (Bakotic, 2016). When integrated into Herzberg's dual-factor theory (1959), one can hypothesise that performance could be enhanced by enhancing motivation factors and avoiding job dissatisfaction by managing hygiene factors.

3.8.3 Self-Determination Theory

Self-determination theory (SDT) (Ryan & Deci, 1985) categorises motivation into amotivation, extrinsic motivation, and intrinsic motivation categories. Along with the categories, it differentiates regulatory styles pertaining to the different types of motivation.

Amotivation refers to the state of lacking intention to act, in other words, there exists no motivation to engage in a particular behaviour. In this category, an individual does not act at all or acts without intent.

Four types of regulation strategies have been distinguished that fall under extrinsic motivation, depending on how self-determined the behaviour of the individual is. Extrinsic motivation behaviours are performed to satisfy an external demand or reward contingency. First, the least autonomous form thereof is external regulation, which refers to the performance of actions to obtain rewards or avoid blame or chastisement by others. The focus is completely on compliance and either receiving external rewards or avoiding external punishment. Secondly, introjected regulation, refers to behaviours that are strengthened through internal pressures such as guilt, anxiety or pride. Regulation is, therefore, not fully accepted as one's own and behaviour is, in some cases, due to ego-involvement or self-esteem reasons. In this respect, it is as though the regulation is controlling the person (Gagné & Deci, 2005). The third category, identified regulation, places an emphasis on behaviour and the worth given to that behaviour. It is more autonomous than introjected regulation. The action is owned as important to the person and the behaviour is more harmonious with the individual's goals and identity (Gagné & Deci, 2005). The fourth

category, integrated regulation, represents the most independent form of extrinsic motivation which occurs when identified regulations are fully integrated into the self, and the individual has the feeling that the behaviour is part of who they are (Gagné & Deci, 2005). There is alignment between behaviour rules and needs, goals, and the individual's personal values.

Intrinsic motivation means engaging in an activity for itself and for the pleasure and satisfaction derived from participation rather than for a separate consequence derived from the action. It is, therefore, highly autonomous and behaviour is completely regulated by the individual.

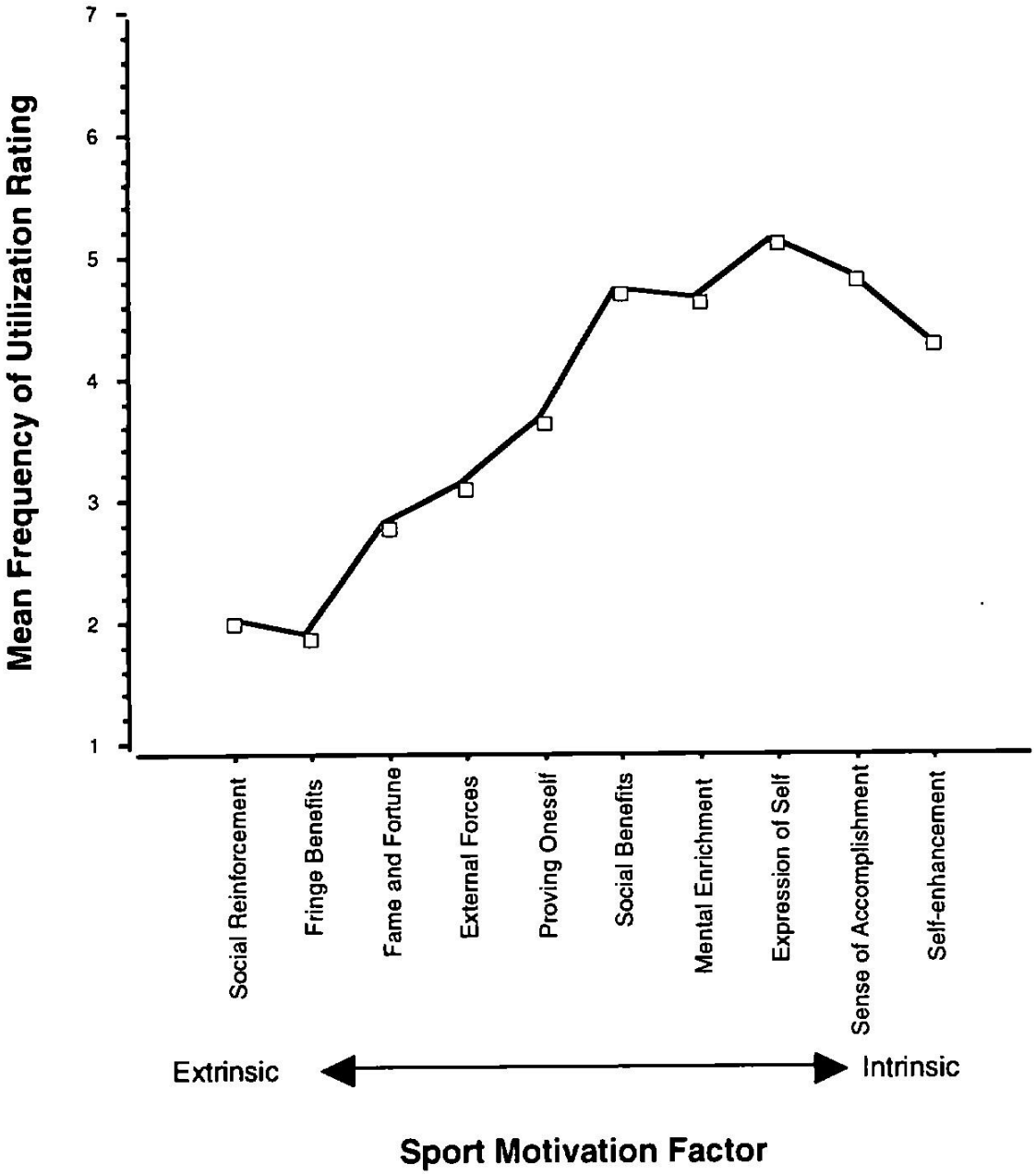
The most positive outcomes result from the most self-determined forms of motivation (intrinsic motivation and identified regulation), while negative outcomes follow from the least self-determined motivations, that is, external regulation, especially amotivation (Vallerand & Losier, 1999).

3.8.4 SDT in Sport

This theory has generated considerable attention in the sport environment and has led to the development of the Sport Motivation Scale (Pelletier et al., 1995), which has subsequently led to a greater understanding of motivation in sport (Pelletier et al., 2013). In an attempt to delve deeper into intrinsic and extrinsic motivation, Pederson (2002) attempted to establish certain factors for the types of motivation. The study elicited ten factors of sport motivation and was rated on the intrinsic–extrinsic continuum as well as in terms of utilisation. As depicted in Figure 3.1, it is clear that more intrinsic factors are used more often, thus proving to be stronger drivers of motivation.

Figure 3.1

Motivational Factors vs Frequency of Utilisation



Note. The figure indicates utilisation as well as where the factor is plotted with respect to the type of motivation. From “Intrinsic-Extrinsic Factors in Sport Motivation”, by Pederson, D. M., 2002. *Perceptual and Motor Skills, 95*, pp. 459-476. (http://doi.org/10.2466/pms.2002.95.2.459). Copyright 2002 by Perceptual and Motor Skills.

Gould et al. (2002) investigated psychological characteristics and their development in Olympic champions and highlighted the importance of motivational issues and orientations as psychological characteristics. The researchers found that a higher-order theme, labelled "drive", emerged. Sub-themes of "drive" were (a) driven to meet high expectations/perfectionism, (b) being driven to please others and (c) general motivation/dedication/determination. The sub-themes of motivation, dedication and determination and being driven to meet personal high expectations or perfectionism were the most cited. This alludes to the more self-determined forms of motivation being utilised more often but also the presence of externally regulated forms. This seems to confirm the findings of Pederson (2002) that the more intrinsic factors are used more frequently, thus proving to be stronger drivers of motivation.

A more recent study by Fletcher and Sarkar (2013) investigated motivation in Olympic champions. These Olympians motives were found to be both self-determining and non-self-determining, with several motives for competing at the Olympic level. It would appear that at the onset of their sporting careers, their reasons included passion for the sport, achieving incremental approach goals, and social recognition. Although later in their careers, their motives included being the best that they could be, demonstrating competence and proving their worth to others. The studies by Fletcher and Sarkar (2013) and Gould et al. (2002) are indicative of the presence of extrinsic and intrinsic motivational factors amongst elite athletes. Typically, one might hypothesise that elite athletes would mainly use the most self-determined factors, however, motivation factors are complex and dynamic and might be different at various career stages of the athlete.

In accordance with this, the higher performing and more successful Bulgarian athletes who were title and medal holders exhibited higher levels of non-self-determined extrinsic motivation than their lower performing counterparts (Chantal et al., 1996). A potential explanation thereof could be that those individuals who win titles and medals are

naturally in the sport to win the titles and medals, therefore they value the benefits gained from achieving them.

More recent studies in the sport environment highlight the link between the more self-determined forms of motivation and other characteristics that also potentially influence overall performance, such as positive thought and positive self-talk during competition (Amado et al., 2019), intention to stay physically active (Almagro et al., 2020), emotional intelligence (Arribas-Galarraga et al., 2019) and athlete engagement (De Fransico et., 2018). In general, these studies indicated a positive relationship between the more self-determined forms of motivation and these performance-related characteristics.

3.8.5 SDT of Motivation in the Military Context

McGraw et al. (2012) concluded that military personnel displaying a superior mental skill profile were more intrinsically motivated and psychosocially healthier than their peers. Furthermore, Tremblay et al. (2009) reported that as the individuals' self-determined motivation increased, they were more likely to display involvement and commitment to their work as well as loyalty towards their organisation. By contrast, higher levels of non-self-determined motivation were indicative of individuals that are more likely to be involved with counterproductive behaviour as well as being less willing to assist co-workers (Tremblay et al., 2009). From a physical performance perspective, Norwegian soldiers on a peacekeeping mission in Kosovo were evaluated in terms of their volume of training and their motivation. Intrinsic motivation positively predicted training volume to the extent of 70% more than the low intrinsic motivation group (Dyrstad et al., 2007). Similar results were reported by Carlson (2016) who stated that military personnel who reported higher levels of self-determined motivation performed better on the army physical fitness tests than those who reported the least self-determined forms of motivation. Recently, Filosa et al. (2021) conducted a study on military cadets attending their school for non-commissioned officers. The researchers reported intrinsic motivation was strongly related to work engagement, while amotivation was

inversely related to work engagement. Furthermore, external regulation and amotivation were also positively correlated with emotion exhaustion, cynicism and interpersonal strain. According to Filosa et al. (2021), intrinsic motivation was significantly correlated to job performance and organisation citizenship behaviours, and negatively correlated to the intention to quit.

The research above shows overwhelmingly that military personnel with more self-determined forms of motivation will most likely be preferable in the organisation. The expected benefits of organisational engagement, physical effort and less engagement in deviant behaviour seem to be optimal for performance outcomes in the military setting.

3.8.6 SDT Measurements

An array of SDT instruments have been developed. In accordance with SDT, the different motivation regulation levels form the basis of measurement scales for most of the instruments. Some instruments are, however, not inclusive of all the different regulation levels as per the SDT. Most do, however, at least provide scores for the three main categories, namely amotivation, extrinsic motivation and intrinsic motivation.

The Sport Motivation Scale (Pelletier et al., 1995) was one of the first SDT measurements to assess motivation in a sporting context. The original version measures seven factors related to SDT, three types of intrinsic motivation (intrinsic motivation to know, intrinsic motivation to experience stimulation, and intrinsic motivation to accomplish), three of the four types of extrinsic motivation (external regulation, introjected regulation, and identified regulation), and amotivation. Criticism and shortcomings led to the development of the Sport Motivation Scale-6 (SMS-6) (Mallett et al., 2007) and Sport Motivation Scale-2 (SMS-2) (Pelletier et al., 2013). SMS-6 and SMS-2 incorporated the integrated regulation subscale and intrinsic motivation was condensed into only one subscale. As indicated by their names, these instruments were developed with the focus on the sporting environment. This is also the case with the Behavioural Regulation in Sport Questionnaire (Lonsdale et al.,

2008), which the developers emphasise was explicitly designed for use with competitive sport participants and they do not advocate its use in other physical activity contexts. The Behavioural Regulation in Exercise Questionnaire-3 (Markland & Tobin, 2004; Wilson et al., 2006), which is the latest modification of the original Behavioural Regulation in Exercise Questionnaire (Mullan et al., 1997), attempts to provide an assessment that bridges the gap between assessing motivation in exercise or physically active contexts and competitive sport situations.

Organisational application of SDT has given rise to instruments developed for workplace use. These instruments provide measurements of the sublevels of motivation regulation with questions worded to fit organisational application. Some of the most common instruments are the MWMS (Gagné et al., 2015), the Work Extrinsic and Intrinsic Motivation Scale (Tremblay et al., 2009) and the Situational Motivation Scale (Guay et al., 2000).

3.9 Performance Strategies

3.9.1 Definition and Attributes

Performance strategies, often referred to in the literature as mental or psychological skills, have been assessed and incorporated into training programmes for athletes as well as military populations (Zinsser et al., 2004). These are clustered under the umbrella term of self-regulation and incorporate techniques such as arousal control, goal setting, imagery, self-talk, pre-competition routines and visualisation (Doğan, 2016). According to Kruk et al. (2017), the structure of psychological strategies is mostly discussed in two theoretical approaches: first, the approach of performance strategies and, second, the psychological skills training approach. The latter generally only includes the four strategies of self-talk, imagery, relaxation and goal setting, whereas the performance strategy approach incorporates additional strategies. Although not necessarily seen as psychological traits or attitudes, certain strategies and coping methods related to performance are often implemented by elite athletes. These strategies are implemented for the purpose of

regulating arousal, processing information and managing emotion which, in turn, may better aid performance (Thomas et al., 1999). Stemming from the above, one can deduce that a certain internal state or intensity thereof could potentially aid or diminish individual performance.

Although one would generally assume that a positive internal state may lead to improved performance, the presence of a negative state might not decrease performance as a certain level of anxiety has been found to aid performance (Hardy et al., 1996; Sanchez et al., 2010). It therefore appears that negative states do not always hamper performance and the efficacy of these performance-enhancing techniques may be questioned (Doğan, 2016).

Relationships between mental skills and intrinsic motivation are of primary interest to both sport and military researchers and practitioners as these constructs are consistently highlighted as key components of mental toughness and thus performance (McGraw et al., 2012).

3.9.2 Performance Strategies in a Sporting Environment

Gould et al. (2002) used a battery of inventories, including the Test of Performance Strategies (TOPS), to examine the psychological characteristics and their development in nine Olympic champions. The athletes were high on goal setting, activation, relaxation and emotional control in a competition context. In practice context they exhibited high scores for goal setting and attention control. Compared to the norms for international athletes (Thomas et al., 1999), the Olympic champions scored substantially higher on automaticity, emotional control and relaxation in competition, and lower on negative thinking (Hardy et al., 2010). The results regarding psychological characteristics corroborated findings from other sport psychology research with regard to the presence of psychological characteristics associated with peak performance (Williams & Krane, 2001). Gould et al. (2002) have also suggested that adaptive perfectionism, dispositional hope and high levels of optimism are new variables to consider.

Gould et al. (2002) concluded that no single Olympian was characterised by all the factors identified and the psychological make-up of each was unique in how the factors were combined. The development of these psychological characteristic is best thought of as a intricate system made up of a range of influential factors. It is a long-term process that requires appropriate cultivation if success is to be attained.

Kruk et al. (2017) found that numerous studies had investigated the association between psychological strategies and performance, although these studies had not investigated the changes across the sport season. Consequently, they investigated changes in mental strategies across the sport season and their effects on performance and individual satisfaction with performance (Kruk et al., 2017). The researchers collected data pre-season, mid-season and at the end of the season. The researchers measured performance with a 300m endurance run. Their results indicated a decrease in some strategies but an increase in others throughout the season, that is, the use of relaxation, emotional control and distractibility increased, whereas the use of imagery and negative thinking decreased. Furthermore, a high level of relaxation at the pre-season stage predicted a high level of performance on the 300m run at the end of season stage. Their results also indicated that a high usage of self-talk and the rare use of distractibility and emotional control at the pre-season stage predicted a higher level of self-rated satisfaction of individual performance at the end of season.

3.9.3 Performance Strategies in a Military Environment

According to Krueckel et al. (2020), it is only logical to use adapted sport psychology techniques of mental skills training for the enhancement of resilience in military personnel, and a survival, evasion, resistance and extraction situation can potentially be a fitting environment for the utilisation of such techniques. Psychological skills training have also been associated with development of other characteristics such as mental toughness and well-being (Golby & Wood, 2016). Navy seals focus on four different aspects, namely goal

setting, self-talk, visualisation and arousal control (which is focused on breathing control) to improve their mental toughness (Divine, 2013). In particular, self-talk, emotional control and relaxation strategies have been found to correlate positively with mental toughness (Crust & Azadi, 2010).

In their study, McGraw et al. (2012) found that soldiers with strong mental skills were psychosocially healthier than their counterparts, a factor which is integral to the functioning of a combat-ready force. Hammermeister et al. (2010) classified soldiers in three clusters of psychological skills and found a significant difference in the physical performance on the US Army Physical Fitness Test between those classified with strong mental skills and their peers who were classified with lower psychological skills.

Adler et al. (2015) evaluated the effectiveness of a cognitive skills training programme with US Army soldiers completing their basic military skills training. The focus of their training incorporated motivational and instructional self-talk, self-regulation (attention control), emotion regulation, cognitive restructuring (effective thinking), mental rehearsal and goal setting. A control group of soldiers which had been exposed to a military history programme was used for comparison across the 10-week course. The researchers collected baseline data and data at three consecutive stages across the course. Their results indicated that those who had undergone cognitive skills training used a variety of the skills, had higher levels of self-confidence at earlier stages of the training, and performed slightly better in comparison to the control group. Individuals from the experiment group reported a greater usage of self-talk, relaxation, control of negative thinking, and automaticity than those in the control group. However, nearing the end of training, ratings of self-talk and relaxation had begun to converge. Reported levels of self-confidence indicated a similar trend, nearing the end of the training the reported levels began to converge. Furthermore there were no significant training effects found for goal setting, imagery, emotion control, and attention control.

Fitzwater et al. (2018) found significant differences relating to the use of relaxation and imagery skills and the influence on individual performance when comparing a control and experimental group of British Army Para recruits during selection week. In Fitzwater et al.'s (2018) study, a group of British Army Para recruits were engaged in a psychological skills intervention for three weeks and, thereafter, an evaluation was conducted on observer-rated mental toughness and performance in this elite military context. The findings showed that the experimental group engaged in significantly greater use of goal setting, relaxation techniques, self-talk strategies, and imagery or mental rehearsal in training than the control group.

There was also a significant increase in observer-rated mental toughness in the experimental group pre- and post-test, but there was no change in mental toughness in the control group. Individual performance was significantly higher in the experimental group during selection week, compared to performance during training. However, Fitzwater et al. (2018) only found significant differences in psychological skills usage pertaining to relaxation and imagery during selection, and, although the experiential group had higher overall pass rates during selection, the difference was not significant.

The total effect of the implemented strategies on performance seems to be unclear, as the two previous studies had shown promising effects in the early stages but the results seemed to align with the control group as time progressed. A potential explanation of the results is that a person naturally seems to adapt and implement such strategies as coping mechanisms; the benefit of coaching relevant skills then lies in the fact that the individual might implement these strategies quicker than would occur from natural adaptation.

Although the overall performance effect seems ambiguous, the development of mental skills appears to be important for the development of potential and excellence. MacNamara and Collins (2013) indirectly questioned whether mental skills made champions and whether an instrument such as the Psychological Characteristics of Developing Excellence Questionnaire (MacNamara & Collins, 2011) could discriminate between good

and poor developers. This questionnaire was sufficiently sensitive and correctly discerned between good and poor developers of excellence for team and individual sports. The questionnaire correctly classified between 67% and 75% of the athletes, based on their responses. Although not all the factors assessed proved to be significant, “support for long-term success” (MacNamara & Collins, 2011, p.740) was found to be significant for both team and individual performers. The results thus indicate the importance of a systematic approach to developing psychological characteristics underlying excellence and how a structured coaching process could prove beneficial to athletes and military personnel alike.

3.9.4 Measurement of Performance Strategies

Various measurement instruments have been developed to assess certain performance strategies. Most of the instruments were constructed to determine the frequency of use of a chosen performance strategy; therefore, the main differences between instruments are mostly in terms of what the assessed strategy is. Respective scores will thus provide an indication of what strategies are being favoured above others.

Some of the better known instruments are: the Psychological Skills Inventory (PSI) (Wheaton, 1998); the Ottawa Mental Skills Assessment Tool (OMSAT-3) (Durand-Bush et al., 2001); BMSQ (Bull et al., 1996); Test of Performance Strategies 2 (TOPS 2) (Hardy et al., 2010); and the Athletic Coping Skills Inventory-28 (ACIS-28) (Smith et al.,1995). As can be seen from Table 3.2, there are vast overlaps of performance strategies measured between the different assessments. The TOPS 2 is, however, unique in that it provides a measurement of strategies used in competition and practice. The OMSAT-3 groups the skills under three different categories with respective subscales. Inspection of the subcategories shows overlap with what is assessed by most other instruments. The ACSI-28 differs in that it incorporates a coachability scale which is fitting in a sport coaching application. Table 3.2 provides an overview of certain instruments and strategies assessed.

Table 3.2

Instrument and Performance Strategy Assessed

Instrument	Performance Strategy
Athletic Coping Skills Inventory 28 (ACIS-28)	Coping with adversity, peaking under pressure, goal setting and mental preparation, concentration, freedom from worry, confidence and achievement motivation, and coachability
Bull's Mental Skills Questionnaire (BMSQ)	Imagery, mental preparation (goal setting), self-confidence, anxiety and worry management, concentration, relaxation and motivation
Psychological Skills Inventory (PSI)	Achievement motivation, goal directedness, activation control, concentration, imagery and maintaining self-confidence
Test of Performance Strategies 2 (TOPS 2)	The competition scale contains the following factors: goal setting, imagery, self-talk, negative thinking, relaxation, emotional control, automaticity, activation. The practice scale incorporates an attentional control factor but excludes the negative-thinking factor
The Ottawa Mental Skills Assessment Tool (OMSAT-3)	Foundation skills (goal setting, commitment and self-confidence), psychosomatic skills (stress reaction, fear control, relaxation and activation) and cognitive skills (imagery, mental rehearsal, focusing, refocusing and competition planning)

3.10 Conclusion

There is a great deal of literature on the underlying psychological drivers of performance outcomes. An overview of numerous dispositional traits, motivation, and performance strategies that are all relevant to performance have been outlined. Closer investigation of these strategies has highlighted overlapping areas and relationships between the factors, as well as their dynamic complexity and influence under certain conditions. Although debates exist and conceptual clarity is still amiss, all the discussed psychological characteristics have been related to performance-enhancing behaviour; however, most research studies have focused only on examining one or two of the psychological characteristics at a time.

The potential performance-enhancing benefits associated with developing characteristics such as mental toughness, resilience, hardiness, grit and other performance dispositions may potentially yield the envisaged “super” soldier who is required to function in today’s dynamic battle space. A comprehensive study investigating the dispositions, motivation, and performance strategies characteristic of SANDF military personnel will provide insight into their unique psychological composition and pave the way for future developmental interventions.

Chapter 4: Research Design and Methodology

4.1 Introduction

The aim of this chapter is to outline the research design and methods that were used to investigate the dispositional traits, motivation, and performance strategies of military personnel in the SANDF. Research design and methods can be described as the different layers that provide the means to uncover the ways and means of data gathering and analysis (Saunders et al., 2012). In other words, they pertain to the plans and procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis (Creswell, 2009).

4.2 Research Paradigm or Worldview

There are four primary worldviews or paradigms: post-positive, social construction, advocacy or participatory, and pragmatic (Creswell, 2009). A worldview can be described as an overarching philosophical framework of the way in which scientific knowledge is produced that guides one's approach to the inquiry (Brink et al., 2012). The post-positive worldview was applied to this study.

Post-positivism holds a deterministic philosophy in which causes determine effects or outcomes. Therefore, it seeks to identify and assess the sources that influence and cause particular outcomes. Knowledge is developed through careful observation and measurement of reality (Creswell, 2009*).* Traditionally, positivism emphasised the existence of one reality but while post-positivism also holds the belief of a single reality, it also understands the complexities pertaining to it (De Vos et al., 2011). Post-positivism approaches assume that reality is not fixed but is, instead, subjective and mentally constructed by individuals (Maree, 2007).

The rationale for using the post-positivist worldview in this study was that it allowed the researcher to investigate and identify the deterministic causes that manifested in the

performance behaviour of the related sample. Knowledge is developed through the measurement of reality, where reality is seen as complex and mentally constructed by individuals, while the researcher remains unbiased and objective through the use of appropriate methods.

Furthermore, the research is strongly rooted in the framework of positive psychology. As discussed in Chapter 2, the concept of human performance falls under the paradigm of positive psychology (Salama-Younes, 2011). As the proposed research aimed to investigate the dispositional traits, motivation, and performance strategies of military personnel related to performance, it can be concluded that it falls under the positive psychology paradigm applied in the military environment.

4.3 Research Methodology

Research methodology refers to the logic behind the research methods and techniques applied (Welman et al., 2005). It therefore applies to the scientific acquisition of knowledge of human behaviour in a variety of contexts. Table 4.1 provides a visual summary of the perspectives and research process utilised in this study that will be discussed in the relevant sections below.

Table 4.1

Summary of Research

Paradigm	Post-Positivism
Research Methodology	Quantitative Strategy
Research Design	Quantitative Cross-Sectional Design
Sampling Method	Non-probability quota Sampling
Data Collection Strategy and Procedure	Administration of instruments and questionnaires
Validity and Reliability	All Participants completing the same questionnaires in similar setting Using standardised and validated instruments Applicable Statistical Analysis

4.3.1 Research Design

The study adopted a quantitative approach in the form of a cross-sectional design. Quantitative research as described by Creswell (2009) is a means to test objective theories by examining relationships among variables. Variables such as those applicable to the study are measured typically through instruments so that numbered data can be analysed using relevant statistical procedures. The study design was also non-experimental as participants were not exposed to pre- and post-test procedures. In other words, the impact of an intervention was not investigated. A cross-sectional approach was followed where data was collected once-off at a particular moment in time with relevant sample groupings and using relevant instruments.

4.3.2 Sampling

The units of analysis were determined by means of a non-probability approach through quota sampling. This sampling method is considered to be the non-probability equivalent of stratified sampling where the purpose is to draw a sample that has the same characteristics as the entire population (Brink et al., 2012). In this case, the participants were selected based on their membership of identified groups.

The airborne-qualified participants were selected from the following stratum groups: Special Forces operators, pathfinders and paratroopers. Thus, all the participants from the three sub-groups belonged to the overarching airborne grouping. Any individual who did not have the necessary airborne qualification (completion of the basic static-line course) was excluded from the airborne sample. The greatest number of airborne-qualified members in the SANDF resides at units with a mandate to develop the airborne capacity. Therefore, through the applicable channels of command potential participants from these units were approached.

Non-airborne participants were selected based on ease of access with the inclusion criteria being that the participant had to be staffed as a uniformed member of the SANDF. Exclusion criteria pertaining to this grouping applied to any person who might be staffed in the SANDF but was not serving as a uniform member, as these members fell under the category of Public Service Act Personnel. Although Public Service Act Personnel members might at times, deploy with uniformed members, they are viewed as civilian and non-combatant and, in general, most do not have any military training. The complete sample was, therefore, composed of uniformed military personnel. Potential participants were approached through the applicable channels of command in order to discuss the availability of potential personnel. All potential participants were engaged in a military related activity at the time of the study such as: operationally deployed, awaiting deployment or attending a military course either as student or instructor.

Sampling is a process that ensures generalisability to the population (Welman et al., 2005). An important aspect, therefore, is the sample size to ensure generalisability with the least likelihood of errors. Brink et al. (2012) suggested the following factors be taken into consideration to determine suitable sample size: accuracy, size of population, nature of design, type of research, methods of data collection, statistical analysis and attrition rate of participants.

Pertaining to quantitative studies, a large sample size is seen as advantageous (Brink et al., 2012). A well-defined, non-probability method should contain a larger sample size which will better represent the population and findings will be more accurate (Maree, 2007).

To calculate sample size, the following formula can be used when the population size is known.

$$\text{Size} = \frac{X^2NP}{d^2(N-1) + X^2P(1-P)}$$

X^2 = Table value of chi-square

N = Population size

P = Population proportion

d = Degree of accuracy

In terms of the current study, the exact population size was not known, although it was very large (> 74 000). Using the above formula would, most likely, have produced a sample size that was not necessarily required. Therefore, the statistical analysis procedures formed the basis for consideration of the sample size.

In consideration of the statistical analysis procedures envisaged, specifically SEM with complex models, the aim was to obtain the largest possible sample size. Determining adequate sample size requirements for SEM is a challenge faced by investigators, peer reviewers and others (Wolf et al., 2013) but several approaches exist to determine minimum sample size requirements for SEM. MacCallum et al. (1999) demonstrated the influence of model characteristics which, in turn, raised doubts about the application of some of the generally accepted criteria. Kline (2011) indicated that a typical sample size in studies with SEM was approximately 200 participants; this number is close to the recommendation of above 250 (Hu & Bentler, 1999). To accommodate for potential missing data, and consequently the removal of incomplete data, the researcher envisaged a total sample of above 500 participants with at least 100 airborne-qualified participants.

4.3.3 Participants

Table 4.2 provides a breakdown of the sample characteristics inclusive of all respondents (N = 610) before missing responses were removed.

Table 4.2

Socio-Demographic Characteristics of Participants

Socio-demographics	N	%
Gender		
Male	421	69
Female	145	24
Missing	44	7
Age		
18 – 25	98	16
26 – 35	244	40
36 – 45	64	10
46 – 55	84	14
56 – 65	13	2
Missing	107	18
Race		
Asian	0	0
Black	516	85
Coloured	29	5
Indian	0	0
White	19	3
Other	0	0
Missing	46	8
Rank		
Private/Rifleman	340	56
Lance Corporal/ Lance Bombardier/ Able Seaman	61	10
Corporal	66	11
Sergeant	37	6
Staff Sergeant	24	4
Warrant Officer	5	1
Candidate Officer	2	0

Socio-demographics	N	%
Lieutenant	9	1
Captain	8	1
Major	4	1
Missing	54	9
Arm of Service		
SAMHS	17	3
SAAF	3	0
SAN	2	0
JOPS	30	5
SAA	513	84
Missing	45	7
Airborne Qualified		
Yes	164	27
No	393	64
Missing	53	9
Home Language		
Afrikaans	37	6
English	13	2
Ndebele	20	3
Northern Sotho	119	20
South Sotho	32	5
Swati	24	4
Tsonga	62	10
Tswana	75	12
Venda	35	6
Xhosa	56	9
Zulu	80	13
Other	4	1
Missing	53	9

SAMHS, South African Military Health Service; SAAF, South African Air Force; SAN, South African Navy; JOPS, Joint Operations; SAA, South African Army

4.3.4 Data Collection Procedure

The researcher collected most of the data by visiting the participants' respective military units across the country and administering the identified instruments. Registered psychologists staffed in the SANDF assisted the researcher with data collection when he could not visit the participants himself. These individuals were adequately briefed beforehand by the researcher to ensure consistency and standardisation. Potential participants were informed through the correct channels of SANDF command of the arranged dates for data collection. This procedure was followed to ensure the maximum number of available participants. All participants were briefed about the aim of the study and the voluntary nature of participation, and written consent was obtained before commencing data collection.

4.3.5 Data Collection Instruments

4.3.5.1 Selection of instruments. As indicated in the previous chapter, an array of instruments exist which can be used to investigate a chosen psychological characteristic. The researcher applied the following criteria for inclusion of an instrument in the battery of assessments: (1) Has the instrument previously been used in South Africa in a military and/or civilian context?; (2) Has the instrument previously been used in an international military environment?; (3) Is the instrument aligned with the chosen theory?; (4) Are the instrument the most comprehensive?; (5) The instrument displayed superior psychometric properties above others evaluating similar characteristics.; (6) The instrument displayed a good fit for the study in consideration of the context.

4.3.5.2 Socio-demographic and other characteristics. Socio-demographic information along with other descriptive information were collected through a self-developed

questionnaire. The questionnaire allowed the researcher to differentiate between the relevant groups and to gather additional descriptive information. The questionnaire was, however, anonymous to protect the identities of the participants. Numerical codes were assigned to the completed questionnaires. The participants completed the section that pertained to the respective group to which they belonged.

4.3.5.3 Dispositional Resilience Scale-II. The DRS-II (Sinclair et al., 2003) is an 18-item questionnaire designed to measure psychological hardiness. The instrument provides results for six factors: control, powerlessness, commitment, alienation, challenge and rigidity. The instrument incorporates the traditional three factors of hardiness (control, commitment, challenge) as well as an additional three factors. The first three are referred to as the positive dimensions where higher scores indicate a greater resource in dealing with stress. The other three dimensions are referred to as the negative dimensions and indicate a greater vulnerability to stress, thus a lower score on these dimensions would result in a greater degree of hardiness.

The respondents were provided with statements and asked to indicate the extent to which they felt the statement to be true. A 5-point Likert scale was provided that ranged from definitely false (1) to definitely true (5). For the purpose of analysis, the subscale scores and the total score on the positive and negative dimensions were used.

Although the measure of hardiness has not yet been utilised in South Africa, it has been used for international military studies (Delahaij et al., 2010; Lo Bue et al., 2016; Sinclair et al., 2003). Confirmatory factor analysis supported the hypothesised six-factor structure for the scale, and reliability analysis provided acceptable internal consistency levels (Sinclair et al., 2003). Internal consistency coefficients for the hardiness scales reported were all within acceptable ranges with Cronbach alphas ranging from 0.66 to 0.93 (Sinclair et al., 2003). The DRS-II has also been validated on a Dutch military sample with overall Cronbach alphas reported of 0.8 and 0.81 on two respective samples (Delahaij et al., 2010).

4.3.5.4 The Short Grit Scale (Grit-S). Duckworth et al. (2007) developed the Grit Scale, which is a 12-item questionnaire, measuring higher-order grit along with two sub-factors, namely consistency of interest and perseverance of effort. Psychometric indicators have shown that the scale demonstrates high internal consistency. Duckworth and Quin (2009) went on to develop the Short Grit Scale (Grit-S) which retains the two-factor structure of the original Grit Scale. However, the Grit-S retained only eight items and yielded improved psychometric properties when compared to its predecessor. Therefore, the developers recommended the Grit-S as an economical measure of perseverance and passion for long-term goals.

Respondents were asked to indicate how much they felt a statement applied to them in comparison to most people. Scores of one to five were assigned to their responses. A total score was calculated and the average obtained, where 5 indicated “extremely gritty” while 1 indicated “not at all gritty”. For analysis purposes, the grit total score as well as the subscale scores were used in the study.

Duckworth and Quinn (2009) reported adequate internal consistency, with Cronbach alphas ranging from 0.73 to 0.83. The Grit Scale and Grit-S have both been applied in a South African context although not in the military (Mason, 2018; Pendame, 2014). As discussed in Chapter 3, the instrument has been applied in studies on international military samples. Pendame (2014) reported a Cronbach’s alpha of 0.71 for the total grit score on the Grit-S, which was used on a sample of South African students.

4.3.5.5 The Sport Mental Toughness Questionnaire. The SMTQ is a 14-item measure of mental toughness consisting of three subscales: confidence, constancy and control. Respondents are provided with a statement and asked to indicate an applicable response. In this study, the SMTQ was used to evaluate the participants’ mental toughness (Sheard et al., 2009). A 4-point Likert scale was provided that ranged from not at all true (1) to very true (4). Scores were calculated for each subscale and added to provide a global

measure of mental toughness. For the purpose of this study, scores from the respective subscales as well as the total mental toughness score were used in the analysis.

Confirmatory factor analysis provided support for the three subscales with a goodness-of-fit index of 0.95, and internal reliability of the SMTQ subscales with Cronbach alphas of greater than 0.72 were also reported (Sheard et al., 2009). The SMTQ has also been used on South African samples, with reported Cronbach alphas of 0.74 for total mental toughness, 0.64 for confidence, 0.52 for constancy, and 0.67 for control (Cowden et al., 2016). Additional validity studies have also indicated a correlation between the higher-order mental toughness scores of the SMTQ and MTQ48 with a significant positive relationship ($r = .75$; $p < .001$) (Crust & Swann, 2011). Although the Cronbach alpha of the constancy scale, reported by Cowden et al. (2016), does not meet the minimum criteria (Field, 2005; Hair et al., 2010), the decision for inclusion of the SMTQ was not based on the relevance to a specific subscale but rather the psychometric properties of the instrument as a whole.

4.3.5.6 The Reinforcement Sensitivity Theory Personality Questionnaire. The RST-PQ (Corr & Cooper, 2016) is a 65-item questionnaire that measures six scales, including the FFFS, the BIS and four BAS factors, that is, reward interest, goal-drive persistence, reward reactivity, and impulsivity. The RST-PQ also provides a separate scale for defensive fight. For this study, the additional eight items from the defensive fight scale were included. The eight items were incorporated into the existing instrument and distributed as every ninth item, in order to prevent familiarity of items related to the same scale.

The instrument provides respondents with a list of statements about everyday feelings and behaviours and asks them to rate how accurately each statement describes them in general. A 4-point Likert scale was provided that ranged from not at all (1) to highly (4). Respective items load onto the different scales, thus adding up to a subscale score.

Alpha coefficients reported during the instrument development ranged from 0.74 to 0.93 for individual scales (Corr & Cooper, 2016). The RST-PQ has been utilised on a sample of South African students to investigate punishment and reward sensitivity, thus only the

BAS and BIS scales were used. Cronbach alphas reported for the BAS and BIS scales were 0.85 and 0.93, respectively (Hunt et al., 2017).

4.3.5.7 The Bull's Mental Skills Questionnaire. The BMSQ measures seven different scales: imagery, mental preparation (goal setting), self-confidence, anxiety and worry management, concentration, relaxation, and motivation (Bull et al., 1996). The questionnaire has 28 items and assesses participants along a 6-point Likert scale. Respondents were asked to indicate the extent to which they agree with the given statement and provide an applicable response. Item responses ranges from strongly disagree (1) to strongly agree (6). The instrument yields subscale scores and a total score.

The instrument has been used in South Africa across a range of sport disciplines with norms also generated (Edwards & Steyn, 2011; Edwards et al., 2014; Kruger et al., 2013). Cronbach alphas reported for the full scale on a South African sample was 0.89 (Edwards et al., 2014).

4.3.5.8 Brunel Mood Scale. The BRUMS was developed out of the POMS by Terry and Lane in 1999. The BRUMS measures six identifiable affective states through a self-report inventory, with respondents rating a list of 24 adjectives. The adjectives are words that describe feelings that people have. Respondents provided a rating on a 5-point Likert scale of how they have been feeling the previous week. Item responses ranged from not at all (0) to extremely (4). The six subscales measured by the instrument are: tension, depression, anger, vigour, fatigue and confusion. A Total Mood Distress (TMD) score can also be computed by summing all the subscale scores, except for vigour which is subtracted. All the respective subscale scores as well as the TMD score were used in the data analysis.

The instrument has also been used locally, specifically within the military, with norms having been developed for the South African population (Van Wijk, 2011). Van Wijk (2011) reported alpha coefficients that ranged from 0.66 to 0.89 for the subscales.

4.3.5.9 Multidimensional Work Motivation Scale. The MWMS (Gagné et al., 2015) was developed with the goal of using SDT in the field of organisational behaviour. The

instrument provides the respondent with 19 items. Respondents were asked to indicate to what extent the items correspond with the reason why they do or would put effort into their job. Respondents provided a rating for each item on a 7-point Likert scale of how strongly it corresponds for them. Item responses range from not at all (1) to completely (7). The MWMS provides scores for six dimensions: amotivation; extrinsic regulation–social; extrinsic regulation–material; introjected regulation; identified regulation; and intrinsic motivation. Scores thus indicate the dominant motivation form of the respondent.

The data gathered to validate the MWMS was obtained in seven languages across nine countries (Canada, Senegal, United Kingdom, Indonesia, Switzerland, Norway, China, France and Belgium) varying widely in their cultural values and economic systems, and across a wide variety of organisations and jobs. Data indicated that of 35 alpha coefficients only two (identified and introjected regulation on the German Form) were below 0.70, while the majority were above 0.8 and therefore acceptable (Gagné et al., 2015). The MWMS has been used on a South African sample of nurse leaders (Maria et al., 2020). The Cronbach alphas reported for the different types of motivation were: amotivation, 0.83; extrinsic regulation–social, 0.85; extrinsic regulation–material, 0.79; introjected regulation, 0.52; identified regulation, 0.88 and intrinsic motivation, 0.92.

4.3.5.10 Brief Sailor Resiliency Scale. The BSRS (Van Wijk & Martin, 2019) is an adapted form of the Comprehensive Airman Fitness instrument developed by Bowen, Jensen and Martin (2016). The only adaptations were a change to a 5-point Likert scale and a name change, with no item changes. The instrument assesses four domains of resilience: mental, physical, spiritual and social fitness. The instrument consists of 12 items. Each respondent provided a rating on each statement depending on how much they agree with the statement. Item responses ranged from not at all (1) to completely (4).The instrument yields scores for the respective dimensions as well as a total resilience score. Both subscale scores and total resilience score were used in the analysis.

The BSRS has been used locally and specifically within the South African military environment. The preliminary validation results of the BSRS for use in the South African Navy was satisfactory with Cronbach alphas ranging from 0.75 to 0.89 for the respective scales (Van Wijk & Martin, 2019).

4.3.5.11 Emotion Regulation Questionnaire. The ERQ was developed to measure two particular aspects related to emotion control: reappraisal and suppression (Gross & John, 2003). The individual self-reports how they feel about a statement involving their emotional experience and expression thereof, with a preferred strategy of emotion regulation which can thus subsequently be identified. The preliminary validation results of the ERQ were satisfactory with Cronbach alphas of 0.73 for the suppression and 0.79 for reappraisal scales (Gross & John, 2003). The original structure provided an exceptional fit across different ethnic groups and gender and, therefore, use thereof in future studies was highly recommended (Melka et al., 2011). The instrument has also been used locally (Ginton et al., 2022; Nicholson et al., 2021) with a reported alpha coefficient of 0.85 for the instrument (Nicholson et al., 2021).

4.3.6 Data Analysis

Quantitative data from the administered questionnaires were analysed using inferential and descriptive statistical methods. Descriptive statistics describe what the data looks like. Common techniques usually used in quantitative data analysis to describe the data are central tendency, mean, mode, average, standard deviation, skewness, kurtosis and correlations (Field, 2005). These descriptive values allow the researcher to compare variables numerically (Saunders et al., 2012). For the purpose of this study, descriptive statistical methods were fitting to investigate and compare the results of numerous variables and groupings, as obtained from the administered questionnaires.

An indication of the relationship between the variables is provided by means of a correlation. The correlation coefficient is a number between minus one and plus one; it

indicates the strength and direction of the relationship. A positive number indicates a direct relationship in which, as one variable increases, so will the other, whereas a negative number indicates an inverse relationship. The closer the number to plus or minus one, the stronger the correlation (Leedy & Ormrod, 2005). Based on the sample distribution, Pearson correlation coefficients between the factors were calculated for each instrument to ensure theoretical alignment of the instrument with reported results from the developers.

Inferential statistical methods were also employed in the study. Inferential statistics allow the researcher to infer from a sample to a population and to test a statistically based hypothesis (Leedy & Ormrod, 2005). A number of inferential statistical methods applied are discussed below.

Factor analysis is a parametric statistical procedure used to examine the correlations between variables and identify clusters of highly interrelated variables that reflect underlying themes referred to as factors within the data (Leedy & Ormrod, 2005). There are two common approaches of factor analysis to assess factor structure, namely CFA and exploratory factor analysis. The former is used to confirm and the latter to explore factors. In the exploratory factor analysis approach, there are no restrictions on cross-loading of items and items are allowed to freely load on different factors concurrently (Gomez & Stavropoulos, 2021). On the other hand, CFA does not allow cross-loading to take place and has, therefore, often been described as too constraining for use in certain circumstances (Asparouhov & Muthen, 2009; Marsh et al., 2014). A CFA approach was applied in the current study.

To investigate whether some of the differences between the variables were significant, the researcher used an independent samples t-test. A t-test is used to determine whether a statistical, significant difference exists between two means. In other words, to determine whether the difference is due to chance (Leedy & Ormrod, 2005). Several independent samples t-tests were conducted to investigate significant differences between the airborne- and non-airborne-qualified groups.

To develop a descriptive psychological model, SEM was conducted. This can be described as a multivariate technique combining aspects of CFA and multiple regression (Schreiber et al., 2006). This analysis enabled the researcher to simultaneously investigate a series of interrelated dependence variables among measured variables and latent variables and between latent constructs (Hair et al., 2010), thereby addressing the shortcomings of other techniques by allowing the researcher to simultaneously investigate multiple relationships between variables. Although SEM is viewed as a confirmatory technique, it can be used as an exploratory technique as well and it extends the possibility of relationships among the latent variables (Schreiber et al., 2006). Hair et al. (2010) stated that all SEM models have three common characteristics:

1. Estimate of multiple and interrelated dependence relationships
2. An ability to represent unobserved concepts in these relationships and account for measurement error in the estimation process
3. Define a model to explain the entire set of relationships

The envisaged end state of SEM is a developed model that has a good fit and is, therefore, an accurate representation of reality and the data. Hence, a developed model is described as having a goodness-of-fit, which depicts its validity. A number of goodness-of-fit measures have been developed and are usually used when evaluating a developed model.

In terms of goodness-of-fit indicators for the models, the following measures were used to determine their overall fit: chi-square test statistic (x^2), comparative fit index (CFI), root mean square error of approximation (RMSEA), goodness-of-fit index (GFI) and standardised root mean square residual (SRMR) (Hair et al., 2010; Hu & Bentler, 1995, 1998, 1999).

Thus, SEM was the appropriate technique to use in the development of the psychological models of the study. It allowed the researcher to investigate relationships between measured aspects and latent variables in an exploratory manner. Moreover, SEM

with maximum likelihood estimation was conducted and, in terms of goodness-of-fit, applicable indicators for models were used to determine the best model fit.

4.4 Reliability and Validity

The selected data collection instruments were chosen because they have proved to be statistically reliable and valid. Even so, it is the responsibility of the researcher to ensure that the reported results are reliable and valid. Reliability is obtained when scores or responses to items on an instrument are internally consistent, stable over time, and when the test administration and scoring thereof remains consistent (Creswell, 2009). To evaluate internal consistency, that is, whether the responses to items pertaining to an aspect were consistent, the researcher calculated the Cronbach's alpha coefficients applicable to the instruments. To ensure the reliability of the administration and scoring, a standardised programme for administration was followed across the groups, with the same order of test administration. Scoring instructions were implemented as instructed by the respective developers of each test.

Validity refers to the drawing of meaningful and useful inferences from the scores of the particular instrument used and whether one can trust the results as an accurate measurement of what was intended to be measured (Creswell, 2009). Internal validity refers to the extent to which a researcher can draw accurate conclusions about cause-and-effect and other relationships, in other words, whether the effects measured are a result of manipulating the independent variable and not another factor (Leedy & Ormrod, 2005). External validity refers to the extent to which the results can be applied to other situations beyond the study itself and thus be generalised to other contexts (Leedy & Ormrod, 2005).

Of particular importance to the study is instrument validity, which seeks to ascertain whether an instrument will accurately measure what it is supposed to measure in the context in which it is applied (Brink et al., 2012). To comprehensively evaluate the validity of the

questionnaires, Brink et al. (2012) suggested the following considerations: face validity, construct validity, criterion validity and content validity.

To ensure validity of the instruments used and for the purpose of model development using the factors from the respective instruments, the construct validity was of utmost importance. Therefore, to ensure validity, the underlying factor structure of the measurement instruments was explored. Confirmatory factor analysis using SEM with maximum likelihood estimation was conducted on the instruments to examine the underlying factor structure and dimensionality of the models as measurement instruments. The results were compared with those reported by the developers and, where applicable, to other research to compare the results from this study with the reported psychometric properties.

Creswell (2009) pointed out the following threats in line with internal and external validity: history, selection, mortality, maturation, interaction of selection and treatment, and interaction of history and treatment. Prior to onset of the study, these threats were evaluated and none were deemed to be a substantial threat to the validity of the study.

4.5 Ethical Considerations

Permission was sought and obtained from the relevant stakeholders and governing bodies within the SANDF, namely the Director of Psychology, General Officer Commanding Infantry Formation, General Officer Commanding Special Forces, Defence Intelligence and the 1 Military Health Research and Ethics committee. Permission was also obtained from the University of Pretoria Postgraduate Research and Ethics committee to conduct the study. Informed consent was obtained from the research participants before data collection commenced. The researcher ensured confidentiality of participant information through the use of separate documents. The first document obtained the participant's signed consent, the second document was a booklet inclusive of the selected instruments which was completed anonymously. Taking the sensitivity pertaining to the identities of the sample participants of this study into account, participants were informed of their right to continue or

withdraw should they wish to do so. The researcher ensured that no intentional harm was done to the participants and highlighted that there were no negative or positive consequences pertaining to participation or non-participation. All completed questionnaires were personally captured by the researcher. Electronic data will be kept by the researcher on his personal laptop with a password protected backup. Completed questionnaires will be archived at the researcher's place of work (Military Psychological Institute) for a minimum period of 15 years as per Directorate Psychology and guidelines of the Health Professions Council of South Africa. Access to the data will only be permitted by the researcher.

4.6 Conclusion

This chapter discussed the methodology that was applied to investigate the dispositional traits, motivation, and performance strategies of SANDF military personnel. It provided an overview of the sample, data collection instruments and statistical techniques applied during the data analysis phase. The following chapter provides descriptive statistics and the psychometric properties for each of the respective instruments used.

Chapter 5: Results – Descriptive Statistics and Instrument Psychometric Properties

5.1 Introduction

The aim of this chapter is to provide an outline of the results of the study. To investigate the dispositional traits, motivations, and performance strategies methodically, the psychometric properties of each instrument were first assessed. The data screening and preliminary analyses were conducted to evaluate reliability and validity. Validity was explored through CFA along with fit statistics to determine model fit. Internal consistency and reliability were assessed by calculating Cronbach's alpha coefficients for the various instruments and subscales. Exploring the psychometric properties of the instruments and ensuring their validity and reliability contributes to the development of scientifically sound, descriptive psychological models. The data for the current study was analysed using the Statistical Package for the Social Sciences version 23 (SPSS 23) in combination with Amos Graphics 22 software.

5.2 Descriptive Analysis

Data was screened for accuracy, outliers, missing values and normality (Hair et al., 2010). Questionnaires completed incorrectly and with missing data were removed from the study. Minimum and maximum values were investigated for each item and, where discrepancies were detected, it was clarified and corrected by referring to the raw data. Missing values resulted in the removal of the participants' data for that particular instrument but not for the other instruments. This process was followed in order to retain the largest possible sample when evaluating the psychometric properties of the instruments and determining model fit. This implies that the number of sample participants differed between instruments. The sample used for the developed models (Chapter 6) included only those

participants whose questionnaires had no missing data across all the instruments, that is, they completed every instrument and question.

Table 5.1 provides a breakdown of the descriptive statistics of the various instruments used in the study.

Table 5.1

Descriptive Statistics

Instrument	Subscale/Total	n	Mean	Median	SD	Min	Max
RST-PQ	BAS-Goal-Drive Persistence	461	25.66	27	2.86	11	28
	BAS-Impulsivity	461	17.10	17	3.98	8	31
	BAS-Reward Interest	461	23.34	24	3.33	10	28
	BAS-Reward Reactivity	461	29.89	31	4.54	13	40
	Behaviour Inhibition System	461	40.81	39	10.86	23	79
	Defensive Fight	461	20.42	21	4.72	8	32
	Fight-Flight-Freeze System	461	21.20	21	6.00	10	40
DRS-II	Alienation	580	4.50	4	1.80	3	15
	Challenge	580	11.16	12	3.21	3	15
	Commitment	580	12.63	13	1.93	4	15
	Control	580	13.72	14	1.41	7	15
	Powerlessness	580	4.50	4	1.94	3	14
	Rigidity	580	9.71	10	2.29	3	15
BRUMS	Anger	531	1.14	0	2.32	0	15
	Confusion	531	1.75	1	2.53	0	14

Instrument	Subscale/Total	n	Mean	Median	SD	Min	Max
	Depression	531	1.06	0	2.26	0	15
	Fatigue	531	2.93	2	3.43	0	16
	Tension	531	2.37	2	2.83	0	15
	Vigour	531	12.37	13	3.19	0	16
	Total Mood Distress	531	-3.11	-6	11.95	-16	56
BSRS	Mental	568	10.92	12	1.48	3	12
	Physical	568	9.45	10	2.35	1	16
	Social	568	8.80	9	2.98	0	12
	Spiritual	568	9.83	11	2.50	0	12
	Total Fitness	568	39.01	40	6.94	8	48
BMSQ	Anxiety & Worry	492	18.83	19	4.20	4	24
	Concentration	492	20.96	22	3.65	4	24
	Imagery	492	19.86	20	3.21	7	24
	Mental Preparation	492	21.24	22	2.66	8	24
	Motivation	492	20.48	21	3.00	5	24
	Relaxation	492	20.15	21	3.35	8	24
	Self-Confidence	492	21.35	22	2.88	12	24

Instrument	Subscale/Total	n	Mean	Median	SD	Min	Max
	Total Mental Skills	492	142.87	145	16.12	89	168
ERQ	Reappraisal	583	33.32	34	7.05	6	42
	Suppression	583	17.39	18	5.82	4	28
SMTQ	Confidence	565	19.26	20	3.85	6	24
	Constancy	565	14.68	15	1.66	7	17
	Control	565	11.71	12	2.44	4	16
	Total Mental Toughness	565	45.65	46	5.55	31	56
MWMS	Amotivation	526	4.00	3	2.52	3	21
	External Regulation-Material	526	10.55	10	5.18	3	21
	External Regulation-Social	526	9.69	9	4.72	3	21
	Identified Regulation	526	18.61	20	3.23	3	21
	Intrinsic Motivation	526	18.13	19	3.49	3	21
	Introjected Regulation	526	20.46	21	5.60	4	28
GRIT	Consistency of Interest	581	16.31	17	3.17	4	20
	Perseverance of Effort	581	17.12	17	2.17	8	20

RST-PQ, The Reinforcement Sensitivity Theory Personality Questionnaire; BAS, Behaviour Activation System; DRS, Dispositional Resilience Scale; BRUMS, Brunel Mood Scale; BSRS, Brief Sailor Resilience Scale; BMSQ, Bull's Mental Skills Questionnaire; ERQ, Emotion Regulation Questionnaire; SMTQ, Sports Mental Toughness Questionnaire; MWMS, Multidimensional Work Motivation Scale

Table 5.2 indicates the Cronbach's alpha coefficients for the various instruments and subscales:

Table 5.2

Cronbach's Alpha Coefficients

Instrument	Subscale/Total	N	α
RST-PQ	BAS-Goal-Drive Persistence	461	.736
	BAS-Impulsivity	461	.632
	BAS-Reward Interest	461	.754
	BAS-Reward Reactivity	461	.715
	Behaviour Inhibition System	461	.905
	Defensive Fight	461	.715
	Fight-Flight-Freeze System	461	.784
DRS-II	Alienation	580	.501
	Challenge	580	.681
	Commitment	580	.383
	Control	580	.531
	Powerlessness	580	.639
	Rigidity	580	.311
BRUMS	Anger	531	.841

Instrument	Subscale/Total	N	α
	Confusion	531	.771
	Depression	531	.832
	Fatigue	531	.848
	Tension	531	.803
	Vigour	531	.700
BSRS	Mental	568	.682
	Physical	568	.813
	Social	568	.862
	Spiritual	568	.873
	Total Fitness	568	.862
BMSQ	Anxiety & Worry	492	.670
	Concentration	492	.780
	Imagery	492	.553
	Mental Preparation	492	.709
	Motivation	492	.572
	Relaxation	492	.563
	Self-Confidence	492	.648

Instrument	Subscale/Total	N	α
ERQ	Reappraisal	583	.769
	Suppression	583	.712
SMTQ	Confidence	565	.812
	Constancy	565	.559
	Control	565	.559
	Total Scale	565	.732
MWMS	Amotivation	526	.676
	External Regulation -Material	526	.659
	External Regulation -Social	526	.659
	Identified Regulation	526	.814
	Intrinsic Motivation	526	.769
	Introjected Regulation	526	.683
GRIT	Consistency of Interest	581	.738
	Perseverance of Effort	581	.313

RST-PQ, The Reinforcement Sensitivity Theory Personality Questionnaire; BAS, Behaviour Activation System; DRS, Dispositional Resilience Scale; BRUMS, Brunel Mood Scale; BSRS, Brief Sailor Resilience Scale; BMSQ, Bull's Mental Skills Questionnaire; ERQ, Emotion Regulation Questionnaire; SMTQ, Sports Mental Toughness Questionnaire; MWMS, Multidimensional Work Motivation Scale

From Table 5.2, it is clear that the majority of the scales were found to have good internal consistency and reliability with the Cronbach's alpha coefficients (> .6), although some of the subscales yielded coefficients which did not meet the minimum criteria (Field, 2005; Hair et al., 2010).

5.3 Confirmatory Factor Analysis

In order to explore the underlying factor structure of the measurement instruments, CFA using SEM with maximum likelihood estimation was conducted on the instruments to examine the underlying factor structure and dimensionality of the models as measurement instruments. This was done to ensure the accurate investigation of the dispositional traits, motivation, and performance strategies that are characteristic of military personnel in the SANDF and as a preceding statistical process for the development of scientifically valid descriptive models. The validity of the instruments used therefore warranted evaluation. The CFAs were conducted with the original reported factor structures of the instruments as proposed by the developers. The statistical analysis procedures allowed factors within the confirmatory models to correlate, in accordance with theory on which the original developed instrument was based. Modification indices (significantly correlated errors) were used to ensure the best fit for the models with significant errors being allowed to correlate, based on their theoretical alignment, content and the judgement of the researcher.

In terms of goodness-of-fit indicators for the models, the following measures (Table 5.3) were used to determine the overall fit of the models (Hair et al., 2010; Hu & Bentler, 1995, 1998, 1999):

Table 5.3

Goodness-of-Fit Indicators for the Models

Indicator	Interpretation guideline
Chi-square test statistic	Significant chi-square (p <.05) indicates bad fit
CFI	Values ≥.90 indicate good fit
RMSEA	Values <.06 indicate good fit yet values <.08 may also indicate acceptable fit
GFI	Values ≥.90 indicate good fit
SRMR	Values <.08 indicate good fit

CFI, Comparative Fit Index; RMSEA, Root Mean Square Error of Approximation; GFI, Goodness-of-Fit Index; SRMR, Standardised Root Mean Square Residual

The item factor loadings after CFA was conducted indicate the significance of the loading of each item on the relevant factor. In line with the general rule of thumb and, in consideration of the sample size, only items with a factor loading of ≥.4 were considered significant (Field, 2005; Hair et al., 2010). The correlations between the factors were also explored in order to investigate whether the obtained results were congruent with theory regarding the assessed constructs and also results reported by the instrument developers. The following guidelines for interpretation were used: negligible (<.3), low (>.3 and <.5), moderate (>.5 and <.7), strong (>.7 and <.9) and very strong (>.9 to < 1.0) (Hinkle et al., 2003).

The CFAs conducted could not confirm the structures of several of the instruments as reported by the developers. To improve overall model fit and achieve a more parsimonious model, certain instruments were revised in accordance with theoretical and statistical substantiation. When taking into consideration improved reliability statistics, significant item loadings, factor correlations supportive of the theoretical model, and improved model fit, an overall improvement of the instruments psychometric properties was achieved. Given the adjusted psychometric properties yielded for this sample, the revised

instruments were adopted for further analysis. Of the total instruments used, four yielded revised factor/item structures. Three instruments retained their original factor structure but did not retain all the original items. Only two instruments retained the original structure along with all the original items. A short summary of each instrument's CFA is provided below.

5.3.1 Dispositional Resilience Scale-II

The DRS-II (Sinclair et al., 2003) is an 18-item questionnaire designed to measure psychological hardiness. The instrument provides results for six factors, namely control, powerlessness, commitment, alienation, challenge and rigidity.

Confirmatory factor analysis of the DRS-II indicated that certain items did not load significantly on the respective factors. Consequently, three items were removed and 15 items were retained. The original six-factor structure was also retained. Goodness-of-fit indicators (Table 5.4) indicated an improvement after changes were incorporated and the model fit was found to be adequate.

Table 5.4

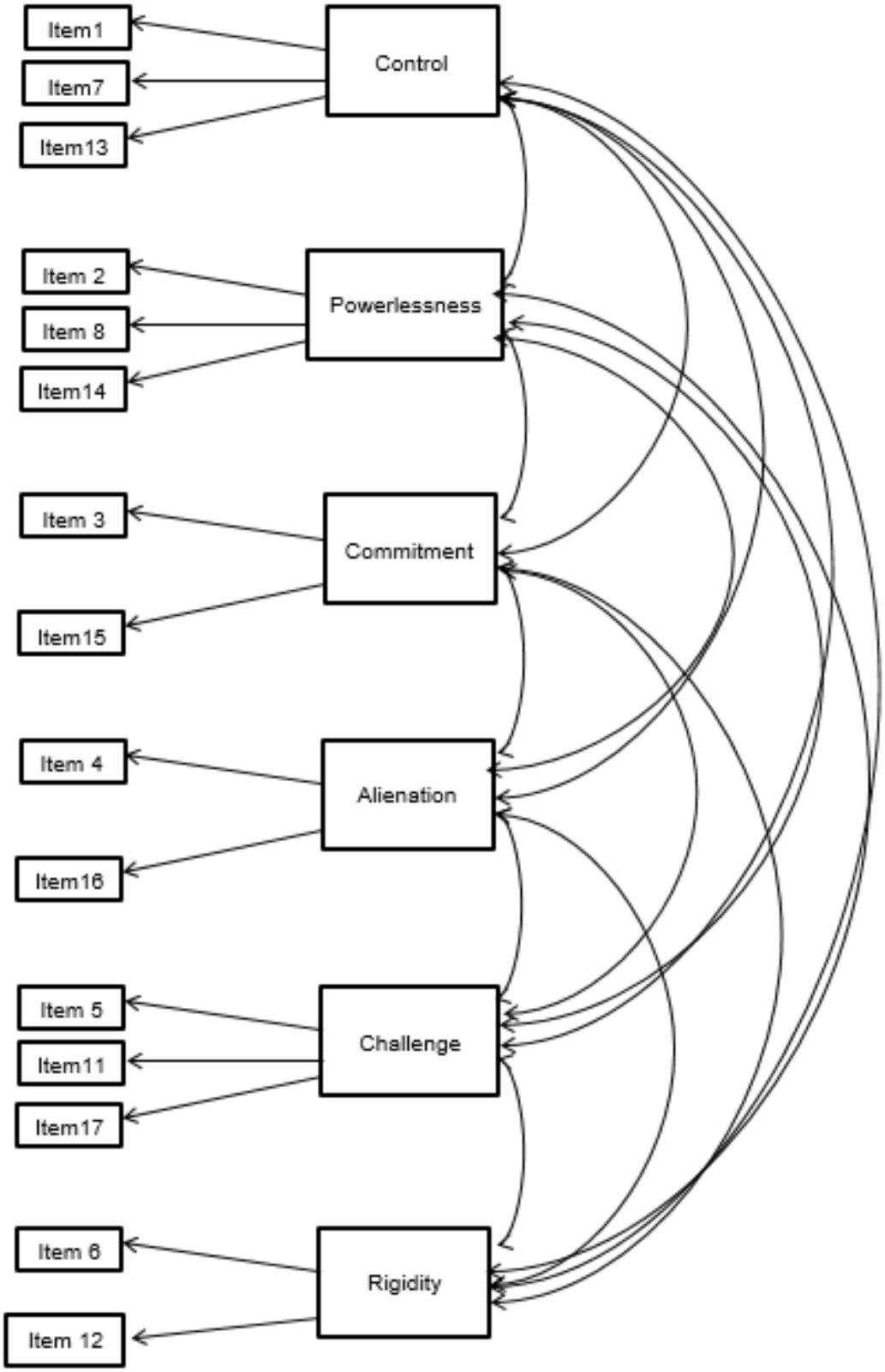
Revised DRS-II Factor Model Goodness-of-Fit Indices

Model	x^2	*Df*	*P*	CFI	RMSEA	GFI	SRMR
DRS-II 6-factor model	272.8	75	.000	.872	.067	.943	.0530

Figure 5.1 portrays the revised structure of the DRS-II.

Figure 5.1

Revised Structure DRS-II



5.3.2 Short Grit Scale

Duckworth and Quin (2009) developed the Grit-S, an eight-item questionnaire measuring higher-order grit along with two sub-factors, namely consistency of interest and perseverance of effort.

In line with the originally developed structure of the Grit-S, CFA was conducted (Duckworth & Quin, 2009). The CFA indicated that one item did not load significantly on its respective factor and was consequently removed. Grit as a higher-order factor could not be retained, although the original two factors measured were retained. Goodness-of-fit indicators (Table 5.5) indicated an improvement after changes were incorporated and a good model fit.

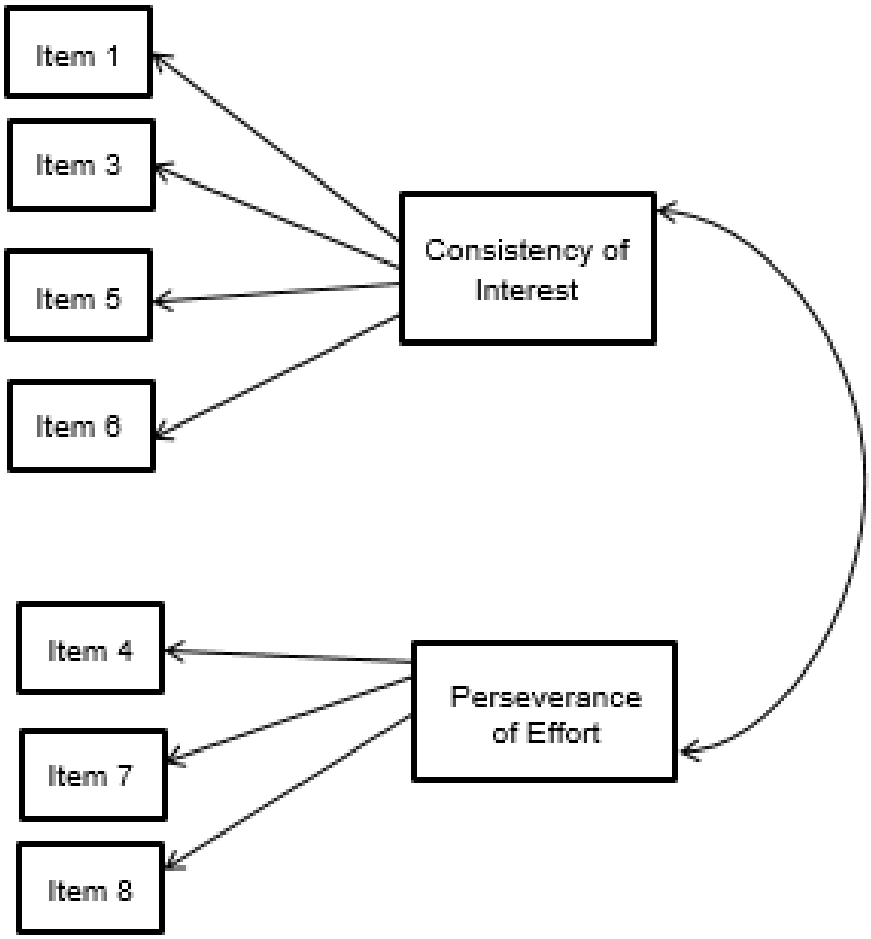
Table 5.5 *Revised GRIT-S Factor Model Goodness-of-Fit Indices*

Model	x^2	*Df*	*P*	CFI	GFI	RMSEA	SRMR
GRIT-S factor model	22.850	13	.044	.987	.988	.036	.0311

Figure 5.2 portrays the revised structure of the GRIT-S.

Figure 5.2

Revised Structure GRIT-S



5.3.3 Sport Mental Toughness Questionnaire

The SMTQ was used to evaluate the participants' mental toughness (Sheard et al., 2009). The SMTQ is a 14-item measure of mental toughness consisting of three subscales: confidence, constancy and control. The three subscales load onto the higher-order factor of mental toughness; therefore, a total mental toughness score can be computed by adding the factor scores together.

The CFA of the SMTQ indicated that the original model (Sheard et al., 2009) was not supported, with several items not loading significantly on their respective factors. Consequently, items were removed and the model postulated again. This yielded a

theoretical inconsistency (Sheard et al., 2009) and led to the removal of the control factor. Eight items were retained which assess the two factors, confidence and constancy. The two-factor model also yielded a better fit than the three-factor model with the incorporated changes. Goodness-of-fit indicators (Table 5.6) after changes were incorporated, indicated a good model fit.

Table 5.6

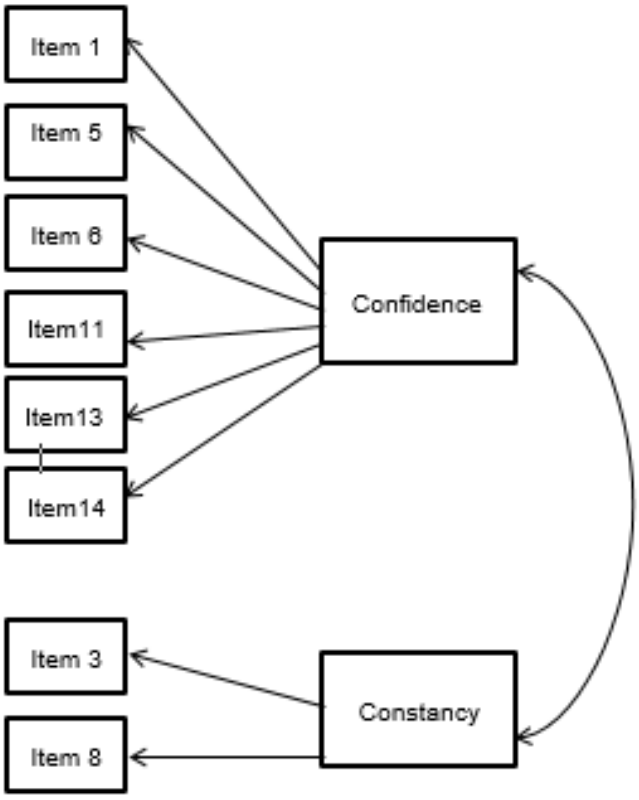
SMTQ Two-Factor Model Goodness-of-Fit Indices

Model	x^2	*Df*	*P*	CFI	GFI	RMSEA	SRMR
Two-factor model	50.453	18	.000	.978	.979	.057	.0309

Figure 5.3 portrays the revised structure of the SMTQ.

Figure 5.3

Revised Structure SMTQ



5.3.4 Reinforcement Sensitivity Theory Personality Questionnaire

The Reinforcement Sensitivity Theory of Personality Questionnaire (RST-PQ) (Corr & Cooper, 2016) is a 65-item questionnaire that measures six scales. The scales include the FFFS and the BIS along with four BAS factors (reward interest, goal-drive persistence, reward reactivity, and impulsivity). The RST-PQ also provides a separate scale of defensive fight, which was included in the study. Confirmatory factor analysis of the RST-PQ indicated that certain items did not load significantly on their respective factors as proposed by Corr and Cooper (2016). Eight items were, therefore, removed. The original six-factor structure of the RST-PQ was, however, retained. The scale for defensive fight, a single-factor model with eight items, was treated separately in accordance with the statistical analysis followed by Corr and Cooper (2016). Confirmatory factor analysis indicated that one item did not load significantly on the defensive fight factor and was, therefore, removed.

Goodness-of-fit indicators (Table 5.7) for the RST-PQ after changes were incorporated indicated mixed results pertaining to model fit. The SRMR (<.08) indicated an acceptable fit with the RMSEA (<.06) indicating a good fit of the hypothesised model. However, the CFI and GFI indicated an inadequate model fit (see Table 5.7). Lower CFI and GFI scores can be the result of a complex model with several latent variables, each with multiple indicators. Although most goodness-of-fit indicators attempt to accommodate for the complexity of models, with the exception of RMSEA, they have been found to be limited in this capacity (Cheung & Rensvold, 2002).

Table 5.7

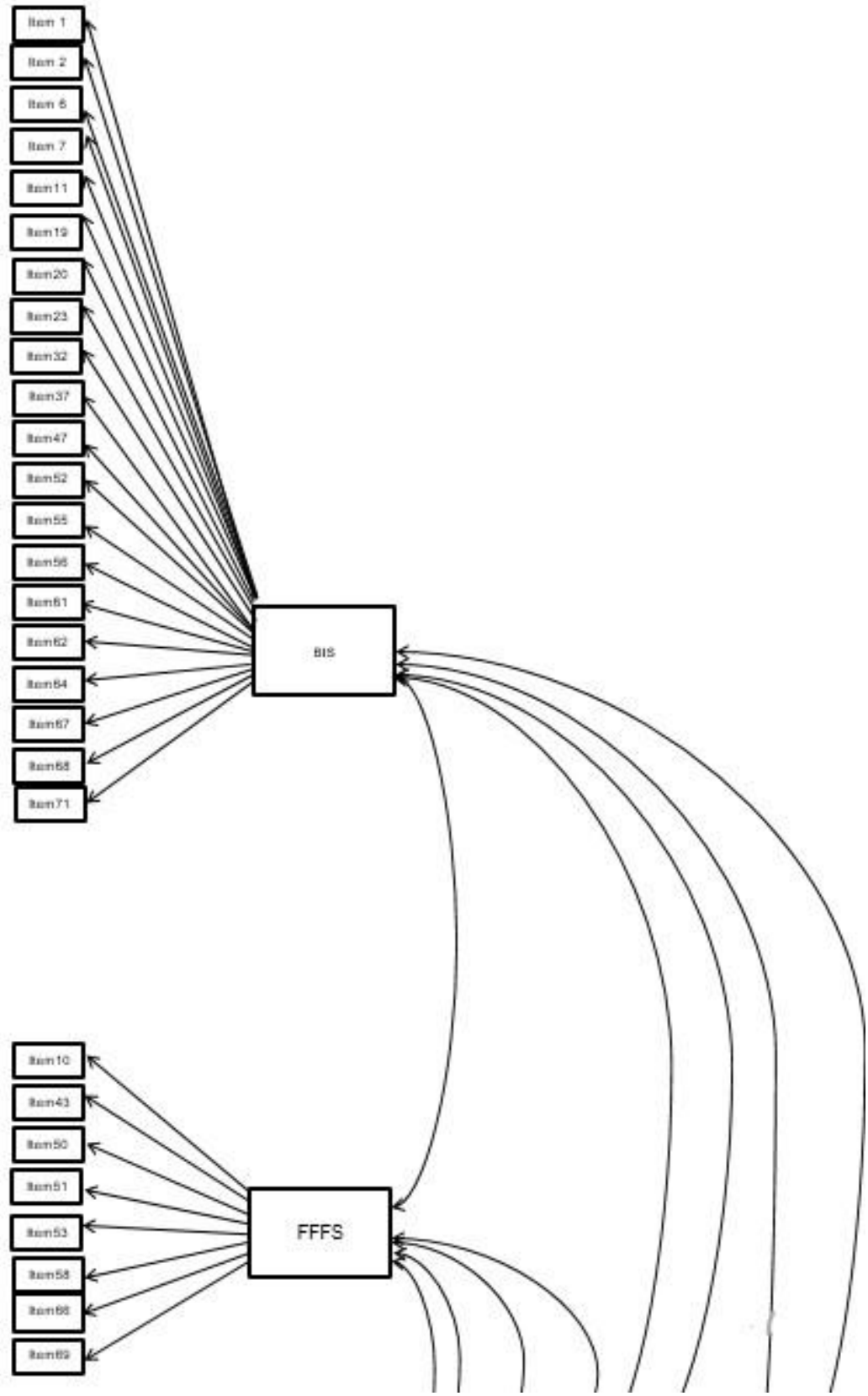
Revised RST-PQ Factor Model Goodness-of-Fit Indices

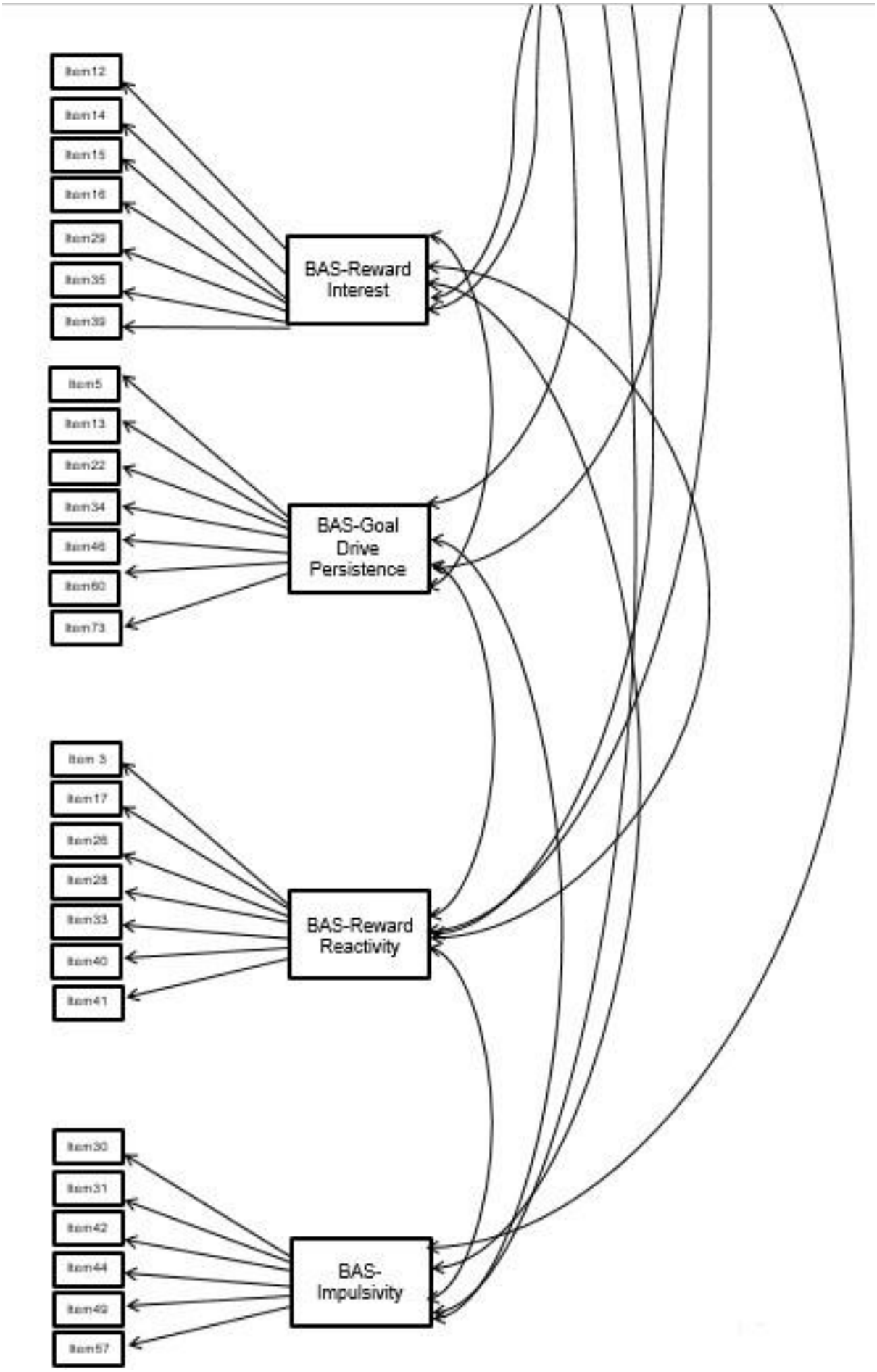
Model	x^2	*Df*	*P*	CFI	GFI	RMSEA	SRMR
RST-PQ factor model	2682.690	1465	.000	.843	.819	.043	.0679

Figure 5.4 portrays the revised structure of the RST-PQ.

Figure 5.4

Revised Structure RST-PQ





5.3.5 Bull's Mental Skills Questionnaire

Bull's Mental Skills Questionnaire (BMSQ) measures seven different scales, namely imagery, mental preparation (goal setting), self-confidence, anxiety and worry management, concentration, relaxation, and motivation (Bull et al., 1996). The instrument yields subscale scores that provide an indication of potential developmental areas for the individual. Confirmatory factor analysis of the BMSQ indicated that the original model (Bull et al., 1996) was not supported, with several items not loading significantly on their respective factors. In accordance with statistical justification and applicable research on performance strategies (Durand-Bush et al., 2001), factors were combined into four revised factors (foundation skills, psychosomatic skills, concentration and imagery). The revised four-factor structure was supported by CFA and Cronbach alphas for the revised scales were acceptable (>.6). Goodness-of-fit indicators (Table 5.8) indicated an improvement after changes were incorporated and resulted in a good model fit.

Table 5.8

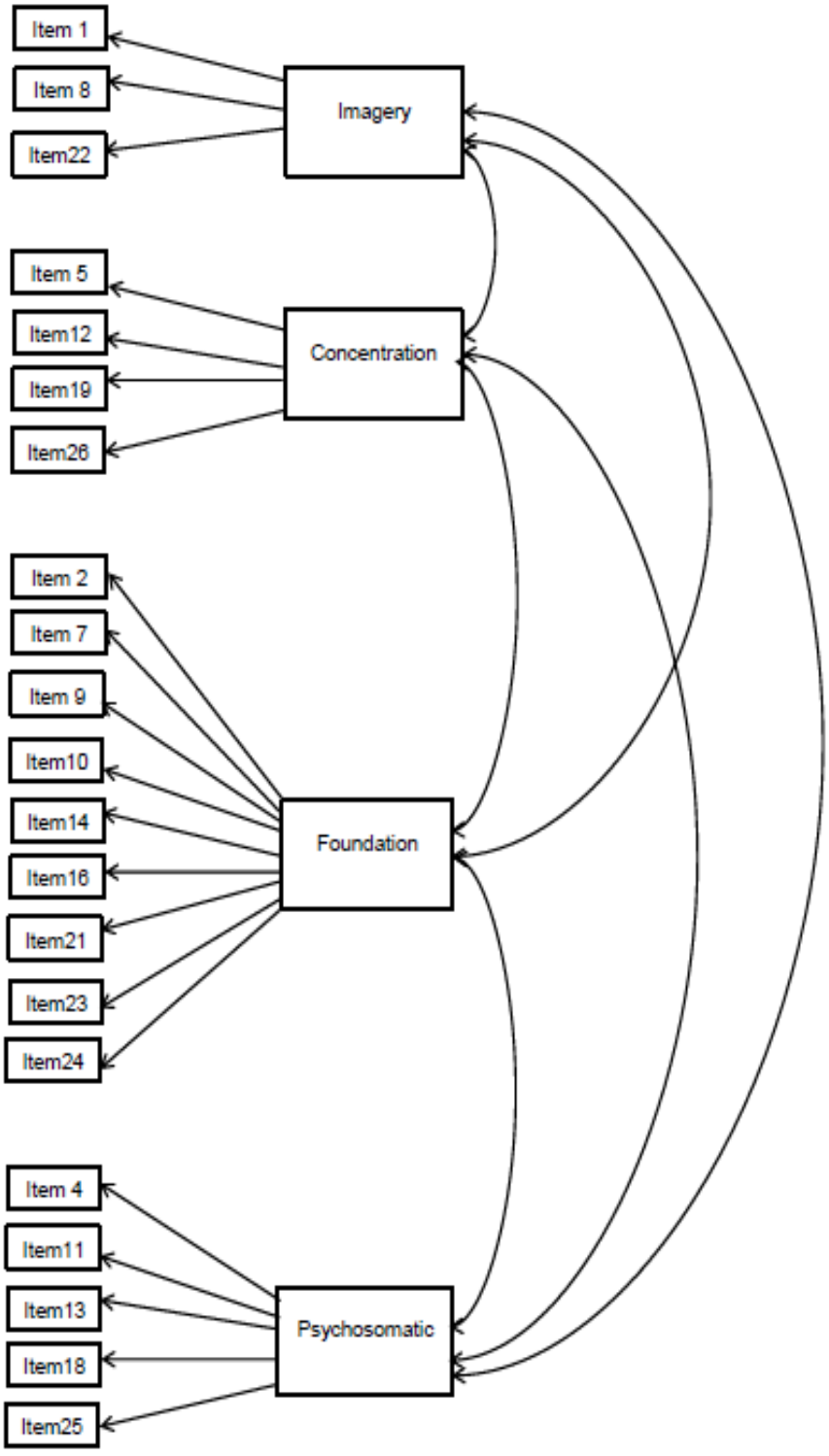
Revised BMSQ Four-Factor Model Goodness-of-Fit Indices

Model	x^2	*Df*	*P*	CFI	GFI	RMSEA	SRMR
4 factor model	499.677	182	.000	.910	.914	.060	.560

Figure 5.5 portrays the revised structure of the BMSQ.

Figure 5.5

Revised Structure BMSQ



5.3.6 Brunel Mood Scale

The BRUMS measures six identifiable affective states through a self-report inventory, with respondents rating a list of 24 adjectives (Terry et al., 1999). The six subscales measured are: tension, depression, anger, vigour, fatigue and confusion. A TMD score can also be computed by summing all the subscale scores except for vigour which is subtracted.

Confirmatory factor analysis of the BRUMS indicated that the original model (Terry et al., 1999) was supported, with all items loading significantly onto their respective factors (>.4). The CFI, RMSEA and SRMR suggested acceptable fit of the hypothesised model (see Table 5.9). The GFI score were just below rule of thumb for acceptable fit. It appears that the fit statistics indicate an adequate fit. Therefore, no adaptations were made to the original instrument.

Table 5.9

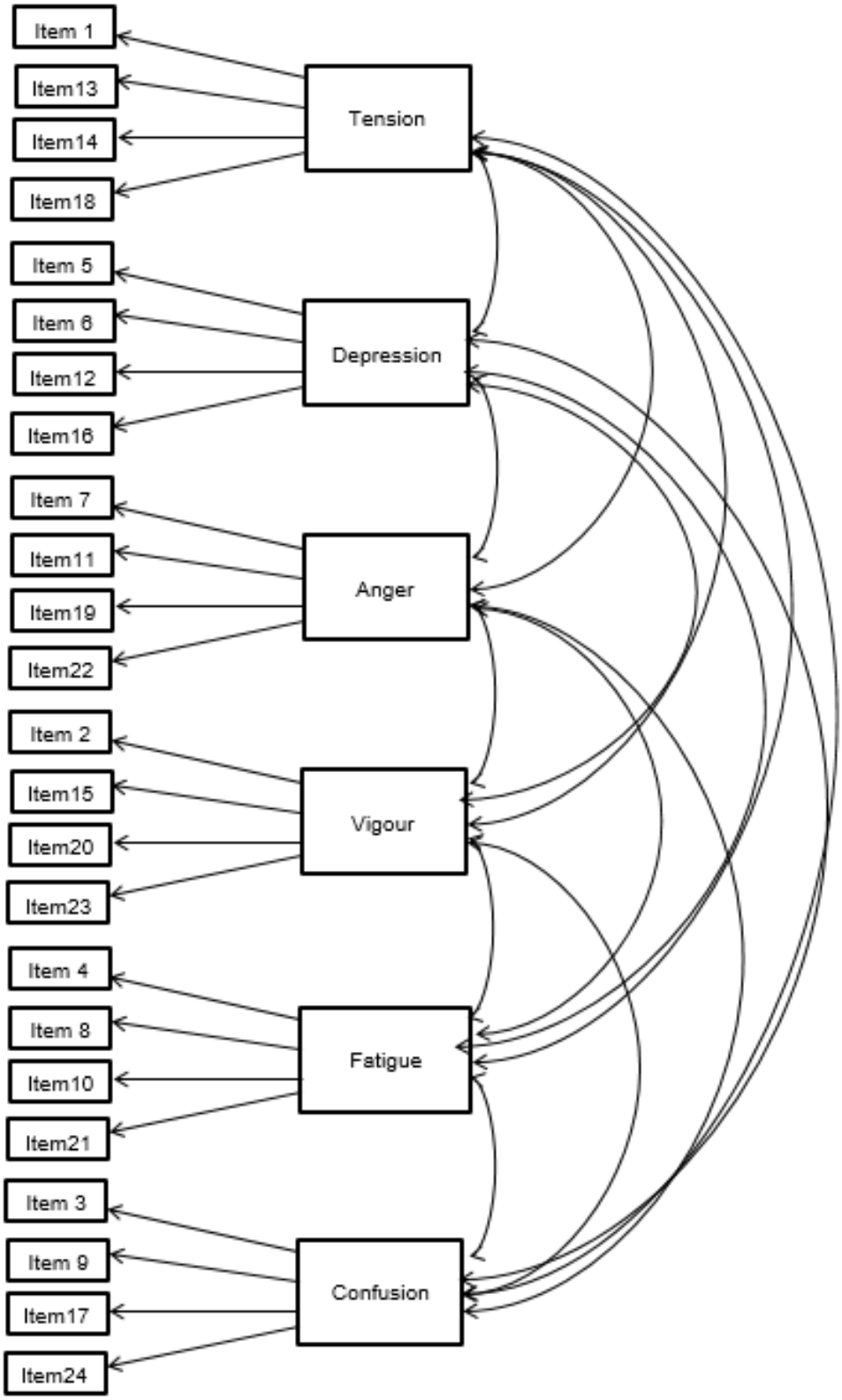
BRUMS Factor Model Goodness-of-Fit Indices

Model	x^2	*Df*	*P*	CFI	GFI	RMSEA	SRMR
BRUMS factor model	786.191	237	.000	.917	.887	.066	.0511

Figure 5.6 portrays the original supported structure of the BRUMS.

Figure 5.6

Original Structure BRUMS



5.3.7 Multidimensional Work Motivation Scale

The MWMS (Gagné et al., 2015) was developed in order to use SDT in the field of organisational behaviour. The MWMS contains 19 items and provides scores for six dimensions, namely amotivation; extrinsic regulation – social; extrinsic regulation – material; introjected regulation; identified regulation; and intrinsic motivation. Scores provide an indication of the dominant motivation form of the respondent.

Confirmatory factor analysis of the MWMS indicated that the original model (Gagné et al., 2015) was not supported, with certain items not loading significantly on their respective factors. In accordance with statistical justification and in alignment with the SDT of motivation (Decci & Ryan, 1958), a revised three-factor (self-determined motivation, amotivation and external regulation) model was explored. The revised three-factor structure was supported by CFA and Cronbach alphas for the revised scales were acceptable (>.6). The three-factor model also yielded a better fit than the original factor model. Goodness-of-fit indicators (see Table 5.10) after changes were incorporated indicated a good model fit. The changes incorporated yielded improved psychometric properties and the revised MWMS model was used for further analysis.

Table 5.10

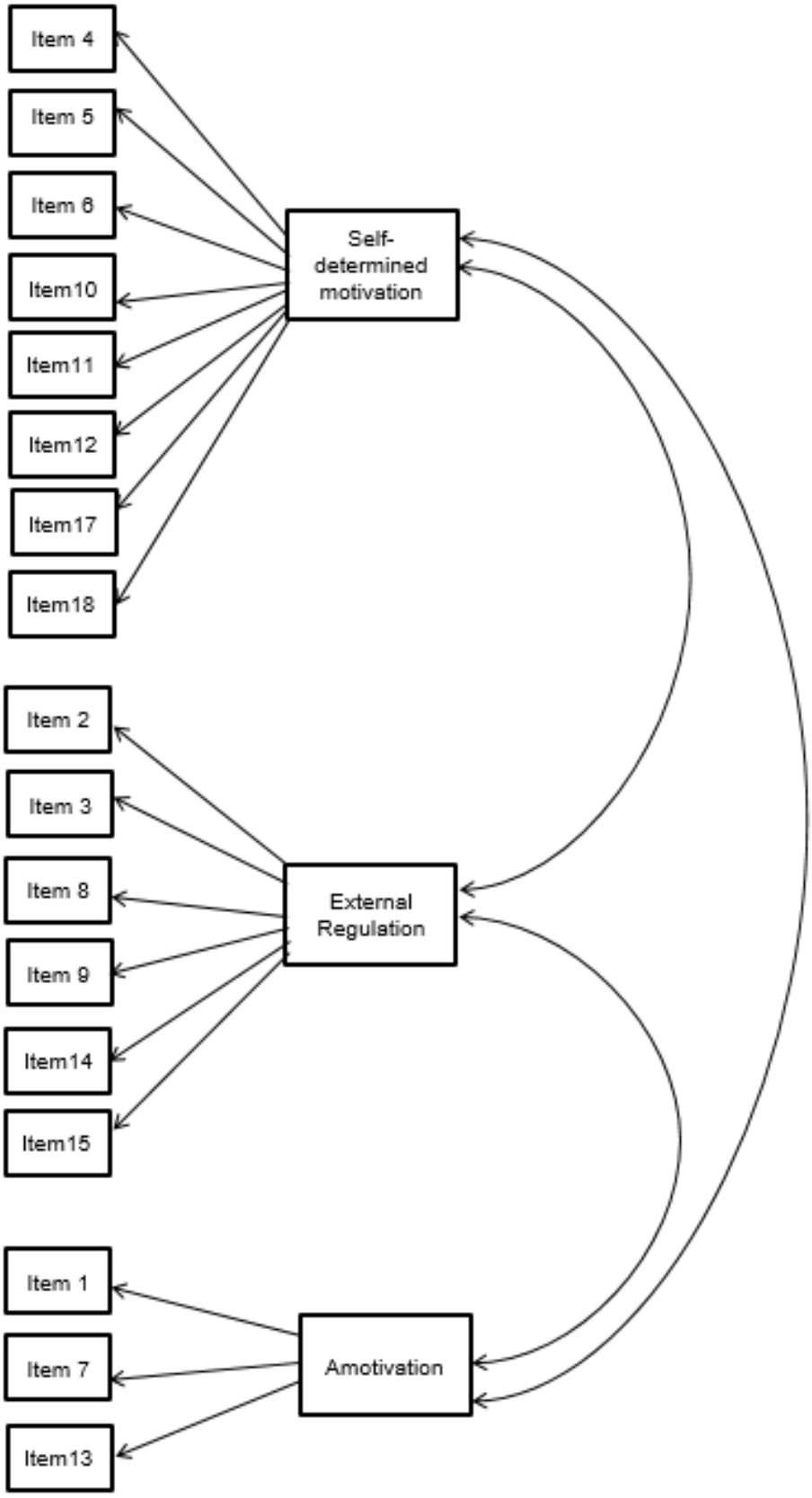
MWMS Revised Three-Factor Model Goodness-of-Fit Indices

Model	x^2	*Df*	*P*	CFI	GFI	RMSEA	SRMR
MWMS three-factor model	391.461	114	.000	.930	.918	.068	.0645

Figure 5.7 portrays the revised structure of the MWMS.

Figure 5.7

Revised Structure MWMS



5.3.8 Brief Sailor Resiliency Scale

The BSRS (Van Wijk & Martin, 2019) is an adapted form of the Comprehensive Airman Fitness instrument developed by Bowen, Jensen and Martin (2016). The instrument consists of 12 items assessing four domains of resilience, namely mental, physical, spiritual, and social fitness. The instrument yields scores for the respective dimensions as well as a total resilience (fitness) score.

Confirmatory factor analysis of the BSRS indicated that the original model (Van Wijk, & Martin, 2019) was supported with all items loading significantly onto their respective factors (>.4). In contrast to the chi-square statistic, the RMSEA, CFI, GFI and SRMR suggested good fit of the hypothesised model (see Table 5.11). Therefore, the original model was supported. The overall psychometric properties pertaining to the instrument were found to be satisfactory, and no adaptations were made to the original instrument.

Table 5.11

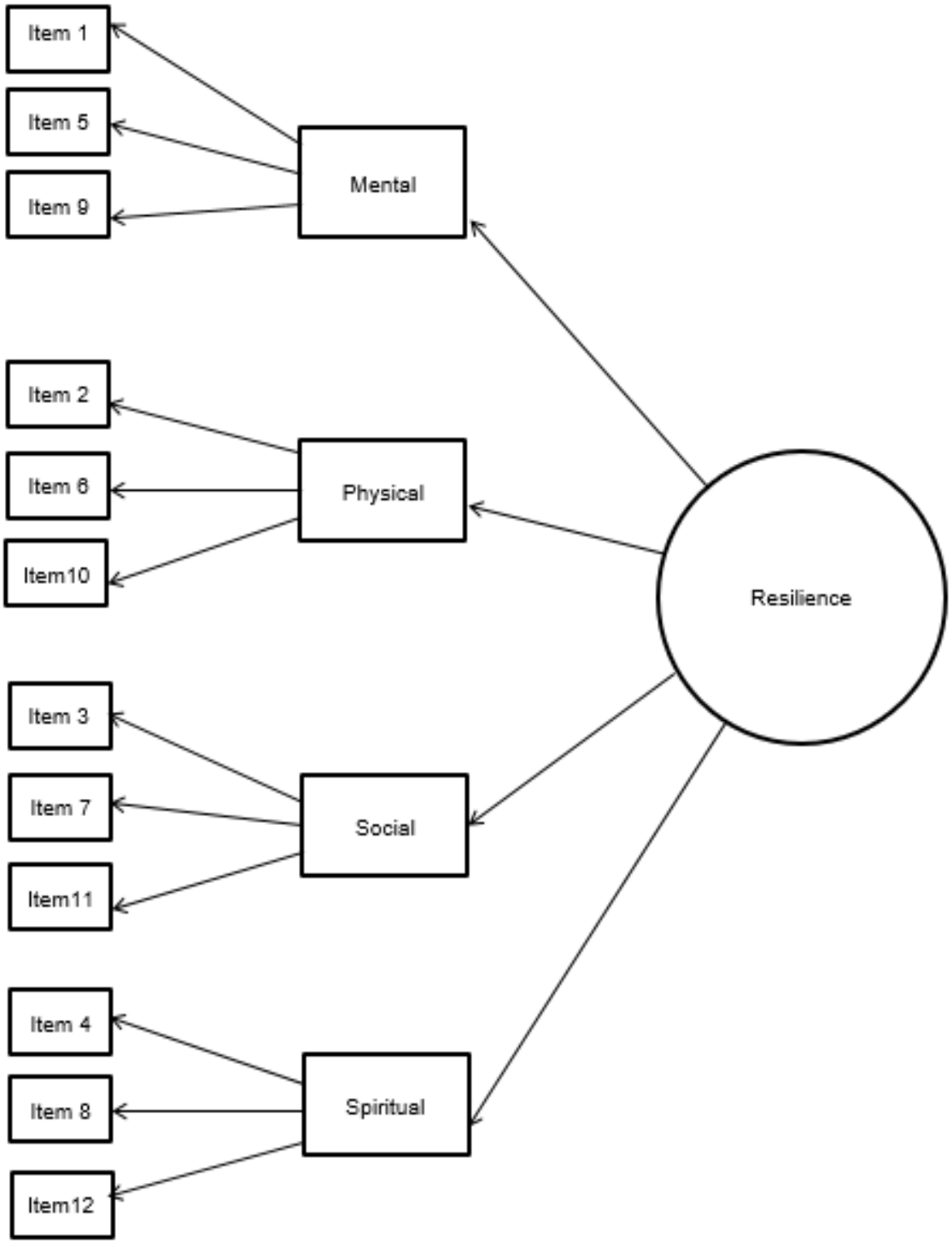
BSRS Factor Model Goodness-of-Fit Indices

Model	x^2	*Df*	*P*	CFI	GFI	RMSEA	SRMR
BSRS factor model	149.222	50	.000	.970	.958	.059	.0421

Figure 5.8 portrays the original supported structure of the BSRS

Figure 5.8

Original Structure BSRS



5.3.9 Emotion Regulation Questionnaire

The ERQ was developed to measure two particular aspects related to emotion control, namely reappraisal and suppression (Gross & John, 2003). The individual self-reports how they feel about a statement involving their emotional experience and the expression thereof, indicating a preferred strategy of emotion regulation.

Confirmatory factor analysis of the ERQ indicated that one item did not load significantly on its respective factor as proposed in the original factor analysis (Gross & John, 2003). This item was removed and the original two-factor structure of the instrument was retained. Goodness-of-fit indicators (see Table 5.12) showed an improvement after changes were incorporated and resulted in a good model fit.

Table 5.12

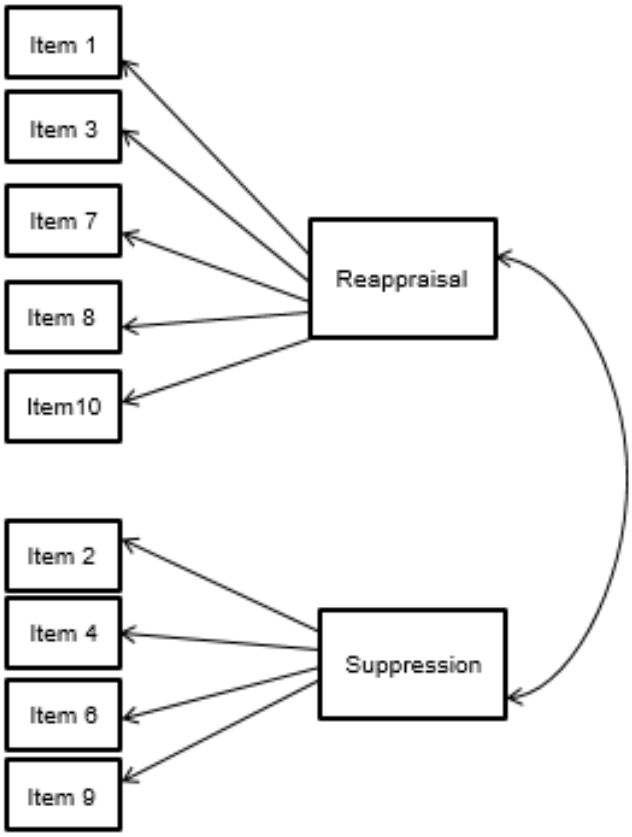
ERQ Factor Model Goodness-of-Fit Indices

Model	x^2	Df	P	CFI	GFI	RMSEA	SRMR
ERQ factor model	168.918	34	.000	.906	.944	.083	.0511

Figure 5.9 portrays the revised structure of the ERQ.

Figure 5.9

Revised Structure ERQ



5.4 Conclusion

This chapter provided the descriptive statistics and indicators of reliability and validity pertaining to the instruments used in the study. Numerous revised models displayed improved model fit while still remaining theoretically aligned with the original developers' proposed structure and applicable research. Considering the improved psychometric properties for this sample, where applicable, the revised instruments will be used for further analysis. Item loadings, fit statistics and correlation tables applicable to the analyses discussed above can be made available on request. Descriptive statistics of the revised instruments along with the development of the descriptive psychological models are detailed in the following chapter.

Chapter 6: Results – Descriptive Statistics, Comparative Analysis and Development of Psychological Models

6.1 Introduction

The aim of this chapter is to provide an overview of the results based on the revised instruments discussed in Chapter 5. Aligning with the objectives of the study outlined in Chapter 1, the results are presented as follows: first, the descriptive statistics pertaining to the revised instruments will be discussed; second, the significant differences between airborne- and non-airborne-qualified military personnel; and third, the development of descriptive psychological models for the sample.

6.2 Descriptive Statistics: Revised Instruments

To investigate the dispositional traits, motivation, and performance strategies that are characteristic of military personnel in the SANDF, descriptive statistics were computed following a detailed psychometric analysis of the factor structure of the instruments used in this study. The results portrayed are based on the revised instruments discussed above, and, where applicable, the original supported scales of the respective instruments. Percentages of the mean scores were calculated, which provides an indication of the average obtained on the specific scale.

Table 6.1 provides a breakdown of the descriptive statistics for the revised instruments.

Table 6.1

Descriptive Statistics: Revised Instruments

Instrument	Subscale/Total	n	Mean	Mean %	Median	SD	Min	Max
RST-PQ	BAS-Goal-Drive Persistence	461	25.66	92%	27	2.86	11	28
	*BAS-Impulsivity	461	11.22	47%	11	3.40	6	23
	BAS-Reward Interest	461	23.34	83%	24	3.33	10	28
	*BAS-Reward Reactivity	461	20.17	84%	21	3.17	8	24
	*Behaviour Inhibition System	461	37.97	43%	36	10.46	22	75
	*Defensive Fight	461	18.43	66%	19	4.38	7	28
	*Fight-Flight-Freeze System	461	16.07	50%	16	5.07	8	32
DRS-II	*Alienation	580	2.64	26%	2	1.20	2	10
	Challenge	580	11.16	74%	12	3.21	3	15
	*Commitment	580	8.82	88%	9	1.18	3	10
	Control	580	13.72	91%	14	1.41	7	15
	Powerlessness	580	4.50	30%	4	1.94	3	14
	*Rigidity	580	5.38	54%	6	2.13	2	10

Instrument	Subscale/Total	n	Mean	Mean %	Median	SD	Min	Max
	*Positive Factors	580	33.69	84%	34	4.44	17	40
	*Negative Factors	580	12.51	36%	12	3.97	7	31
BRUMS	Anger	531	1.14	7%	0	2.32	0	15
	Confusion	531	1.75	11%	1	2.53	0	14
	Depression	531	1.06	7%	0	2.26	0	15
	Fatigue	531	2.93	18%	2	3.43	0	16
	Tension	531	2.37	15%	2	2.83	0	15
	Vigour	531	12.37	77%	13	3.19	0	16
	Total Mood Distress	531	-3.11	__	-6	11.95	-16	56
BSRS	Mental	568	10.92	91%	12	1.48	3	12
	Physical	568	9.45	79%	10	2.35	1	16
	Social	568	8.80	73%	9	2.98	0	12
	Spiritual	568	9.83	82%	11	2.50	0	12
	Total Fitness	568	39.01	81%	40	6.94	8	48
BMSQ	Concentration	492	20.96	87%	22	3.65	4	24

Instrument	Subscale/Total	n	Mean	Mean %	Median	SD	Min	Max
	*Foundation skills	492	47.66	88%	49	5.73	14	54
	*Imagery	492	15.28	85%	16	2.38	8	18
	*Psychosomatic Skills	492	23.81	79%	25	5.10	5	30
ERQ	*Reappraisal	583	27.61	79%	29	6.46	5	35
	Suppression	583	17.39	62%	18	5.82	4	28
SMTQ	Confidence	565	19.26	80%	20	3.85	6	24
	*Constancy	565	7.16	90%	8	1.14	2	8
MWMS	Amotivation	526	4.00	19%	3	2.52	3	21
	*External Regulation	526	20.24	48%	19	9.12	6	42
	Self-Determined Motivation	526	48.98	87%	51	8.17	8	56
GRIT	Consistency of Interest	581	16.31	82%	17	3.17	4	20
	*Perseverance of Effort	581	14.02	93%	15	1.40	6	15
	*Total Grit	581	30.33	87%	31	3.88	14	35

RST-PQ, The Reinforcement Sensitivity Theory Personality Questionnaire; BAS, Behaviour Activation System; DRS, Dispositional Resilience Scale; BRUMS, Brunel Mood Scale; BSRS, Brief Sailor Resilience Scale; BMSQ, Bull's Mental Skills Questionnaire; ERQ, Emotion Regulation Questionnaire; SMTQ, Sports Mental Toughness Questionnaire; MWMS, Multidimensional Work Motivation Scale; * Scales that were revised

The results per instrument are portrayed below, with a comparison between the SANDF sample results and relevant research sample(s). Relevant samples were selected based on their characteristics. Preference was given to military and South African samples, and, if none were available, research results stemming from the sport environment and those used in the development of the instrument were chosen.

As certain scales were revised (see Chapter 5), a comparison with other research results was not always possible. Where scales were revised only with the removal of an item(s), a mean percentage score was calculated, which can be compared to mean percentages obtained by the comparative sample for that measured construct. This technique resembles proration of data, which is implemented when researchers have collected item-level data using questionnaires and obtained missing scores on one or more of the items comprising a scale. A prorated scale is computed by averaging the available items that measure a single construct (Mazza et al., 2015). Although proration is a useful technique, it can create potential bias (Mazza et al., 2015). Use of this technique in the current study allows for a comparison between the construct average on the revised scale and the relevant research results which used the original scale.

Graham (2009) has indicated that proration may be reasonable when (1) a relatively high proportion of the items (more than half) are used to form the scale score, (2) the item-total correlations are similar, and (3) the internal consistency reliability of the scale is high. Although the descriptive statistics based on the original developed instruments could be used, it would entail using results based on instruments with inferior psychometric properties, which is less reliable and less valid for the chosen sample. Taking the above into account, the researcher carefully considered the application of proration, and the revised versions with a proration approach was applied in the study.

6.2.1 Reinforcement Sensitivity Theory Personality Questionnaire

Table 6.2 provides the mean scores and percentages for the current study with a comparison to the results obtained during development of the instrument with a United Kingdom (UK) sample (Corr & Cooper, 2016).

Table 6.2

Comparison of RST-PQ Results

Instrument	Subscale	Mean	Mean %	Mean**	Mean (%) **
RST-PQ	BAS-Goal-Drive Persistence	25.66	92%	21.23	76%
	*BAS-Impulsivity	11.22	47%	19.82	62%
	BAS-Reward Interest	23.34	83%	18.48	66%
	*BAS-Reward Reactivity	20.17	84%	28.62	72%
	*Behaviour Inhibition System	37.97	43%	56	61%
	*Defensive Fight	18.43	66%	23.3	73%
	*Fight-Flight-Freeze System	16.07	50%	24.07	60%

RST-PQ, The Reinforcement Sensitivity Theory Personality Questionnaire; BAS, Behaviour Activation System; * Scales that were revised; ** Corr and Cooper, 2016

A comparison of the percentages indicates that the SANDF military personnel obtained higher percentages for the following scales: BAS-reward reactivity, BAS-reward interest and BAS-goal-drive persistence. Lower percentages were obtained for the military personnel on the following scales: FFFS, BAS-impulsivity, behaviour inhibition system and defensive fight. The comparison of the percentages indicates that there are several observable differences on some of the scales between the SANDF military personnel compared to the UK participants used during the development of the instrument.

6.2.2 Dispositional Resilience Scale-II

Table 6.3 provides the mean scores and percentages for the current study compared to the results obtained during development of the instrument with military personnel from the US National Guard (Sinclair & Oliver, 2003).

Table 6.3

Comparison of DRS-II Results

Instrument	Subscale/Total	Mean	Mean %	Mean**	Mean (%) **
DRS-II	*Alienation	2.64	26%	4.98	33%
	Challenge	11.16	74%	11.88	79%
	*Commitment	8.82	88%	12.27	82%
	Control	13.72	91%	12.72	85%
	Powerlessness	4.50	30%	4.8	32%
	*Rigidity	5.38	54%	9.51	63%
	*Positive Factors	33.69	84%	36.87	82%
	*Negative Factors	12.51	36%	19.29	43%

DRS, Dispositional Resilience Scale; *Scales that were revised; **Sinclair and Oliver, 2003

A comparison of the percentages indicates that the SANDF sample obtained higher percentages for the following scales: control, commitment and the combined positive factors. Lower percentages were obtained for the SANDF military personnel on the following scales: powerlessness, challenge, rigidity, alienation and the combined negative factors. A comparison of the percentages indicates that there are several observable differences on some of the scales between the sample groupings, although the observable differences are relatively small between the SANDF and the US National Guard military personnel.

6.2.3 Brunel Mood Scale

Table 6.4 provides the mean scores and percentages for the current study compared to results obtained during the development of South African norms using employed public service personnel (Van Wijk, 2011).

Table 6.4

Comparison of BRUMS Results

Instrument	Subscale/Total	Mean	Mean %	Mean*	Mean (%) *
BRUMS	Anger	1.14	7%	1.34	8%
	Confusion	1.75	11%	1.25	8%
	Depression	1.06	7%	1.16	7%
	Fatigue	2.93	18%	2.36	15%
	Tension	2.37	15%	1.73	11%
	Vigour	12.37	77%	11.05	69%
	Total Mood Distress	-3.11	---	-3.19	---

BRUMS, Brunel Mood Scale; *Van Wijk, 2011

A comparison of the scores indicates that the SANDF military personnel obtained higher scores for the following scales: tension, vigour, fatigue, confusion and total mood distress. Lower scores were obtained by the military personnel for the following scales: depression and anger. A comparison of the scores indicates that there are several observable differences on some of the scales between the military personnel and the normative sample from the public sector, although the observable differences appear to be relatively small and most of the results were similar.

6.2.4 Brief Sailor Resiliency Scale

Table 6.5 provides the mean scores and percentages for the current study compared to results obtained during a validation study of the BSRS on a South African Navy sample (Van Wijk & Martin, 2019).

Table 6.5

Comparison of BSRS Results

Instrument	Subscale/Total	Mean	Mean %	Mean*	Mean (%) *
BSRS	Mental	10.92	91%	10.39	87%
	Physical	9.45	79%	8.79	73%
	Social	8.80	73%	8.99	75%
	Spiritual	9.83	82%	10.13	84%
	Total Fitness	39.01	81%	38.3	80%

BSRS, Brief Sailor Resilience Scale; *Van Wijk and Martin, 2019

A comparison of scores indicates that the current study sample obtained higher scores compared to the South African Navy personnel on the mental, physical and total fitness scales, and lower scores on the social and spiritual scales. The comparison scores indicate that there were observable differences on some of the scales between the sample groups, although the differences were relatively small and most of the results were similar.

6.2.5 The Bull's Mental Skills Questionnaire

Table 6.6 below provides the mean scores and percentages obtained for the current study and, for comparison purposes, the results obtained from two studies on South African athletes (Kruger et al., 2013; Edwards and Steyn, 2011).

Table 6.6

Comparison of BMSQ Results

Instrument	Subscale/Total	Mean	Mean%	Mean **	Mean (%) **	Mean ***	Mean (%) ***
BMSQ	Concentration	20.96	87%	16.06	67%	17.88	75%
	*Foundation skills	47.66	88%	—	—	—	—
	*Imagery	15.28	85%	18.25	76%	18.48	77%
	*Psychosomatic Skills	23.81	79%	—	—	—	—

BMSQ, Bull's Mental Skills Questionnaire; *Scales that were revised; **Kruger et al., 2013; ***Edwards and Steyn, 2011

A comparison of the scores and percentages indicates that the military personnel obtained higher scores on both the imagery and concentration scales, and they may use these mental skills differently from South African athletes.

6.2.6 Emotion Regulation Questionnaire

Table 6.7 provides the mean scores and percentages for the current study, and, for comparison, the results obtained during research with UK athletes from individual and team sports competing from recreational to national level (Uphill et al., 2012).

Table 6.7

Comparison of ERQ Results

Instrument	Subscale/Total	Mean	Mean %	Mean**	Mean (%)**
ERQ	*Reappraisal	27.61	79%	26.22	62%
	Suppression	17.39	62%	15.56	56%

ERQ, Emotion Regulation Questionnaire; *Scales that were revised; **Uphill et al., 2012

A comparison of the scores and percentages indicates that the SANDF military personnel obtained higher scores on both the suppression and the reappraisal scales. This

indicates that SANDF military personnel use these emotion regulation techniques differently from those reported for UK athletes engaged in team and individual sports. Compared to US undergraduates from a diverse ethnic background, the same trend was noticed with SANDF military personnel scoring higher for both suppression and reappraisal techniques compared to the US undergraduates (Gross & John, 2003).

6.2.7 Sport Mental Toughness Questionnaire

Table 6.8 provides the mean scores and percentages for the current study. A comparison is provided with results from SMTQ validation study on UK athletes from a diverse range of sports and levels of competition (Sheard et al., 2009).

Table 6.8

Comparison of SMTQ Results

Instrument	Subscale/Total	Mean	Mean%	Mean Male **	Mean Male (%) **	Mean Female **	Mean Female (%) **
SMTQ	Confidence	19.26	80%	17.03	71%	14.65	61%
	*Constancy	7.16	90%	12.92	81%	12.91	81%

SMTQ, Sports Mental Toughness Questionnaire; *Scales that were revised; **Sheard et al., 2009

Additional studies that were completed with South African athlete samples indicate a mean score of 18.78 (78%) and 18.15 (76%) for confidence and 13.76 (86%) for constancy (Asamoah, 2013; Cowden et al., 2016). A comparison of the scores and percentages indicates that the SANDF military personnel obtained higher scores for both the confidence and constancy scales compared to the UK athletes. The results were, however, more closely aligned to those obtained with South African athlete samples (Asamoah, 2013; Cowden et al., 2016).

6.2.8 Multidimensional Work Motivation Scale

Table 6.9 provides the mean scores and percentages obtained for the current study together with comparative results from a study conducted across nine countries in seven languages. The comparative data pertains to the English-speaking sample (Gagné et al., 2014) as English is the official language used in the SANDF.

Table 6.9

Comparison of MWMS Results

Instrument	Subscale/Total	Mean	Mean %	Mean*	Mean (%) *
MWMS	Amotivation	4.00	19%	7.68	37%
	*External Regulation	20.24	48%	—	—
	*Self-Determined Motivation	48.98	87%	—	—

MWMS, Multidimensional Work Motivation Scale; *Scales that were revised; **Gagné et al., 2014

A comparison of the scores and percentages indicates that the SANDF military personnel obtained a lower score on the amotivation scale compared to the English-speaking-community samples across numerous other countries. The results indicated an 18% difference between SANDF military personnel and the English sample groups.

6.2.9 The Short Grit Scale

Table 6.10 below provides the mean scores and percentages obtained for the current study compared to the results obtained during construction and validation of the Grit-S using a sample of military personnel from the US Military Academy (Duckworth & Quinn, 2009). Research on a sample of South African students using the 12-item Grit Scale (Mason, 2018) is also included in the table.

Table 6.10

Comparison of Grit Results

Instrument	Subscale/Total	Mean	Mean%	Mean **	Mean (%) **	Mean ***	Mean (%) ***
Grit-S	Consistency of Interest	16.31	82%	11.6	58%	16.54	55%
	*Perseverance of Effort	14.02	93%	14.6	74%	19.46	65%
	*Total Grit	30.33	87%	27.2	68%	37.62	63%

*Scales that were revised; **Duckworth and Quinn, 2009; ***Mason, 2018

A comparison of the percentages indicates that the SANDF military personnel sample obtained higher percentages on both consistency of interest and perseverance of effort scales and on the total grit score when compared to the US Military Academy participants and the sample of South African students. The comparison indicates observable differences pertaining to grit between the SANDF military personnel and both the military and student samples.

6.3 Airborne- and Non-Airborne-Qualified Military Personnel

Independent samples t-tests using a 95% confidence interval were conducted to compare the results between airborne- and non-airborne-qualified military personnel on the different assessments utilised. Differentiation into separate groups yielded too small a sample size to develop separate psychological models for the airborne and non-airborne groups. T-tests and effect sizes (Cohen's d) were calculated to explore psychological differences between the groups.

Given the differences in training and environments in which these military personnel function, differences in psychological profiles may provide insight into unique psychological characteristics that drive performance in the airborne environment. The t-tests and effect sizes (Cohen's d) were calculated on the revised factor scales presented in Chapter 5. Effect

sizes were interpreted in accordance with guidelines provided by Cohen (1988) (0.8 = large, 0.5 = moderate and 0.2 = small). The results are presented below.

6.3.1 Emotion Regulation Questionnaire

Table 6.11 indicates that there was a statistically significant difference (p <.001) in the suppression scores between the airborne- (*M* = 19.09, *SD* = 4.90) and non-airborne-qualified samples (*M* = 16.70, *SD* = 6.02); *t*(364.01) = 4.95, *p* = 000. Cohen's effect size value (*d* = 0.44) suggested a small to moderate practical significance. There was also a statistically significant difference (p <.001) in the reappraisal scores between the airborne- (*M* = 29.29, *SD* = 5.02) and non-airborne-qualified samples (*M* = 26.97, *SD* = 6.81); *t*(402.41) = 4.50, *p* =.000. Further, Cohen's effect size value (*d* = 0.39) suggested a small to moderate practical significance. These results indicate that airborne-qualified military personnel use the emotion regulation techniques of reappraisal and suppression differently from non-airborne-qualified military personnel. Airborne-qualified military personnel had significant higher mean scores for both the reappraisal and suppression scales.

Table 6.11

ERQ Sample Statistics

Scale	Non-Airborne			Airborne			*t*	*df*	*p*	*d*
	n	Mean	SD	n	Mean	SD				
Reappraisal	415	26.97	6.81	164	29.29	5.02	4.500	402.408	.000*	.39
Suppression	415	16.70	6.02	164	19.09	4.90	4.950	364.013	.000*	.44

Note. n = Number of participants

6.3.2 Brunel Mood Scale

Table 6.12 indicates that there was a statistically significant difference (p <.001) in the vigour scores between the airborne- (*M* = 13.23, *SD* = 2.46) and non-airborne-qualified samples (*M* = 12.05, *SD* = 3.39); *t*(370.26) = 4.42, *p* =.000. Cohen's effect size value (*d* =

0.40) suggested a small to moderate practical significance. There was also a statistically significant difference (p <.01) in the confusion scores between the airborne- (*M* = 2.25, *SD* = 2.77) and non-airborne-qualified samples (*M* = 1.51, *SD* = 2.33); *t*(234.94) = 2.88, *p* =.004. However, Cohen's effect size value (*d* = 0.29) suggested a small practical significance. As well as a statistically significant difference (p <.01) in the fatigue scores between the airborne- (*M* = 3.53, *SD* = 3.52) and non-airborne-qualified samples (*M* = 2.68, *SD* = 3.33); *t*(525) = 2.604, *p* =.009, Cohen's effect size value (*d* = 0.25) suggested a small practical significance. The results, therefore, indicate that different mood states exist in airborne- and non-airborne-qualified military personnel. The airborne military personnel exhibited significantly higher mean scores for fatigue, confusion and vigour compared to the non-airborne military personnel.

Table 6.12

BRUMS Independent Samples Test

Scale	Non-Airborne			Airborne			*t*	*df*	*p*	*d*
	n	Mean	SD	n	Mean	SD				
Anger	378	1.01	2.18	149	1.36	2.46	1.592	525	.112	.15
Confusion	378	1.51	2.33	149	2.25	2.77	2.877	234.935	.004*	.29
Depression	378	0.96	2.16	149	1.20	2.23	1.129	525	.260	.11
Fatigue	378	2.68	3.33	149	3.53	3.52	2.604	525	.009*	.25
Tension	378	2.28	2.75	149	2.51	2.88	0.842	525	.400	.08
Vigour	378	12.05	3.39	149	13.23	2.46	4.422	370.258	.000*	.40
Total Mood Distress	378	-3.61	11.18	149	-2.38	12.78	1.087	525	.277	.10

6.3.3 Brief Sailor Resilience Scale

Table 6.13 indicates that there was a statistically significant difference (p <.01) in the physical scores between the airborne- (*M* = 9.87, *SD* = 2.15) and non-airborne-qualified samples (*M* = 9.28, *SD* = 2.4); *t*(336.39) = 2.82, *p* =.005. Cohen's effect size value (*d* = 0.26) suggested a small practical significance. Furthermore, a statistically significant difference (p <.001) was found in the social scores between the airborne- (*M* = 8.03, *SD* = 3.05) and non-airborne-qualified samples (*M* = 9.14, *SD* = 2.89); *t*(562)= 4.06, *p* =.000. Cohen's effect size value (*d* = 0.37) suggested a small to moderate practical significance. These results indicate that airborne-qualified military personnel display significantly different levels of social and physical resilience when compared with the non-airborne cohort. Airborne military personnel reported higher physical resilience and significantly lower social resilience.

Table 6.13

BSRS Independent Samples Test

Scale	Non-Airborne			Airborne			*t*	*df*	*p*	*d*
	n	Mean	SD	n	Mean	SD				
Mental	400	11.00	1.45	164	10.74	1.51	1.915	293.768	.057	.18
Physical	400	9.28	2.40	164	9.87	2.15	2.823	336.385	.005*	.26
Social	400	9.14	2.89	164	8.03	3.05	4.057	562	.000*	.37
Spiritual	400	9.83	2.54	164	9.85	2.39	0.087	562	.931	.01
Total Fitness	400	39.25	7.10	164	38.48	6.42	1.195	562	.233	.11

6.3.4 Dispositional Resilience Scale-II

Table 6.14 indicates there was a statistically significant difference (p <.01) in the challenge scores between the airborne- (*M* = 11.74, *SD* = 2.35) and non-airborne-qualified samples (*M* = 10.93, *SD* = 3.47); *t*(416.96) = 3.20, *p* =.001. Cohen's effect size value (*d* =

0.27) suggested a small practical significance. There was also a statistically significant difference (p <.05) in the rigidity scores between the airborne (*M* = 5.72, *SD* = 2.00) and non-airborne-qualified samples (*M* = 5.23, *SD* = 2.15); *t*(574) = 2.44, *p* =.015. Further, Cohen's effect size value (*d* = 0.24) suggested a small practical significance. As well as a statistically significant difference (p <.05) in the positive factors scores between the airborne-(*M* = 34.35, *SD* = 3.48) and non-airborne-qualified samples (*M* = 33.46 *SD* = 4.71); *t*(380.08) = 2.47, *p* =.014. Cohen's effect size value (*d* = 0.21) suggested a small practical significance. These results indicate that airborne-qualified military personnel display significantly different levels of psychological hardiness pertaining to the rigidity and challenge factors as well as the sum of the positive factors. The airborne military personnel exhibited significantly higher mean scores for challenge, rigidity and the sum of the positive factors.

Table 6.14

DRS-II Independent Samples Test

Scale	Non-Airborne			Airborne			*t*	***df***	***p***	***d***
	n	Mean	SD	n	Mean	SD				
Alienation	418	2.64	1.24	158	2.60	1.08	0.378	574	.706	.03
Challenge	418	10.93	3.47	158	11.74	2.35	3.200	416.958	.001*	.27
Commitment	418	8.85	1.15	158	8.79	1.21	0.510	574	.610	.05
Control	418	13.68	1.43	158	13.82	1.26	1.134	319.081	.258	.10
Powerlessness	418	4.47	1.91	158	4.51	1.96	0.244	574	.807	.02
Rigidity	418	5.23	2.15	158	5.72	2.00	2.438	574	.015*	.24
Positive Factors	418	33.46	4.71	158	34.35	3.48	2.471	380.08	.014*	.21
Negative Factors	418	12.35	4.06	158	12.83	3.62	1.310	574	.191	.12

6.3.5 Multidimensional Work Motivation Scale

Table 6.15 indicates that there were no statistically significant differences on any of the scales between the airborne- and non-airborne-qualified samples. These results indicate that airborne-qualified military personnel do not use different motivational strategies differently from non-airborne-qualified military personnel.

Table 6.15

MWMS Independent Samples Test

Scale	Non-Airborne			Airborne			*t*	*df*	*p*	*d*
	n	Mean	SD	n	Mean	SD				
Amotivation	374	3.99	2.53	148	3.94	2.39	0.229	520	.819	.02
External Regulation	374	20.34	9.31	148	20.04	8.69	0.343	520	.732	.03
Self-Determined Motivation	374	48.68	8.09	148	50.00	7.97	1.688	520	.092	.16

6.3.6 Sport Mental Toughness Questionnaire

Table 6.16 indicates that there was a statistically significant difference ($p < .01$) in the confidence scores between the airborne- (M = 19.90, SD = 2.96) and non-airborne-qualified samples (M = 19.02, SD = 4.11); $t(395.25) = 2.82$, p =.005. Further, Cohen's effect size value (d = 0.25) suggested a small practical significance. The result indicates that airborne-qualified military personnel have a higher confidence level than the non-airborne-qualified cohort.

Table 6.16

SMTQ Independent Samples Test

Scale	Non-Airborne			Airborne			*t*	*df*	*p*	*d*
	n	Mean	SD	n	Mean	SD				
Confidence	404	19.02	4.11	158	19.90	2.96	2.824	395.246	.005*	.25
Constancy	404	7.12	1.21	158	7.28	0.91	1.477	560	.140	.15

6.3.7 Bull's Mental Skills Questionnaire

Table 6.17 indicates there was a statistically significant difference (p <.001) in the imagery scores between the airborne- (*M* = 15.86, *SD* = 2.08) and non-airborne-qualified samples (*M* = 15.03, *SD* = 2.45); *t*(490) = 3.63, *p* =.000. Cohen's effect size value (*d* = 0.37) suggested a small to moderate practical significance. There was also a statistically significant difference (p <.05) in the foundational skills scores between the airborne- (*M* = 48.51, *SD* = 4.81) and non-airborne-qualified samples (*M* = 47.29, *SD* = 6.07); *t*(357.31) = 2.39, *p* =.017. Cohen's effect size value (*d* = 0.22) suggested a small practical significance. These results indicate that airborne-qualified military personnel use certain mental skills differently from non-airborne-qualified military personnel. The airborne military personnel exhibited significantly higher mean scores for imagery and foundational skills.

Table 6.17

BMSQ Independent Samples Test

Scale	Non-Airborne			Airborne			*t*	*df*	*p*	*d*
	n	Mean	SD	n	Mean	SD				
Concentration	341	21.01	3.59	151	20.83	3.80	0.515	490	.607	.05
Foundation skills	341	47.29	6.07	151	48.51	4.81	2.392	357.314	.017*	.22
Imagery	341	15.03	2.45	151	15.86	2.08	3.626	490	.000*	.37
Psychosomatic skills	341	24.11	5.08	151	23.15	5.10	1.919	490	.056	.19

6.3.8 Short Grit Scale

Table 6.18 indicates that there were no statistically significant differences on any of the scales between the airborne- and non-airborne-qualified samples. These results indicate that airborne-qualified military personnel do not differ significantly on their level of grit compared to non-airborne-qualified military personnel.

Table 6.18

GRIT-S Independent Samples Test

Scale	Non-Airborne			Airborne			*t*	*df*	*p*	*d*
	n	Mean	SD	n	Mean	SD				
Consistency of Interest	416	16.40	3.18	162	16.11	3.11	0.992	576	.322	.09
Perseverance of Effort	416	14.07	1.38	162	13.93	1.37	1.148	576	.251	.10
Total Grit	416	30.47	3.83	162	30.04	3.89	1.225	576	.221	.11

6.3.9 Reinforcement Sensitivity Theory Personality Questionnaire

With respect to the RST-PQ, Table 6.19 indicates there was a statistically significant difference (p <.001) in the FFFS scores between the airborne- (*M* = 14.42, *SD* = 3.79) and non-airborne-qualified samples (*M* = 16.73, *SD* = 5.37); *t*(343.41) = 5.20, *p* =.000, with a moderate practical significance (*d* = 0.50) suggested. There was also a statistically significant difference (p <.05) on the BIS scores between the airborne- (*M* = 39.72, *SD* = 10.14) and non-airborne-qualified samples (*M* = 37.26, *SD* = 10.48); *t*(456) = 2.30, *p* =.022. However, Cohen's effect size value (*d* = 0.24) suggested a small practical significance. Moreover, a statistically significant difference (p <.01) was found on the BAS-Impulsivity scores between the airborne- (*M* = 12.05, *SD* = 3.39) and non-airborne-qualified samples (*M* = 10.90, *SD* = 3.35); *t*(456) = 3.35, *p* =.001, with Cohen's effect size value (*d* = 0.34) reflecting a small to moderate practical significance. There was also a statistically significant difference (p <.05) on the BAS- goal-drive persistence scores between the airborne- (*M* = 26.11, *SD* = 2.14) and non-airborne-qualified samples (*M* = 25.50 *SD* = 3.03); *t*(343.43) = 2.40, *p* =.017. Cohen's effect size value (*d* = 0.23) suggested a small practical significance. On the defensive fight scale, there was also a statistically significant difference (p <.001) between the airborne- (*M* = 19.62, *SD* = 4.02) and non-airborne-qualified samples (*M* = 17.93, *SD* = 4.41); *t*(456) = 3.83, *p* =.000. Effect size was small to moderate (*d* = 0.40). These results indicate that airborne-qualified military personnel differ significantly and airborne military personnel presented with significantly higher BAS-impulsivity, BAS-goal-drive persistence, BIS and defensive fight and significantly lower FFFS than the non-airborne military personnel.

Table 6.19

RST-PQ Independent Samples Test

Scale	Non-Airborne			Airborne			*t*	*df*	*p*	*d*
	n	Mean	SD	n	Mean	SD				
BAS-Goal-Drive Persistence	325	25.50	3.03	133	26.11	2.14	2.399	343.433	.017*	.23
BAS-Impulsivity	325	10.90	3.35	133	12.05	3.39	3.346	456	.001*	.34
BAS-Reward Interest	325	23.31	3.53	133	23.38	2.83	0.242	303.785	.809	.02
BAS-Reward Reactivity	325	20.22	3.25	133	20.04	2.97	0.572	456	.567	.06
BIS	325	37.26	10.48	133	39.72	10.14	2.301	456	.022*	.24
Defensive Fight	325	17.93	4.41	133	19.62	4.02	3.827	456	.000*	.40
FFFS	325	16.73	5.37	133	14.42	3.79	5.197	343.414	.000*	.50

FFFS, Fight-Flight-Freeze System; BIS, Behaviour Inhibition System; BAS, Behaviour Activation System

6.3.10 Summary

The results of the analysis indicate several statistically significant differences between the airborne- and non-airborne-qualified military personnel. These results indicate that airborne-qualified military personnel differ significantly in terms of numerous psychological characteristics from non-airborne-qualified military personnel. Explanations and implications will be discussed in the following chapter.

6.4 Constructing a Descriptive Psychological Model

The potential factor structure of a descriptive psychological model was explored through CFA using SEM with maximum likelihood estimation. In order to develop a descriptive psychological model, the originally supported or revised factor structures as discussed in Chapter 5 were utilised.

In terms of goodness-of-fit indicators for the models, the following measures (see Table 6.20) were used to determine the overall fit of the models (Hair et al., 2010; Hu & Bentler, 1995, 1998, 1999). The chi-square statistic, however, is sensitive to sample size with larger samples tending to yield a significant result (Bentler & Bonnet, 1980; Hair et al., 2010).

Table 6.20

Goodness-of-Fit Indicators for the Models

Indicator	Interpretation guideline
Chi-square test statistic	Significant chi-square (p <.05) indicates bad fit
CFI	Values ≥.90 indicate good fit
RMSEA	Values <.06 indicate good fit yet values <.08 may also indicate acceptable fit
GFI	Values ≥.90 indicate good fit
SRMR	Values <.08 indicate good fit

CFI, Comparative Fit Index; RMSEA, Root Mean Square Error of Approximation; GFI, Goodness-of-Fit Index; SRMR, Standardised Root Mean Square Residual

The statistical analysis procedure allowed factors within the confirmatory models to correlate, in accordance with theory from the developed instruments. Modification indices (significantly correlated errors) were used to ensure the best fit for the models with significant errors being allowed to correlate based on their theoretical alignment, content and the judgement of the researcher.

The item factor loadings indicate the significance of the loading of each item on the relevant factor in accordance with the developed model. In line with the general rule of thumb, and in consideration of the sample size, only items with a factor loading of ≥.4 can be considered significant (Field, 2005; Hair et al., 2010).

6.4.1 Integrated Psychological Model

6.3.1.1 Model 1. A model was constructed by integrating all the factors from the respective instrument models into one model. All factors in the model were constructed to load onto one higher-order factor deemed performance. The model failed to compute and yielded a negative error variance for the constancy factor, which originates from the revised SMTQ. Consequently, the constancy factor was removed and the model postulated again. The proposed factor structure of the model (constancy removed) is included in Appendix A.

The respective item factor loadings after CFA was conducted indicated that numerous items did not load significantly (≥.4) on the respective factors. In terms of the overall fit of the model, the chi-square statistic was found to be statistically significant with $x^2(14841) = 27101.369$, $p < .05$, suggesting poor fit of the hypothesised model (see Table 6.21). Further goodness-of-fit statistics were computed to assess the overall fit of the hypothesised model. The CFI (.495) and GFI (.591) were below acceptable scores of a good fit, however, the RMSEA (.049) indicated an adequate fit while the SRMR (.1055) also suggested an inadequate fit of the hypothesised model (Table 6.21). In conclusion, goodness-of-fit indicators tended to indicate an inadequate model fit.

Table 6.21

Psychological Model Goodness-of-Fit Indices

Model	x^2	*Df*	*P*	CFI	RMSEA	GFI	SRMR
Psych model	27101.369	14841	.000	.495	.049	.591	.1055

Although the model did compute, the majority of fit indices indicated an inadequate model fit. As expected, and in accordance with theory regarding the characteristics impact on performance, certain factors loaded negatively onto the performance factor, as they were deemed inhibitors thereof. Therefore, a revised model with two higher-order factors, namely “performance enhancers” and “performance inhibitors” was constructed. The statistical analysis from the factor loadings, along with theoretical justification of the impact of the

characteristics on performance were used to group the relevant factors with the applicable higher-order factor (performance enhancers or performance inhibitors). The proposed factor structure of the two-factor model is included in Appendix A.

6.3.1.2 Model 2. The model incorporating the changes above resulted in the following lower-order factors grouped with performance enhancers: confidence, resilience (with sub-factors), vigour, reappraisal, self-determined motivation, external regulation, BAS-reward interest, BAS-reward reactivity, BAS-goal-drive persistence, commitment, control, challenge, perseverance of effort, consistency of interest, psychosomatic skills, foundation skills, concentration and imagery. The following lower-order factors were grouped with performance inhibitors: tension, depression, anger, fatigue, confusion, suppression, BAS-impulsivity, BIS, FFFS, defensive fight, powerlessness, alienation, rigidity and amotivation.

Following this revision process, further analysis was conducted with the incorporated changes. The respective item factor loadings indicated numerous items did not load significantly (≥.4) on the respective factors. In terms of the overall fit of the model, the chi-square statistic was found to be statistically significant with $x^2(148480) = 26370.214$, $p < .05$, suggesting poor fit of the hypothesised model (see Table 6.22). Further goodness-of-fit statistics were also investigated in order to assess the overall fit of the hypothesised model. The CFI (.527) and GFI (.615) were below acceptable scores of an acceptable fit, however, the RMSEA (.047) indicated an adequate fit while the SRMR (.1003) also suggested an inadequate fit of the hypothesised model (see Table 6.22). In conclusion, goodness-of-fit indicators tended to indicate an inadequate model fit.

Table 6.22

Psychological Model Two-Factor Goodness-of-Fit Indices

Model	x^2	*Df*	*P*	CFI	RMSEA	GFI	SRMR
Psych model	26370.214	148480	.000	.527	.047	.615	.1003

To obtain an improved model fit as well as a more parsimonious model, items which loaded <.6 on respective factors were removed from the analysis. Although items with a factor loading of ≥.4 can be considered significant, various researchers have recommended stringent cut-off parameters, with factor loading estimates ranging from .5 to above .7 (Hair et al., 2010; MacCallum et al.,1999, 2001). Tabachnick and Fidell (2007) further proposed a gradient ranging from .32 (poor), .45 (fair), .55 (good), .63 (very good) to .71 (excellent). As higher loadings are considered indicative of a well-defined structure and the goal of factor analysis, a ≥.6 item factor loading was further applied by the researcher as opposed to the less stringent ≥.4 cut-off used in the previous iterations of the model fit.

6.3.1.3 Model 3. Application of the more stringent factor loading cut-off resulted in several items and consequently several lower-order factors being removed prior to further analysis. In this model, lower-order factors not loading significantly onto the higher-order performance enhancers or performance inhibitors factors were also removed. Furthermore, the defensive fight factor was also removed from the analysis. There is limited theoretical substantiation underlying this factors' influence on performance, as previous research could not provide the researcher with a clear indication of the relationship between defensive fight and performance (Corr & Cooper, 2016).

Incorporating the changes above resulted in the removal of the following lower-order factors: defensive fight, BAS-reward reactivity, BAS-impulsivity, FFFS, challenge, control, commitment, rigidity, alienation, powerlessness, perseverance of effort, consistency of interest, foundation skills, psychosomatic skills, concentration, imagery, reappraisal, suppression, amotivation, self-determined motivation and external regulation. The factor structure of the revised two-factor model is included in Appendix A.

Modification indices indicated covariances between the errors of BIS factor items 2 and 23, 23 and 52, as well as 56 and 62. Modification indices indicated covariances for anger factor items 7 and 22, 19 and 22, and fatigue factor items 4 and 10, 8 and 21. To ensure the optimal fit of the model and in consideration of the content of the items, these

covariances were incorporated into the model. Further analysis was conducted after incorporating adaptations into the model.

The respective item factor loadings indicated all items loading ≥.6 on the respective factors. In terms of the overall fit of the model, the chi-square statistic was found to be statistically significant with $x^2(920) = 1730.243$, $p < .05$, suggesting poor fit of the hypothesised model (see Table 6.23). Further goodness-of-fit statistics were thus also investigated in order to assess the overall fit of the hypothesised model. The CFI (.824) and GFI (.894) were below acceptable scores of a good fit although close to an acceptable fit. However, the RMSEA (0.50) and SRMR (.0669) indicated an adequate fit of the hypothesised model (see Table 6.23). In conclusion, some goodness-of-fit indicators tended to indicate an adequate model fit while others failed to meet the minimum criteria.

Table 6.23

Revised Two-Factor Psychological Model Goodness-of-Fit Indices

Model	x^2	*Df*	*P*	CFI	RMSEA	GFI	SRMR
Psych model	1730.243	920	.000	.824	.050	.894	.0669

As the models discussed above failed to meet the minimum requirements for an acceptable fit and, in consideration of the results and in accordance with theory related to the characteristics influence on performance, two separate models were constructed. The first model was inclusive of factors deemed to potentially enhance performance while the second encompassed potential performance inhibitors. Each model was thus constructed with one higher-order factor, namely performance enhancers or performance inhibitors. A discussion of both models follows below.

6.4.2 Model: Potential Performance Enhancers

The proposed model included factors deemed to be potential enhancers of performance. In accordance with theory regarding the assessed characteristics impact on

performance and previous analysis conducted, certain factors loaded positively on performance (Model 1), and a model was therefore constructed with all the applicable factors. The applicable lower-order factors included were: confidence, resilience (with sub-factors), vigour, reappraisal, self-determined motivation, external regulation, BAS-reward interest, BAS-reward reactivity, BAS-goal-drive persistence, commitment, control, challenge, perseverance of effort, consistency of interest, psychosomatic skills, foundation skills, concentration and imagery. The factor structure of the potential performance enhancers model is included in Appendix A.

A CFA using SEM with maximum likelihood estimation of the factor model was conducted. The respective item factor loadings after CFA was conducted indicated that numerous items loaded <.6 on the respective factors. In terms of the overall fit of the model, the chi-square statistic was found to be statistically significant with $x^2(4537) = 8666.459$, $p < .05$, suggesting a poor fit with the hypothesised model (see Table 6.24). Further goodness-of-fit statistics were thus also investigated in order to assess the overall fit of the hypothesised model. The CFI (.629), GFI (.718) and SRMR (.0818) indicated an inadequate model fit; however, the RMSEA (.051) indicated an adequate fit of the hypothesised model (see Table 6.24). In conclusion, the majority of goodness-of-fit indicators tended to indicate an inadequate model fit.

Table 6.24

Potential Performance Enhancers Model Goodness-of-Fit Indices

Model	x^2	*Df*	*P*	CFI	RMSEA	GFI	SRMR
Enhancers model	8666.459	4537	.000	.629	.051	.718	.0818

To obtain an improved model fit as well as a more parsimonious model, certain changes were incorporated. A ≥.6 item factor loading was applied which resulted in several items being removed and consequently several lower-order factors. Lower-order factors not

loading significantly onto the higher-order performance enhancers factor following the removal of items were also removed.

Incorporating the changes above resulted in the removal of the following lower-order factors: external regulation, BAS-goal-drive persistence, commitment, control, challenge, perseverance of effort, consistency of interest, psychosomatic skills, foundation skills, and imagery.

Modification indices indicated covariance between the errors of self-determined motivation factor items 12 and 18. To ensure the optimal fit of the model and in consideration of the content of the items, this covariance was incorporated into the model.

The respective item factor loadings after CFA was conducted indicated all items loaded ≥.6 on the respective factors. The item loading tables of the revised potential performance enhancers model is included in Appendix B. In terms of the overall fit of the model, the chi-square statistic was found to be statistically significant with $x^2(650) = 1247.205$, $p < .05$, suggesting a poor fit of the hypothesised model (see Table 6.25). Further goodness-of-fit statistics were thus also investigated to assess the overall fit of the hypothesised model. As indicated in Table 6.25, the RMSEA (.051), GFI (.900) and SRMR (.0697) had acceptable scores which indicates an adequate fit, according to Bentler and Bonnet (1980). The CFI (.830), however, was found to be below the acceptable value, indicating an inadequate fit. Researchers have been cautioned against judging model fit without considering model complexity. The lower CFI score could have been the result of the complex model with several latent variables each with multiple indicators. Although most goodness-of-fit indicators attempt to accommodate for the complexity of models, with the exception of RMSEA, they have failed to do so (Cheung & Rensvold, 2002). In conclusion, goodness-of-fit indicators indicated an adequate model fit.

Table 6.25

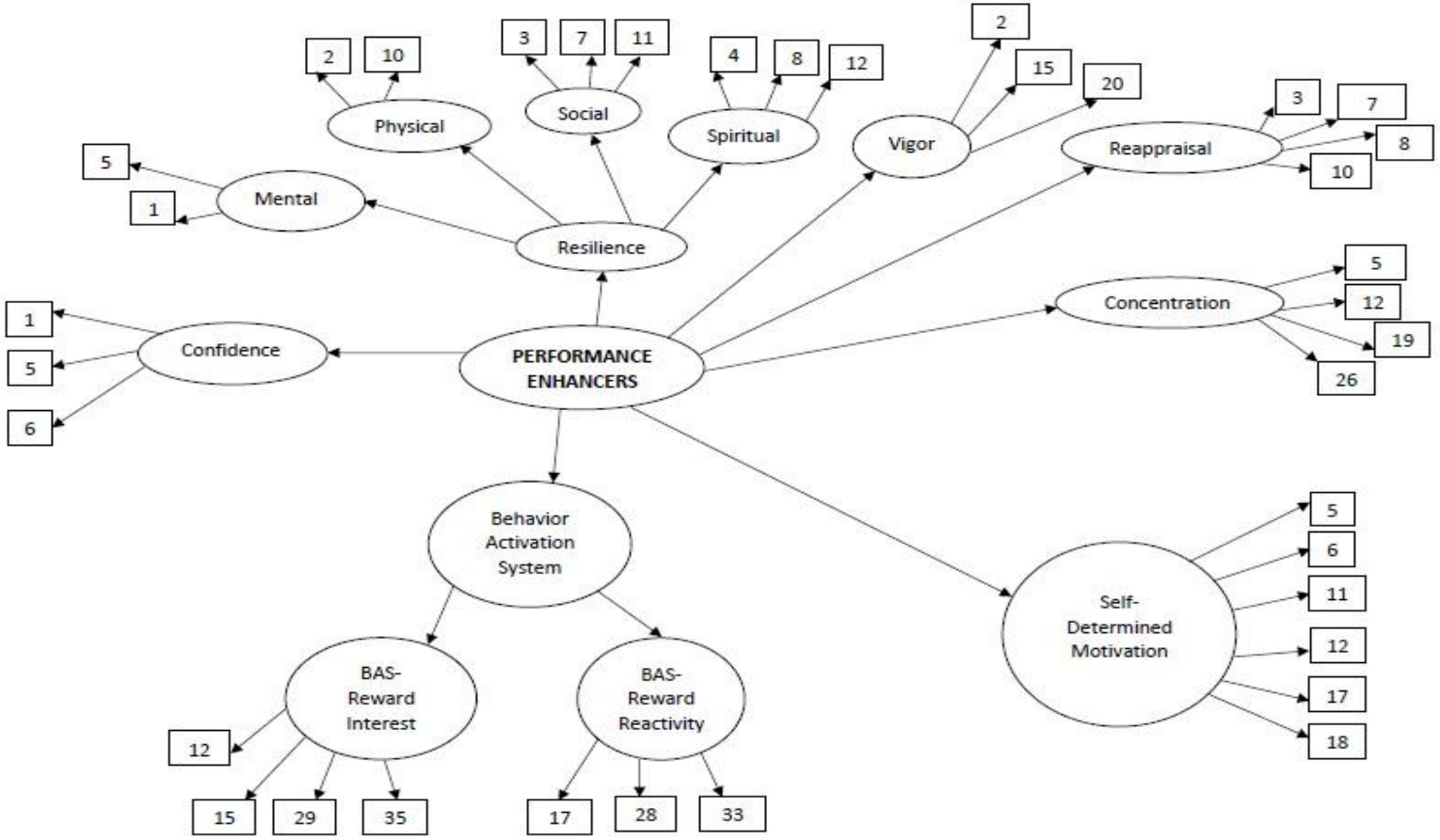
Revised Potential Performance Enhancers Model Goodness-of-Fit Indices

Model	x^2	*Df*	*P*	CFI	RMSEA	GFI	SRMR
Enhancers model	1247.205	650	.000	.830	.051	.900	.0697

The factor structure of the revised potential performance enhancers model is portrayed below (Figure 6.1).

Figure 6.1

Revised Potential Performance Enhancers Model



6.4.3 Model: Potential Performance Inhibitors

The proposed model includes factors deemed to be potentially inhibiting performance. In accordance with theory regarding the assessed characteristics impact on performance and previous analysis conducted, certain factors loaded negatively on performance (Model 1). A model was, therefore, constructed with all the applicable factors. The applicable lower-order factors included were: tension, depression, anger, fatigue, confusion, suppression, BAS-impulsivity, BIS, FFFS, defensive fight, powerlessness, alienation, rigidity and amotivation. The potential factor structure of the potential performance inhibitors model is included in Appendix A.

The respective item factor loadings after CFA was conducted indicated numerous items loaded <.6 on the respective lower-order factors. In terms of the overall fit of the model, the chi-square statistic was found to be statistically significant with $x^2(2835) = 5511.744$, $p < .05$, suggesting a poor fit of the hypothesised model (see Table 6.26). Further goodness-of-fit statistics were thus also investigated in order to assess the overall fit of the hypothesised model. As indicated in Table 6.26, the CFI (.698) and GFI (.747) scores showed an inadequate fit, according to Bentler and Bonnet (1980). The RMSEA (.052) and SRMR (.0770) scores, however, indicated an acceptable fit. In conclusion, some goodness-of-fit indicators indicated a model fit while others did not, therefore, the model was not accepted.

Table 6.26

Potential Performance Inhibitor Model Goodness-Of-Fit Indices

Model	x^2	*Df*	*P*	CFI	RMSEA	GFI	SRMR
Inhibitor model	5511.744	2835	.000	.698	.052	.747	.0770

In order to obtain an improved model fit as well as a more parsimonious model certain changes were incorporated. As discussed above, higher loadings are considered indicative of a well-defined structure and the goal of factor analysis, therefore, a ≥.6 item factor loading was applied. This resulted in several items being removed and consequently several lower-order factors. Factors not loading significantly onto the higher-order performance inhibitors factor following the removal of items were also removed. The defensive fight factor was also removed from the analysis, as theoretical clarity pertaining to the relationship between defensive fight and performance was indistinct (Corr & Cooper, 2016).

Incorporating the changes above resulted in the removal of the following factors: suppression, BAS-impulsivity, FFFS, defensive fight, powerlessness, alienation, rigidity and amotivation. Modification indices indicated covariances between the errors of BIS scale items 23 and 62 as well as 56 and 62. Modification indices also indicated covariances for anger scale items 7 and 22, 19 and 22 as well as fatigue scale items 8 and 21.To ensure the optimal fit of the model and in consideration of the content of the items, these covariances were incorporated into the model.

Thereafter, CFA using SEM with maximum likelihood estimation of the revised factor model with the incorporated changes was conducted. The respective item factor loadings after CFA was conducted indicated all items loaded ≥.6 on the respective factors. The item loading tables of the revised potential performance inhibitors model is included in Appendix B. In terms of the overall fit of the model, the chi-square statistic was found to be statistically significant with $x^2(265) = 713.545$, $p < .05$, suggesting a poor fit of the hypothesised model (see Table 6.27). Further goodness-of-fit statistics were thus also investigated to assess the overall fit of the hypothesised model. As indicated in Table 6.27 below, the RMSEA (.070), GFI (.900) and SRMR (.0566) had acceptable scores which indicate an adequate fit according to Bentler and Bonnet (1980). The CFI (.864), however, was found to be below the acceptable value. As mentioned above, researchers have been cautioned against judging

model fit without taking model complexity into account. The lower CFI scores could have been the result of the complex model with several latent variables each with multiple indicators. Although most goodness-of-fit indicators attempt to accommodate for the complexity of models, with the exception of RMSEA, they have been failed to do so (Cheung & Rensvold, 2002).

Although the CFI suggested a potential inadequate fit, it did improve after the implemented changes. In conclusion, most goodness-of-fit indicators indicated an adequate model fit.

Table 6.27

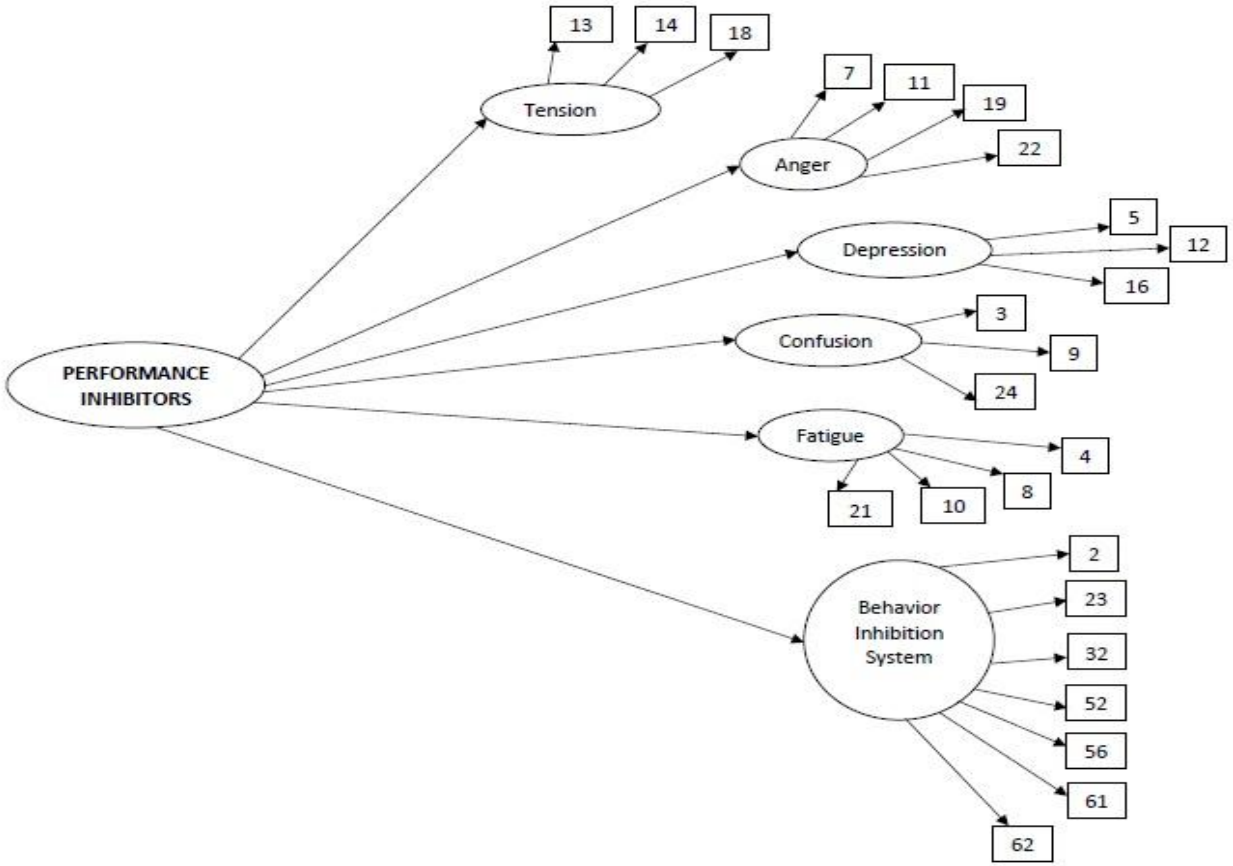
Revised Potential Performance Inhibitor Model Goodness-of-Fit Indices

Model	x^2	*Df*	*P*	CFI	RMSEA	GFI	SRMR
Inhibitor model	713.545	265	.000	.864	.070	.900	.0566

Figure 6.2 portrays the revised factor structure of the potential performance inhibitors model.

Figure 6.2

Revised Potential Performance Inhibitors Model



6.4.4 Summary: Constructed Models

Following numerous iterative statistical processes, a descriptive psychological model incorporating two higher-order factors, namely performance enhancers and performance inhibitors, was constructed. Analysis of goodness of model fit and application of stringent factor loading cut-off criteria yielded results indicating that the model failed to meet the rule-of-thumb criteria for an adequate fit. Two separate models for potential performance enhancers and performance inhibitors were explored. Further analysis of the goodness of model fit and application of stringent factor loading cut-off criteria yielded results that indicated a good model fit for both the potential performance enhancers and performance inhibitors models.

6.5 Conclusion

This chapter highlighted descriptive statistics for the sample on the revised instruments used, together with comparative results from relevant samples. Furthermore, the significant differences between the results of non-airborne- and airborne-qualified military personnel were reported. The development of two separate potential performance-related models were also discussed, with goodness-of-fit indicators showing that an adequate fit was achieved for both the potential performance enhancers and performance inhibitors models. The implications and potential use of these models will be discussed in the following chapter.

Chapter 7: Discussion, Limitations and Recommendations

7.1 Introduction

This chapter provides an overview of the results, discussed in the context of the existing literature. A brief outline of the research, the research objectives, and a discussion of the results obtained will be provided. An extrapolation of possible limitations of the study and recommendations for future research concludes this chapter.

7.2 Aim and Research Outcomes

South Africa's position as an influential role player on the African continent warrants continuous involvement of the SANDF in different military capacities and missions. Accordingly, it is essential to ensure that the SANDF maintains optimal capacity to perform when deployed on missions. Performance, in terms of several combat readiness and operational support factors, ensures a cohesive military force that is capable of executing relevant tasks as dictated by the mission mandate. One such factor that is of utmost importance is the human factor. The first aim of this study was to investigate the performance-related psychological characteristics (dispositional traits, motivation, performance strategies) of military personnel in the SANDF. The second aim was to determine significant differences in performance-related psychological characteristics (dispositional traits, motivation, performance strategies) between airborne- and non-airborne-qualified military personnel. The third aim was to develop a descriptive psychological model of military personnel in the SANDF.

To achieve the set aims, the following objectives were identified as part of the research:

- To describe the profile of dispositional traits, motivation, and performance strategies of military personnel in the SANDF

- To identify significant differences in dispositional traits, motivation, and performance strategies between airborne-qualified military personnel and non-airborne-qualified military personnel in the SANDF through applied descriptive and inferential statistical techniques
- To develop a descriptive psychological model of military personnel in the SANDF using SEM

Based on the existing literature, numerous psychological characteristics pertaining to individual performance and functioning were identified and investigated. These included mental toughness, psychological hardiness, resilience, motivation, grit, mood, emotion regulation, personality, and specific performance strategies. Furthermore, significant differences between SANDF airborne- and non-airborne-qualified military personnel were investigated through inferential statistical methods. The results indicated several statistically and practically significant differences. The identified dispositional traits, motivation, and performance strategies were analysed further for the purpose of developing a descriptive psychological model that potentially underpins performance of military personnel in the SANDF. As relationships exist between certain characteristics, the differentiation of performance factors was considered. Following a rigorous statistical analysis in Chapter 5 and Chapter 6, these were differentiated into factors deemed to be potential enhancers of performance as well as those that might potentially inhibit performance. Consequently, two models were developed inclusive of the above-mentioned factors.

7.3 Dispositional Traits, Motivation, and Performance Strategies Characteristic of SANDF Military Personnel

Descriptive statistics reported in Chapter 6 showed that the participants displayed specific dispositional and motivation characteristics and performance strategies. In comparison with studies that used similar instruments with participants who were military personnel and/or South African participants, numerous observable differences were evident.

The findings discussed below are grouped under relevant meta-level headings, although one should be mindful that some characteristics overlap and influence each other across levels and the division is, therefore, extrapolated for discussion purposes.

7.3.1 Dispositional Traits

The personality profiles, driven by underlying neuropsychological systems, indicated that the SANDF participants appear to be less impulsive than UK civilians (Corr & Cooper, 2016). Impulsivity has been pointed out as an important risk factor that also needs to be evaluated in a clinical setting, coupled with other symptoms it could lead to life-threatening high-risk behaviours (James et al., 2014). The SANDF personnel appeared to be more sensitive to reward, irrespective of it being available or not. They also displayed a strong degree of goal-planning and persistence to obtain set goals. A low score from the SANDF personnel on FFFS, which reflects flight, freeze and active avoidance behaviour, suggests that the military personnel are less likely to engage in actively avoiding danger than the UK civilians. This supports the notion that soldiers may seek and embrace risk that they find in their environment (Breivik et al., 2019). Theoretically, this has been linked to sensation seeking, which includes the willingness to take risks of various types, driven by the need for varied and complex sensations and experiences (Zuckerman, 1994). Sensation seeking could be useful in warlike dangerous situations, although the high sensation seeker can engage in certain undisciplined behaviour when unnecessary or non-relevant forms of risks are taken (Breivik et al., 2019). The SANDF military personnel appeared calculated and controlled in their approach, with the participants of this study exhibiting low impulsivity and indicating a strong degree of planning to obtain goals, irrespective of reward clarity. Consequently, it appears that sensation-seeking behaviour would manifest in a controlled manner and not a rash impulsive pursuit. As sensation seeking and impulsivity are personality traits that are correlated with risk for antisocial behaviour, the low impulsivity

results for the SANDF sample are reassuring, specifically with regard to performance in military contexts (Mann et al., 2017).

The SANDF personnel scored low on the BIS scale compared to the UK civilians (Corr & Cooper, 2016). This indicate a lesser degree of punishment sensitivity and was most likely conditioned by the rigorous military training and commensurate military experience which has been found to influence individual personality characteristics (Jackson et al., 2012). Military training combines a number of socialisation processes which, in turn, create the perfect environment for change in personality traits (Roberts et al., 2008). Military training exposes the individual to challenging simulated environments where endurance of mental and physical discomfort is considered an achievement, and punishment is often used as a tool to enforce discipline (Gutmann & Lutz, 2009; Higate, 2000). Military training could, therefore, have a lasting impact by making an individual less sensitive to punishment. As heightened BIS is a potential inhibitor of performance (Perkins et al., 2007), the current study results show that a combination of dispositional traits and military training may have mitigated inhibitory outcomes related to the BIS system and avoidance behaviours. The current study identified numerous observable differences pertaining to assessed neuropsychological systems expressed through personality, between the SANDF personnel and the sample of UK civilians. Therefore, further research is recommended to establish whether this could be attributed to the comparative samples being vastly different or to the effects of the military environment on the participants. Research should be carried out with a South African civilian sample to establish whether the numerous differences are attributable to the military environment.

Positive psychological hardiness factors were substantially higher than the negative factors, indicating protection against the debilitating effects of stress. Hardiness is an intrapersonal resource that consists of cognitions and attitudes which act as buffers against the debilitating negative effects of traumatic and severe life stressors on individual well-being (Stoppelbein et al., 2017). A comparison with a deploying unit of US National Guard

members showed no observable differences (Sinclair & Oliver, 2003). Thus, the SANDF sample displayed a healthy level of psychological hardiness that would underlie good performance outcomes in a military environment (Lo Bue et al., 2016).

Resilience as a construct has been shown to be a buffer against stress and an enhancer of performance during military training, although it appears that military training also builds resilience (Guo et al., 2021; Sefidan et al., 2021). The overall resilience displayed was very similar when compared to Navy personnel from South Africa (Van Wijk & Martin, 2019). The biggest difference between the sample participants and the Navy personnel pertained to physical resilience. A higher mean score was found for the participants of this study. This could be attributed to the large proportion of airborne-qualified individuals in the current study. In addition to a physically strenuous selection, the SANDF airborne soldier has to pass a higher standard physical training test and, therefore, a strong emphasis is placed on physical fitness in their environment.

The military personnel displayed a high level of confidence, although, when compared to a sample of South African athletes, the observable differences were minimal (Asamoah, 2013; Cowden et al., 2016). Although the differences were minimal, the high level of self-confidence is reassuring as confidence has been shown to enhance individual performance (Ahammer et al., 2019). Self-efficacy, which is closely related to self-confidence, was also found to be a significant contributor as to whether soldiers succeeded in completing the strenuous selection into the US Special Forces (Gruber et al., 2009). As self-confidence is a valuable trait in military and sporting environments, the profile displayed by the study's participants could possibly drive better performance in military contexts.

When comparing the local civilian sample and a US sample, used during instrument development, the level of grit displayed by the SANDF sample was substantially higher (Duckworth & Quinn, 2009; Mason, 2018). Grit, which relates to the passion and perseverance to obtain long-term goals (Duckworth et al., 2007), appears to be related in definition to BAS-goal-drive persistence. This includes goal-planning and persistence in

order to obtain set goals, even though immediate reward is not available (Corr & Cooper, 2016). A substantially higher score was also obtained by the sample on BAS-Goal-Drive Persistence (Corr & Cooper, 2016). Furthermore, the high level of grit aligns with the high level of confidence reported, indicating that the individual's confidence in their abilities may drive them to undertake more ambitious tasks and be more persistent when facing numerous challenges over time (Benabou & Tirole, 2002).

When compared to a local civilian sample, the SANDF personnel displayed more grit (Mason, 2018). It should be noted, however, that the comparative samples differed in terms of gender as the majority of the SANDF sample were males compared to both of the other samples having a majority of females in their study. This alludes to gender or, perhaps, the military environment as being contributing factors to the elevated score displayed by the SANDF personnel. Contrary to this study's finding, Eskreis-Winkler et al. (2014) reported results across four different contexts: the military, marriage, high school and the workplace sales environment. The highest level of grit was displayed by the sales personnel sample and not the military personnel. The results indicated, however, that across all domains grit was found to be a significant predictor of retention. The military personnel were involved in an ARSOF selection course, and individuals who had a higher grit score showed a 32% advantage for a successful outcome (Eskreis-Winkler et al., 2014). The results from Eskreis-Winkler et al. (2014) indicated that although military training has been found to contribute to adaptation of personality traits, it appears that grit might not necessarily be one of the characteristics that is developed more in the military than in the civilian environment. The elevated grit score of the SANDF sample is likely not a result of military training. Furthermore, only males formed part of the ARSOF selection which also indicates that gender was potentially not a contributor to the elevated grit score reported by the SANDF personnel. Therefore, the elevated grit score of the SANDF personnel appears to be unique compared to other research samples.

7.3.2 Motivation

The neuropsychological systems that manifest in personality traits, as discussed above, influence approach and avoidance motivation and, consequently, behaviour and emotions in everyday life (Rogowska et al., 2022). The low BIS score and high scores on certain BAS scales indicate that the majority of the SANDF personnel would be more inclined to be motivated based on the potential rewards of actions and not on the evasion of punishment. The main function of the BAS is to move the individual to satisfy a biological reinforcer, thus its association with rewarding stimuli would produce behaviour that results from a goal-directed approach by the SANDF personnel (Bacon et al., 2018; Gray & McNaughton, 2000). The military personnel would, therefore, be likely to put the necessary plans, coupled with goal-directed behaviour, in place and engage in behaviours that would achieve certain valued rewards.

The substantially lower score for amotivation, which relates to an absence of motivation reported by the SANDF personnel, is considered beneficial in the military context (Gagné et al., 2014). The benefits and performance-enhancing effect of motivation have been discussed in Chapter 3. The absence of motivation has been shown to have a detrimental effect on performance (Calvo et al., 2010; McGraw et al., 2012). Therefore, the detrimental effect of the absence of motivation on performance capacity seems to be minimal for the SANDF personnel.

The assessed mood states indicated several differences although none appeared to be substantial and the results were remarkably similar to a South African normative sample of civilians employed within the public sector. Therefore, the military personnel exhibited mood states that were not any different from other South Africans not serving in the military (Van Wijk, 2011). The biggest observable difference was, however, a slightly elevated mean score on vigour exhibited by the soldiers. Vigour relates to mental robustness and has been found to aid in individual performance (Beedie et al., 2000;Lane et al., 2001; Lochbaum et al., 2021), thereby reflecting the mental robustness of these SANDF personnel. Furthermore,

military training may lead to the reduction of depressive symptoms and could be a contributor to the healthy mood states exhibited by the SANDF personnel (Guo et al., 2021).

7.3.3 Performance Strategies

The utilisation of concentration was substantially higher for the military sample compared to South African athletes (Edwards & Steyn, 2011; Kruger et al., 2013). Concentration in a military environment is necessary where decisions are often taken under extreme levels of physiological and psychological strain and the consequences of decisions and actions can potentially have life or death results (Knighton, 2004; Shortland et al., 2020). The high score displayed by the study sample confirms the importance of concentration for successful functioning in the military environment.

The SANDF sample displayed higher scores for suppression and reappraisal as emotion regulation techniques than those of UK athletes from individual and team sports. This indicates that SANDF military personnel use these emotion regulation techniques differently from athletes (Uphill et al., 2012), although they do not display a preference for a particular technique. Instead, a greater degree of utilisation of a chosen skill is displayed by military personnel, who either suppress or reappraise more. This could be attributed to the military environment in which military personnel experience intense emotions in a range of different situations and where emotion regulation strategies differ (Lane et al., 2012). This indicates that emotion-influencing factors in the military environment warrant a greater application of emotion regulation techniques in order to maintain or exhibit specific behaviours to achieve certain outcomes. Emotion regulation techniques similar to reappraisal appeared to alleviate the impact of BAS/BIS sensitivities on mental disorder symptoms (Wang et al., 2019). Reappraisal has also been reported to be more beneficial than suppression in regulating emotion (Wang et al., 2019). The use of reappraisal by the SANDF personnel is, therefore, a beneficial technique employed to regulate emotion. As suppression is a lesser constructive technique, this indicates a potential developmental area

that warrants intervention. The increased use of emotion regulation techniques is potentially indicative of the psychological demand that the military places on the individual. Military jobs are considered amongst the most stressful occupations, and the increased use of the techniques is, perhaps, employed in an effort to enhance or maintain performance (Harms et al., 2013).

7.3.4 Summary

Dispositional traits displayed by the SANDF military personnel, such as impulsivity and avoidance proclivities, followed a different trend from those reported in a UK-based sample of civilians (Corr & Cooper, 2016). Other traits such as resilience, hardiness and self-confidence appeared to follow similar trends to comparative samples from the military and sport environments (Asamoah, 2013; Cowden et al., 2016; Sinclair & Oliver, 2003; Van Wijk & Martin, 2019). Although grit appears not to be a trait that is developed more in the military than the civilian environment, the SANDF sample obtained elevated scores for grit when compared to other samples (Eskreis-Winkler et al., 2014).

The use of concentration and emotion regulation strategies appeared to be more vital for the SANDF military personnel than the athletes (Edwards & Steyn, 2011; Kruger et al., 2013; Uphill et al., 2012). The increased utilisation of these performance strategies is potentially indicative of the psychological demand that the military places upon the individual and is an effort to enhance and/or maintain performance.

7.4 Dispositional Traits, Motivation, and Performance Strategies of Airborne- and Non-Airborne-Qualified Military Personnel

Independent samples t-tests were conducted to compare the dispositional traits, motivation factors and performance strategies of airborne and non-airborne-qualified military personnel. The results indicate several statistically significant differences between the groups. The findings and potential implications are discussed below.

7.4.1 Discussion: Significant Differences

7.4.1.1 Dispositional Traits. The results indicated numerous significant differences pertaining to the dispositional traits of airborne- and non-airborne-qualified military personnel, a discussion of which is provided below.

The neuropsychological regulation systems and how they manifest in personality characteristics yielded several significant differences between the groups. The FFFS scale includes flight, freeze and active avoidance (Corr & Cooper, 2016), and the findings showed that the non-airborne-qualified military personnel scored significantly higher on this scale and would, therefore, most likely engage in actively avoiding danger – more so than their airborne-qualified counterparts. As the parachute jump is considered a reliable stimulus that elicits psychosocial stress due to the real risk of injury and death (Yonelinas, 2011), it supports the findings that those military personnel who were not airborne qualified would more actively avoid the danger associated with acts such as parachute jumping.

The BIS scale pertains to a defensive approach to avoidable and unavoidable dangerous stimuli. The scale includes motor interruption, behavioural caution and risk assessment, obsessional thoughts, and behavioural disengagement (Corr & Cooper, 2016). The results indicate that the non-airborne-qualified military personnel scored significantly lower on the BIS scale. The higher mean scores exhibited by the airborne-qualified military personnel could be a result of training undergone and the environment in which they function predominantly. As discussed, military training could lead to potential long-lasting personality trait adaptations, such as a lesser or heightened punishment sensitivity (Jackson et al., 2012; Roberts et al., 2008). As airborne-qualified personnel are more likely to be engaged in dangerous situations and have trained for it, they are more likely to engage in a defensive evaluation or approach to avoidable and unavoidable dangerous stimuli than non-airborne military personnel. Heightened punishment sensitivity allows for earlier detection of threat and, in turn, potentially provides the individual with more time to prepare and act accordingly (Corr, 2011). Although a high BIS score has been shown to be performance inhibiting

(Perkins et al., 2007), this is an example of where a certain level of punishment sensitivity can aid functioning in a specific environment. Further research might indicate if there is a specific level or turning point at which the BIS score might start to inhibit the performance of airborne-qualified individuals. Actual performance would be dependent on other factors as well as the interplay of the r-RST processes and, therefore, a higher punishment sensitivity displayed by the airborne personnel might not be performance inhibiting (Corr et al., 2016).

The BAS-Goal-Drive Persistence scale includes goal-planning to put goals in place and persistence, even though immediate reward is not available (Corr & Cooper, 2016). As airborne military personnel undergo rigorous selection, and, in certain cases, prolonged training to obtain certain qualifications, persistent motivation is essential to achieve set goals. The higher mean score exhibited by the airborne-qualified military personnel is, therefore, not surprising and is evidence of the persistent pursuit of set goals.

The non-airborne-qualified military personnel scored significantly lower on the BAS-Impulsivity scale. Corr and Cooper (2016) discussed impulsivity as appropriate when cognitive planning can be replaced and the need for rapid action is sufficient to obtain the final biological reinforcer. In the airborne environment, where a need for rapid action of jumping out of a serviceable aircraft is a requirement, it could be argued that a degree of impulsivity would be essential.

Theoretical and empirical reasons justified the development of a defensive fight scale separate from FFFS on the RST-PQ (Corr & Cooper, 2016). The defensive fight scale pertains to the individual's reaction when encountering a high-intensity, immediate threat that necessitates a functional fight-back response. Not surprisingly, the non-airborne-qualified military personnel scored significantly lower on the scale than their airborne counterparts. Airborne military personnel are sometimes placed in situations eliciting a defensive fight response such as boxing during their selection. Experiences such as these together with military training foster long-lasting individual personality characteristics (Jackson et al., 2012).

Airborne qualified military personnel reported higher level of psychological hardiness, specifically when confronted with challenges. Airborne military personnel embrace the strenuous selection and training which they undergo as a challenge, indicating a belief that they are not entitled to easy comfort and security (Maddi et al., 2006). The airborne military personnel also scored significantly higher on rigidity, which could be a result of their training where certain drills and procedures are rehearsed and any deviation from the processes and procedures is discouraged. In a highly demanding environment which may lead to increased confusion along with interruptions in daily planned routines and schedules, the role of the positive hardiness factors is vital for stress tolerance and successful performance (Bartone et al., 2008).

Airborne-qualified military personnel exhibited a higher level of self-confidence than the non-airborne-qualified personnel. Their successes and accomplishments could be attributed to their higher level of self-confidence or it could be a product thereof. Confidence has been shown to be an enhancer of individual performance, although parachute training has also proved to develop self-efficacy (Ahammer et al., 2019; Bergman et al., 2019). Therefore, the elevated level of self-confidence displayed by the airborne military personnel could be a result of their training and, possibly, the reason for their success. This indicates a future avenue of research, that is, to investigate whether confidence moderates SANDF military personnel's successful qualification into the airborne environment or if it is developed as a result of training and functioning within the environment.

7.4.1.2 Motivation. The results indicated numerous significant differences pertaining to motivation-related aspects of airborne- and non-airborne-qualified military personnel.

The neuropsychological systems that manifest in personality traits also influence approach and avoidance motivation behaviour in everyday life (Rogowska et al., 2022).
As is indicated above, the higher BAS-Goal-Drive Persistence score indicates a greater degree of active goal-planning and persistence behaviour from the airborne-qualified in comparison to non-airborne-qualified personnel (Corr & Cooper, 2016). Therefore the

airborne-qualified personnel might especially come across as driven and motivated in order to achieve their set goals.

Pertaining to mood states, airborne military personnel had higher mean scores for fatigue and confusion. These could be attributed to the environment in which airborne military personnel function. At certain times, military personnel wait for deployment but the exact departure and return dates are ambiguous. This can create confusion and fatigue. It is also standard practice that a company of SANDF paratroopers are always on standby as an intervention force for contingencies. Thus, the airborne environment is demanding, leading to increased fatigue with the ambiguity and the unpredictable nature adding to increased confusion experienced by the airborne military personnel. The higher mean for the vigour scale, however, indicates a positive coping method, as regulating positive emotions can reduce the impact of negative emotions (Tugade & Fredrickson, 2007). Positive affect such as vigour has also been shown to be a significant predictor of resilience which, in turn, would combat the effect of stress (Pillay, 2020; Tugade & Fredrickson, 2007).

A high level of physical performance is essential for successful qualification and functioning in the airborne environment. This is evident from the physically strenuous selection that needs to be passed as well as a higher level physical training test that applies to airborne military personnel. Therefore, higher physical resilience was expected from the airborne-qualified group. Social resilience was, surprisingly, lower for the airborne-qualified group when compared with non-airborne military personnel. The airborne-qualified military personnel perceived a lack of social support from friends and colleagues, which was surprising. Generally, a socially cohesive network is fostered amongst airborne military personnel through their shared sense of belonging to an elite unit (Jordaan, 2012). Further research on enhancing the perceptions of social support and social support interventions should be part of training and intervention programmes.

7.4.1.3 Performance Strategies. The results indicated numerous significant differences pertaining to the use of performance strategies between airborne- and non-airborne-qualified military personnel.

The results indicated that airborne-qualified military personnel utilise the emotion regulation techniques of reappraisal and suppression differently from non-airborne-qualified personnel. The mean scores for both reappraisal and suppression were significantly higher for the airborne group, indicating that there is no preference for a specific technique, but rather a stronger use of both strategies compared to the non-airborne group. This supports the finding that parachutists increase their use of regulation strategies in certain circumstances to elicit certain emotions (Lane et al., 2012). Lane et al. (2012) also emphasised the importance of developing emotion regulation strategies for tasks such as parachute jumping in which anxiety-induced errors can be fatal. Hence, it appears that the airborne-qualified individuals developed a greater application of strategies that were specific to their environmental demands.

An increased use of imagery could be attributed to parachute jumps and the mental execution during training and execution of required drills for a successful completion. Imagery might be a less naturally occurring psychological strategy than others (Fitzwater et al., 2018), thus supporting the higher level of use as a result of training. A higher level of foundational mental skills is also not surprising for the airborne sample, given the impact it has on high level performance (Durand-Bush & Salmela, 2001). As is the case with confidence, it remains unclear if the airborne individual's successes and accomplishments can be attributed to the higher level of foundational skills or if they are a product thereof.

7.4.2 Summary: Significant Differences

The analysis of significant differences in dispositional traits, motivation, and performance strategies of airborne-qualified military personnel compared to non-airborne-qualified military personnel yielded several significant results. Differences were apparent

across the researched meta-levels. It can, therefore, be hypothesised that the airborne military personnel's psychological profile is significantly different from the non-airborne military personnel's.

This study highlights numerous significant differences which can be explored as potential predictors of success on selection. Skoglund et al. (2020) emphasised that predicting performance in high-risk operational personnel selections based exclusively on personality variables has been shown to have marginal success. Results stemming from the analysis indicate several potential avenues for further research as potential predictors of success on selection as well as developmental areas for those already functioning in the environment.

7.5 Psychological Models

The potential factor structure of a descriptive psychological model was explored through CFA using SEM with maximum likelihood estimation. The statistically supported factor scales or the applicable revised scales were used to compute a comprehensive model inclusive of all the factors from every instrument (see Appendix A). Combining all the factors from the instruments into one model yielded a complex model with several latent factors, each with multiple items. Relevant fit indices derived from CFA analysis yielded an inadequate model fit. Further analysis yielded two separate models theoretically relating to performance: the first model was inclusive of potential performance enhancers and the second model included potential performance inhibiting factors.

7.5.1 Model: Potential Performance Enhancers

The final potential performance enhancer's model yielded acceptable fit indices and retained several factors contributing to enhanced performance. The following factors were included in the model: vigour, reappraisal, self-determined motivation, confidence, concentration, resilience, BAS-reward interest and BAS-reward reactivity. Although the

current factors included in the model were justified based on the statistical analysis, their inclusion is also substantiated theoretically as previous studies that are discussed below have shown the relevance of these aspects to positive performance outcomes. These factors relate to separate domains, dispositional traits, motivation, and performance strategies. Although characterised under separate domains, the interplay between these factors underlies individual behaviour.

7.5.1.1 Dispositional Traits. The model incorporated the dispositional traits of: confidence, resilience, BAS-reward reactivity and BAS-reward interest.

Self-confidence can be defined as the belief or assurance in oneself, trusting one's abilities, judgements or decisions, either in general or in a particular situation, and being activity related (Colman, 2008; Greenacre et al., 2014). Competitive athletes have indicated that self-confidence affects their performance through their thoughts, behaviours and feelings (Hays et al. 2007; Stanger et al., 2018). According to Burton (1988) and Rosenqvist and Skans (2015), self-confidence is significantly associated with performance outcomes across numerous sports. In the professional sport competition environment that elicits fatigue and exhaustion, researchers have found that less confident athletes are generally the worst performers (Ahammer et al., 2019). Arguably, it is the individual's confidence in their abilities that drives them to undertake more ambitious tasks coupled with their persistent pursuit through difficulties that are elementary to their performance success (Benabou & Tirole, 2002). Research indicated that higher self-confidence equates to a greater probability of success (Compte & Postlewaite, 2004). Self-confidence also impacts performance and success in a team context as it substantially influences someone's capacity to perform the required tasks individually and consequently within group contexts, to the best of their ability (Skinner, 2013). Generally, the findings from research seem to confirm the positive relationship between self-confidence and performance (Ahammer et al., 2019).

Contrary to the general consensus that self-confidence would enhance performance, Woodman et al. (2010) reported that a little self-doubt might be beneficial to performance.

They hypothesised that a decrease in self-confidence would trigger a little self-doubt which, in turn, would lead to increased effort, resulting in improved performance. This notion supports the hypothesis from Bandura and Locke (2003) that an element of self-doubt might indicate that a greater effort is required and consequently improve performance. Although this seems logical, the improved performance results would be dependent on effort and, therefore, only fitting in a context where increased effort would result in increased performance. Woodman et al. (2010) conducted an experiment and reported that although measured self-confidence decreased and performance increased, there was no additional effort exhibited. They highlighted potential limitations of the task associated with effort although their results indicate that the role of effort should be clarified. Taken together with the debate on the nature of effort, the general consensus among researchers leans towards the view that increased self-confidence would bring about improvement of performance.

High self-confidence leading to ambitious behaviour together with a higher level of successful outcomes aligns with reward sensitivity stemming from the BAS. For example, a confident individual would most likely expect success and engage in behaviour that would have a rewarding outcome (Compte & Postlewaite, 2004). This is corroborated by Baker et al. (2019) who found a positive correlation between the BAS and confidence as well as enterprising interest. Corr and Cooper (2016) described the BAS-reward interest facet as an indicator of an individual's openness to new experiences and opportunities that are potentially rewarding. Individuals with a high BAS-reward interest will probably engage more in an anticipatory approach, and seek out opportunities that would provide exposure to rewarding experiences. It can be distinguished from BAS-reward reactivity in that it does not depend on the presence of actual reward. Consequently, individuals who are high on both these characteristics would generally investigate and pursue opportunities with clear and/or ambiguous rewards associated with them. Therefore, it appears that the drive from the BAS to obtain rewards would move the individual to engage in performance-related behaviour. The link between the BAS and performance has been researched in military, sport and

civilian work environments (Corr et al., 2016; Perkins et al., 2007). The BAS also appears related to other work-related performance influencers as higher emotionally intelligent individuals have also been shown to exhibit sensitivity to reward, which, in turn, has an impact on workplace performance (Bacon & Corr, 2017). In the military environment, research has indicated that the (reward sensitivity) yielded a significant correlation with combat scenario performance (Perkins et al., 2007). These results are consistent with previous studies that showed the BAS to be positively related to sport success and also to high achievement amongst non-athletes (Rogowska et al., 2022; Van Beek et al., 2013). As the BAS is responsible for approach and engagement behaviour, it could explain high performance on the basis of an individual's willingness to engage in behaviours and be able to maintain motivation, based on the premise of potential reward (Rogowska et al., 2022).

Although generally it appears that higher reward sensitivity (BAS) supports higher performance, contrary perspectives include the performance debilitating effect of the BAS in the context of individual psychopathology and well-being. Heightened BAS has been linked with vulnerability to bipolar disorder (Dornbach-Bender et al., 2020). Hypersensitivity of the BAS leads to individuals being highly sensitive to rewards and subsequently this increases arousal, positive affect and, in severe cases, symptoms of mania (Alloy et al., 2015). Bacon et al. (2018) found that the BAS indicated links with antisocial behaviour although the link appears to be centred on the combination of two distinguishable facets thereof and is also dependent on gender. Antisocial behaviour for males was associated with impulsivity (BAS-impulsivity) coupled with goal-focused strategic behaviour (BAS-goal-drive persistence). Antisocial behaviour for females was also associated with impulsivity (BAS-impulsivity) but gets deterred with a heightened goal-focused strategic behaviour (BAS-goal-drive persistence). Their results also indicated that impulsivity was negatively associated with self-control (Bacon et al., 2018). In the current study, BAS-impulsivity and BAS-goal-drive persistence were, however, not incorporated in the model of potential performance enhancers. On the contrary, the BAS-reward interest facet was included in the model of

potential performance enhancers. The inclusion thereof corroborates the results from Bacon et al. which indicated a significant positive correlation between BAS-reward interest and self-control. The results from Bacon et al. (2018) indicated that it is potentially separate facets of the BAS and a unique combination thereof that is instrumental in pathological behaviour exhibited. The facets of reward interest and reward reactivity, which is included in the model, appear not to be drivers of pathological behaviour.

Resilience has been broadly characterised as the ability to maintain healthy psychological and physiological functioning in the presence of high stress and trauma (Wu et al., 2013). Reich et al. (2010) summarised resilience as the outcome of successful adaptations to hardships. In the military environment, resilience is a highly valued concept and arguably plays a decisive role in achieving victory, as lack of resilience has been found to contribute to poor performance in military outcomes (Gilmore, 2016). Resilience also provides a mediating effect against deployment stressors and post-traumatic stress symptoms (Wooten, 2012). Consequently, assessing, facilitating and sustaining resilience is of particular importance in military environments and, therefore, often included as part of pre-deployment training.

Research has indicated numerous aspects of which resilience is deemed to be composed, although two equally important aspects are central, that is, recovery and sustainability (Reich et al., 2010). Van Wijk and Martin (2019) supported this and described resilience as an iterative process of adaptation and adaptability. Boermans et al. (2012) proposed a two-resource (internal capacities and external resources) framework for resilience-enhancement in military environments. They defined internal capacities as relating to the natural character strengths an individual possesses that enhance positive psychological functioning. External resources describe those aspects of the social environment that empower the individual to respond in a positive way to hardship. This framework aligns well with the current factors included in the performance enhancer's model which relates to resilience. The spiritual, mental and physical factors support the notion of

internal capacity. The social factor undoubtedly forms part of the external resources that empower the individual to respond positively. Resilience, therefore, involves the interplay between internal capacities and external resources.

As resilience is defined as a process, it is arguably more a state rather than a trait (Bartone & Hystad, 2010). Krueckel et al. (2020) supported this notion and stated that resilience should not be seen as static capacity. In a military context, resilience can be viewed as a process outcome which reflects in the performance of important military and personal life roles (Bowden & Martin, 2011). Therefore, the efficacious interplay between the individual's internal capacities and external resources equates to good performance in important life roles. The implication thereof is that to maintain an appropriate level of resilience state, one would have to monitor the process and intervene when required in order to maintain internal capacity and external resource levels that would lead to desired performance outcomes.

7.5.1.2 Motivation. The neuropsychological systems of BAS-reward interest and BAS-reward reactivity would influence approach motivation and, consequently, behaviour and emotions in everyday life (Rogowska et al., 2022). Combined, these BAS facets support individual behaviour that investigates and pursues opportunities with clear and/or ambiguous rewards associated to it. Research indicates the personality as a significant influencer of emotional well-being and the BAS appears related to positive mood states such as vigour (Harnett et al., 2013). High BAS individuals indicate a greater enjoyment during high-intensity sport activities (Malik et al., 2021). This is attributed to the individual experiencing a sense of reward and consequently positive emotions. Emotion and emotion regulation may have a significant role in determining performance outcomes (Lane et al., 2012). Positive emotions, which relates to a vigour mood state, can lead to the maintenance of systematic training essential for high achievement in sport performance (Rogowska et al., 2022).

Vigour refers to the individual's feelings that they possess physical strength, emotional energy and cognitive liveliness, hence it is an affect experienced (Shirom, 2011).

The mood state of vigour is coupled to positive feelings of excitement, liveliness, alertness and energetic (Terry et al., 2003). Evaluating mood states can provide an indication of psychological distress (Van Wijk et al., 2011), with a positive affect state being beneficial to individual resilience (Pillay, 2020). Mood states have shown to provide a prediction of sport performance outcome, with vigour facilitating performance regardless of the presence of depression (Beedie et al., 2000; Lane et al., 2001; Lochbaum et al., 2021). In extreme environments, a moderate correlation was also found between mental toughness and increased vigour (Graham et al., 2021). Research has indicated that mental toughness has performance-enhancing benefits in challenging circumstances (Jones et al., 2002). Graham et al. (2021) evaluated athletes on numerous aspects over a three-day ultra-marathon conducted in the Arctic. They found that mood changes were not related to sleep quantity but numerous significant correlations between mental toughness and mood states were recorded. They further deduced and emphasised the importance of emotion regulation strategies for improved preparation and performance, as emotion regulation can help foster the adequate mood state that would elevate a characteristic such as mental toughness and consequently performance outcomes.

The result from Graham et al. (2021) demonstrates the importance of vigour on other performance-related factors. Cultivating positive emotions, such as those related to vigour, may be particularly useful in building resilience to stressful events (Tugade & Fredrickson, 2007). Furthermore, findings from Lester et al. (2021) confirm that it is not merely the strong presence of negative feelings that influences performance negatively but certain positive feelings may also boost performance. Arguably vigour would have an impact on the other factors included within this model. The importance of emotion regulation to cultivate vigour also appears highly relevant. Although cultivating mood states such as vigour might be beneficial, it appears that the actual effect it has on performance is only moderate (Beedie et al., 2000). This was confirmed in a recent meta-analytical study whose results showed mood states as a reliable predictor of sport performance (Lochbaum et al., 2021).

The self-determined motivation factor within the potential performance enhancers model encompasses the regulatory types of motivation with a degree of internalisation. Internalisation refers to the taking in of a value- or goal-driven activity which was initially externally regulated so that it becomes internally regulated (Ryan& Decci, 2000). Therefore, the regulatory types with a degree of internalisation are described as self-determined (Ryan & Decci, 2000). External regulation is considered non-internalised and not self-determined and equates to engaging in activities merely to avoid punishment and/or obtain rewards administered by others (Gagné et al., 2014). As motivation is a process which directs and influences behaviour, it seems that the more internalised aspects would have a greater influence in performance-enhancing behaviour (Jooste & Hamani, 2007).

In a climate where internalisation is facilitated, individuals are more engaged and persistent, perform more effectively, and display higher levels of psychological health and well-being (Deci, 2017). The obvious benefits thereof have consequently lead to much research and application of the SDT of motivation in the military environment across different contexts such as physical fitness and training (Dyrstad et al., 2007; Frederick et al., 2021), retention of special operation forces (Dyson et al., 2022), in a military academic setting (Filosa et al., 2021), and the role of motivation in a combat environment (Pawiński & Chami, 2019). In general, a more internalised motivation seems to yield a positive outcome.

7.5.1.3 Performance Strategies. The importance of emotion regulation to cultivate specific mood states as an influencer on other performance-enhancing constructs has been highlighted above (Graham et al., 2021). Moreover, emotion regulation may independently have a significant role in determining performance outcomes (Lane et al., 2012). Included within the potential performance enhancers model is the technique of reappraisal. Cognitive reappraisal strategies may lead to more adaptive and less negative emotional responses and, therefore, contribute to resilience (Troy & Mauss, 2011). Reappraisers have been reported as experiencing and expressing a higher level of positive emotions and lesser negative emotions than suppressors (Gross & John, 2003; Mauss et al., 2007). Emotion

regulation plays a beneficial role in cultivating positive emotions, such as those related to vigour which can, in turn, build resilience to stressful events and enhance performance in the sport environments (Lochbaum et al., 2021; Tugade & Fredrickson, 2007).

According to Wang et al. (2019), emotion regulation techniques have also shown to act as moderator of the impact approach/avoidance (BAS/BIS) motivation has on mood disorders. Specifically, reinterpretation and talking out loud were found to alleviate the impact of the BAS/BIS on such symptoms. The definition of reinterpretation provided by Wang et al., (2019) emphasises reappraisal of emotional salience and self-relevance of the event. Consequently, their findings highlight emotion regulation as a target area in psychotherapy interventions. Although other emotion regulation techniques exist, the technique of reappraisal plays an important role in the generation of emotional states, and individual responses to stressful events differ depending on the appraisal thereof (Troy, 2010). Consequently, reappraisal as a technique appears particularly effective in allowing the individual to generate an emotional state through subjective appraisal of the situation, which could potentially have performance-enhancing benefits (Troy, 2010).

Concentration can be defined as sustaining attention over a period of time, and, therefore, it is seen as a degree of attentional engagement (Harris & Harris, 1984; Linnell & Caparos, 2013). Although the importance of concentration might seem obvious, concentration and the ability to remain focused have been highlighted as a performance-enhancement skill and characteristic of Olympic champions (Gould et al., 2002). Krane and Williams (2006) have also pointed out that heightened concentration is an important mental skill associated with high performance. Concentration in the military environment is essential as decisions are often made in arduous circumstances and mistakes can have life and death consequences (Knighton, 2004; Shortland et al., 2020).

The benefit of concentration seems to be the shield it provides against distraction and allowing the individual to sustain attentional engagement in order to complete the task at hand (Sörqvist & Marsh, 2015). Concentration varies depending on exogenous and

endogenous factors. Exogenous factors refer to aspects such as time pressure and intellectual challenge, whereas endogenous factors refer to aspects such as motivation and the capacity for attentional engagement (Sörqvist & Marsh, 2015). It is clear that exogenous factors would not always be under the control of the individual, and this highlights the importance of the endogenous factors. Working memory capacity is typically measured reflecting differences in people's ability to stay focused on what is relevant and resisting distraction (Engle, 2002). Therefore, working memory capacity is an accurate estimator of attentional engagement and also a measurement of an endogenous factor. Interventions to enhance concentration could be focused on techniques to increase individual working memory capacity. Concentration appears to shield against distraction because the processing of the background stimuli is reduced and the locus of attention becomes more resolute. The former is associated with active suppression or inhibition of distraction, the latter with distractor blocking as a consequence of greater facilitation of attention to the attended stimulus (Egner & Hirsch, 2005). The ability to block out distractions and concentrate on completing the task at hand would be performance enhancing to the individual across a number of military contexts and tasks.

Although certain factors were removed through the analysis procedures (Chapter 6), it does not imply that those aspects in isolation may not contribute to individual performance. One such global construct is mental toughness. Mental toughness has been proven to enhance performance and determine success in high-stress environments (Gucciardi et al., 2015). In the current study, the construct of mental toughness was not retained based on the statistical results, although the dimension of self-confidence was retained in the performance enhancers model. This was due to the instrument utilised in this study failing to produce an acceptable model fit. The SMTQ was revised to the extent that a global score of mental toughness was not computed, although scores on mental toughness dimensions confidence and constancy were retained. This aligns with the debate in the literature regarding the lack of conceptual clarity on mental toughness and the subsequent challenges in accurately

measuring the global construct of mental toughness (Gucciardi & Gordon, 2011). For example, Harmison (2011) has explicated that mental toughness exhibits certain state-like qualities, and the research focus could be centred on individual triggers that would amplify the state or bring about a quicker onset thereof. Fitzwater et al. (2018) adopted the idea that mentally tough behaviour is an observable behaviour and should be measured from a behavioural outcome perspective.

7.5.1.4 Summary. The potential performance enhancer's model is inclusive of characteristics linked to dispositional traits, motivation, and performance strategies. Although characteristics belong to separate domains, numerous dispositional traits, motivation states and performance strategies interact across meta-levels and may contribute to overall performance outcomes. As discussed above, previous research indicated that all the included factors in this model have been linked with potential performance enhancement and to some degree provides a theoretical substantiation to the results found in this study

The inclusion of such a wide variety of characteristics across different psychological domains implies that in order to enhance performance successfully, one would have to adopt interventions that address characteristics on different domains. For example, one cannot focus on enhancing self-confidence (dispositional trait) and neglect concentration (performance strategy) as both seem to influence performance outcomes.

The model is uniquely applicable to the SANDF and provides a description and integration of psychological characteristics that underpin an individual's potential capacity to exhibit the desired behaviour in the military environment in order to achieve a desired outcome. Using the developed model as an assessment tool can provide an indication of potential areas for capacity development and, consequently, combat readiness and performance enhancement.

7.5.2 Model: Potential Performance Inhibitors

The final model yielded acceptable fit and retained several factors deemed as potential performance inhibitors. The potential performance inhibitors model incorporated six factors: anger, depression, fatigue, confusion, tension and the BIS. These factors relate to two separate domains, dispositional traits and mood states. Although characterised under the classification of traits and state, the interplay between these factors underlies individual behaviour. Factors included within the performance inhibitor model were justified based on the statistical analysis, although their inclusion is also theoretically supported by the literature discussed below.

7.5.2.1 Motivation. Five of the included factors relate to mood states and stem from the BRUMS instrument (Terry et al., 1999). The BIS relates to neuropsychological regulation and how it manifests in personality aspects (Corr and Cooper, 2016). It influences avoidance motivation and behaviour and emotions in everyday life. Individuals with a high BIS tend to struggle to maintain initial motivation following negative performance (Rogowska et al., 2022). According to this model, motivation consists of a state- and trait-based dyad of mood and neuropsychological regulation. This dyad may be central to less optimal performance outcomes, especially in challenging military environments.

The impact of negative mood on several aspects pertaining to performance has been discussed in Chapter 3. For example, Muchsin et al. (2020) have reported that anxiety negatively decreases self-confidence, and this has been found to be a performance-enhancing construct. According to Breivik et al. (2019), risk taking has been and is of importance in the military environment and influences everyday decision-making. Research on risk taking and affective states such as depression showed that individuals with depression tend to be more conservative in taking risks when making decisions (Yuen & Lee, 2003). Furthermore, fatigue has been found to contribute significantly to risk-taking behaviour, with anxiety and depression contributing to a lesser extent (Hockey et al., 2000). The researchers also found increased risk-taking behaviour for more important decisions

when fatigue was prevalent. According to the results of the current study, fatigue was a statistically significant inhibitor of performance. In accordance with this study, numerous other researchers have also indicated that fatigue is associated with performance decrements across physical and numerous neurocognitive functions (Abd-Elfattah et al., 2015; Lieke et al., 2018; Van Cutsem et al., 2017). Fatigue poses an important safety risk which could potentially lead to loss of life and, therefore, these results emphasise the importance of managing of fatigue in military environments (Kerick el al., 2013; Wingelaar-Jagt et al., 2021). Fatigue management is a critical concern even amongst non-deployed military personnel (Frone & Blais, 2019). Although fatigue is critical, anxiety and depression have also been linked to declining cognitive performance (Delphin-Combe et al., 2016; De Vito et al., 2019; Kizilbash et al., 2002; Wetherell et al., 2002). A negative mood state would thus potentially inhibit the individual's performance with regard to cognitive functioning, decision-making and judgement.

Negative mood states have the potential to inhibit individual and team functioning, in an environment where decisions made can potentially lead to lives being lost or saved (Knighton, 2004; Shortland et al., 2020) because negative individuals impact team processes negatively and consequently impact overall performance (Jordan et al., 2006) and the outcome of a mission. This implies that a conscious effort should be made to manage these factors to mitigate their effects as much as possible. Emotion and emotion regulation may have a significant role in determining performance outcomes, and, as everyday life and basic training might not be effective enough to prepare a soldier to handle the demands of his role, specific focused training practices are needed (Lane et al., 2012). Actively monitoring and implementing appropriate interventions to manage negative mood states of SANDF military personnel may have a significant benefit in addressing inhibited individual and team performance as well as psychological health. Mitigating potential harmful effects of negative mood states could potentially contribute to overall combat readiness and cohesion of the SANDF.

The BIS shares a strong link and influence on emotion and mood. As emotional experiences are linked to approach and avoidance systems, high threat sensitivities are associated with negative affect, negative emotional experiences and anxiety (Carver & White, 1994; Johnson et al., 2003). High punishment-sensitive (BIS) individuals are more likely to experience negative emotions and events in their everyday lives (Gable et al., 2000). Furthermore, punishment sensitivity has been linked to emotion regulation difficulties, non-acceptance of negative emotions, and problems engaging in goal-directed behaviour when experiencing distress (Hannan & Orcutt, 2013; Tull et al., 2010). The combination of PTSD symptoms along with high threat sensitivity also impacts close interpersonal relationships negatively as the intimate relationship erodes due to the individual's heightened sensitivity to cues of relationship-related punishment (Meis et al., 2017).

Generally, it seems that the impact of the BIS (punishment sensitivity) on performance appears to be contextual and influenced by other factors. Although in the current study the results indicated the BIS factor as a performance inhibitor, other studies have not always yielded the same conclusion (Bell et al., 2013; Manley et al., 2018). The influence that the BIS (punishment sensitivity) has on performance is largely influenced by other aspects. The BIS and BAS have the potential for an interactive effect on behaviour under certain circumstances (Corr, 2002), and the BAS has been proven to moderate the negative effect of the BIS on performance outcomes (Delaney et al., 2015). Punishment sensitivity has been shown to yield motor performance enhancements under pressure but only on condition that the threat is detected early enough to implement certain cognitive strategies (Manley et al., 2018). Heightened punishment sensitivity allows for earlier detection of threat and, in turn, provides the individual with potentially more time to prepare and act accordingly (Corr, 2011).

Activation of the BIS entails the engagement of the risk assessment process and also the scanning of memories to help resolve the concurrent conflict (Corr & Cooper, 2016). A soldier who is in a potentially life-threating situation would need to engage in a risk

assessment and scanning of existing memories might aid in resolving the situation with a positive outcome. A certain level of punishment sensitivity can, therefore, possibly aid performance in high-stakes scenarios, as punishment sensitivity leads to earlier threat detection and is potentially adaptive if it leads to the early implementation of necessary coping strategies and behaviour (Manley et al., 2016). Cricketers who exhibited a high level of punishment sensitivity and low level of reward sensitivity were also more mentally tough and able to detect threats early while maintaining a level of goal-directed behaviour under pressure (Hardy et al., 2014).

In accordance with the current study, research has indicated high punishment sensitivity as inhibiting performance and individual functioning in certain situations. Emotional intelligence which positively predicts aspects such as mental, physical health and well-being, and workplace performance has been found to associate negatively with the behaviour inhibition system (Bacon & Corr, 2017). The results of research on a sample of UK military officers also indicated punishment sensitivity to be a significant negative predicator of combat scenario performance (Perkins et al., 2007).

Although the current study indicate the BIS to be a performance inhibitor, the influence thereof on performance appears to be dependent on context and other influential factors. It is therefore recommended that context and environmental factors should be kept in mind when interpreting the results of the BIS scale pertaining to the impact on performance. Corr (2002) argued that the BIS and BAS have a potential interactive effect on behaviour in certain situations and thus the result of the BIS scale should also be interpreted in conjunction with other r-RST system results. Actual net performance would be dependent on other factors as well as the interplay of the r-RST processes (Corr et al., 2016).

As highlighted above, the link between the BIS and mood states are closely related and manifest in motivated behaviour. It thus appears that together high punishment sensitivity and amplified negative mood states have a potential performance-inhibiting effect

on the individual. These results above reflect the complexity of drivers of performance outcomes and the interaction between internal states and traits and external context.

7.5.2.2 Summary. The developed model integrates numerous performance-related characteristics from the mood state and personality domains with motivation. The model is uniquely applicable to the SANDF and provides a descriptive and comprehensive integration of psychological characteristics that pertain to potential inhibiting of an individual's capacity to display desired behaviour in the military environment to achieve a desired outcome. As discussed above, the BIS might not necessarily lead to performance being inhibited, although it seems that the close link with negative mood states would lead to inhibition of individual performance in the case where both are elevated.

The model provides a valid starting point for utilisation and investigation into potential inhibitors of performance. The utilisation of results should not, however, be viewed in isolation, as context and performance-enhancing influencers should also be taken into account. Performance inhibitors and enhancers can be addressed through applicable interventions such as training, which researchers have shown yields performance-enhancing outcomes amongst military samples (Jensen et al., 2019; Meyer, 2018).

7.5.3 Overall Model Summary: Potential Performance-Influencing Models

Through the model development process, two models were developed, one for potential performance enhancers and the other for potential inhibitors. Although the separate development was justified on statistical results (Chapter 6), the theoretical bases of the results are reflected in the literature. Performance-relevant theory such as Herzberg's dual-factor theory on motivation (1959) is an example. Pertaining to Herzberg's theory, certain factors might decrease motivation but the absence thereof does not necessarily enhance motivation. The same potentially applies in this case where certain factors would inhibit performance but the absence thereof does not necessarily equate to a higher performance level but rather an absence of inhibitors. Further research incorporating the application of the

models along with an objective measured outcome of performance in the military context could yield the empirical support indicative of this phenomenon.

From a fortigenesis perspective, the model for potential enhancers of performance can also be viewed as integrating strengths that would equate to positive characteristics of better performance at different end points in life (Strümpher, 1995). Furthermore, the model for potential inhibitors of performance integrates characteristics that potentially diminishes strength and equates to inhibition of performance at different end points in life.

Performance psychology programmes in the military generally include aspects such as goal setting, breathing techniques, visualisation, confidence building, attention control, energy management and bio-feedback (Adler et al., 2015; DeWiggens et al., 2008; Hammermeister et al., 2010). The potential performance inhibitors identified in this study are not usually integrated into performance training, leading to performance-enhancement interventions not addressing potential obstacles. The practical implications are that performance-enhancing interventions should not only be focused on the enhancers, but also take a holistic view and address potential inhibitors thereof.

As previous research included fewer psychological characteristics than the current study, it is not possible to predict with complete accuracy the exact mediating and moderating effects of the characteristics and their strength of influence on behavioural outcomes. This is evident as constructs such as the BAS and vigour have been proven to moderate the negative performance effects of other psychological aspects (Beedie et al., 2000; Delaney et al., 2015). Consequently, a specific measurable performance outcome should be researched in conjunction with the developed models to investigate the inter-construct relationships and overall influence on the outcome. However, the models do provide a scientific way to address individual functioning from the fortigenesis perspective of strength to ensure that capacity of performance can be enhanced and inhibitors addressed.

7.6. Contributions of the Study

7.6.1 Assessment, Training and Interventions

The findings of this study have the potential benefit of providing integrative models which can be used to develop an assessment, and this, in turn, can be used to develop and implement adequate training and interventions that could yield performance-enhancing benefits in the military environment and optimise combat readiness. Adequate training and interventions can potentially mitigate the effects of military-specific demands on the individual. The repeated exposure to stress as found in the military environment can lead to long-term emotional and behavioural problems, particularly amongst those individuals who are psychologically less robust (Fitzwater et al., 2018). Extreme situations and their inherent stress and dangers specific to the military profession warrants training to function effectively in such environments (Bergman et al., 2019). Therefore, equipping military personnel with necessary coping skills in a stress situation can reduce the risk of subsequent trauma and development of further post-traumatic symptoms (Hourani et al., 2012). Although the debate is on-going as to whether aspects such as resilience and hardiness can be taught, they can be trained through the application of pertinent practical procedures (Krueckel et al., 2020). Hence, military training has been used to enhance resilience, for example, and to alleviate negative mood state symptoms (Guo et al., 2021). In order to provide performance-enhancing training, an assessment tool is beneficial to identify developmental areas. Using the developed models and constructing an assessment tool to identify potential areas for development, these areas can then be addressed through appropriate training and interventions.

As discussed, some aspects such as mood states (Van Wijk et al., 2013) and r-RST constructs (Bacon et al., 2018) are also potential indicators of pathology. Assessment coupled with interventions could contribute to enhancing the overall psychological health and well-being of the individual. The appropriate training and interventions aimed at individual

performance would enhance overall personnel combat readiness of the SANDF. Van Wijk and Martin (2019) advocated the use of the BSRS by military mental health practitioners as a potential tool to screen military individuals and stream those requiring intervention to appropriate support providers. The current study adds to their premise and provides the framework for a more comprehensive tool that offers a broader perspective of the individual's functioning. It is recommended, however, that both the potential enhancing- and inhibiting-performance models be utilised together for assessment and the development of applicable interventions. The use of only one specific model for assessment will only provide a one-dimensional perspective and therefore potentially performance-influencing characteristics might be overlooked and not addressed.

7.6.2 Research Contribution: Neuropsychology

Research pertaining to neuropsychology and performance within the SANDF is very limited, although the neuropsychology of performance is not a new concept (Maerlender, 2017). Ericsson et al. (2009) attempted to define a theory of exceptional performance and emphasised the importance of deliberate practice and quality of training to activate dormant genes in healthy individuals. Neuropsychology in the military is a multifaceted force multiplier; its applications include: treatment; selection and assessment; improvement of equipment through the understanding of brain-behaviour dynamics; and training (Green et al., 2017). Training for combat is about brain dynamics and neuroplasticity, educating soldiers about brain functions while incorporating stressors, and functional techniques. An understanding of these factors can prepare units to maintain and sustain emotional stability in battle (Steadman, 2011). The current study has highlighted numerous differences pertaining to neuropsychological systems between SANDF military personnel and a comparative sample as well as between the airborne- and the non-airborne-qualified groupings. These results allude to a specific neuropsychological profile that could potentially be more suited for particular work capacities within the military. This study has attempted to

provide both a research contribution and practical implications thereof. The findings can be used in selection, training and interventions that could be tailor-made to focus on a specific neuropsychological aspect that is deemed important for performance in that work capacity. This study supports the premise that future military neuropsychologists need to focus on including neuropsychological predictors of performance (Green et al., 2017). It provides a basis from which further research can be conducted and novel interventions developed that are embedded in current neuroscience.

7.6.3. Psychometric Contribution

Although the validation of the instruments used was not a specified study objective but rather part of the research process, numerous instruments have been validated for use in the SANDF. The BRUMS and BSRS have been used in the SANDF (Van Wijk & Martin, 2019), but most of the published research relate to South African Navy samples. Findings from the current study have, therefore, validated the use of the BRUMS and BSRS in the SANDF for different arms of services.

The original factor structures of the ERQ, RST-PQ and DRS-II were supported by the CFAs conducted, although certain items were found not to load significantly and thus caution is advised when these instruments are used. Their utilisation in the SANDF is supported although the researcher advises that the psychometric properties should also be investigated along with the utilisation thereof to ensure reliable and valid results are obtained.

The CFAs conducted did not support the original factor structures of the SMTQ, BMSQ and MWMS; consequently, revised structures were determined in accordance with theory and statistical analysis. It is recommended that confirmatory validation of the revised structures be part of any future use of the instruments.

7.7. Limitations

7.7.1 Generalisability

The current study was conducted with an SANDF military sample that was mostly comprised of South African Army personnel. Internal SANDF research on characteristics such as resilience and mood states have not shown significant differences across arms of services and the results should be interpreted with caution when applying results of this study across all arms of service and areas of specialisation or job-tasks. Although the sample size for the study was adequate in order to conduct the statistical analysis procedures, the sample makes up a relatively small percentage of the SANDF population. Therefore, caution should be applied when attempting to generalise the results to the broader SANDF population.

As discussed in Chapter 3, most of the performance-related characteristics investigated in this study have also been researched within the sporting environment. The results and conclusions of this study pertain to the SANDF military sample so caution should be applied in generalising the findings to civilian populations.

7.7.2 Instruments Used

Although the chosen instruments used in the study were scrutinised before application for reliability, validity and environmental fit, the CFAs conducted on the instruments showed that the original factor structure was not always supported. Furthermore, several items did not load significantly on their respective factors (Chapter 5). Although these shortcomings were overcome through the applicable revision of factor structures and removal of items, it does indicate that caution should be applied when instruments are used on a similar sample. A greater SANDF sample might, perhaps, indicate other changes or support for the original proposed structures. A potential adaptation of the rating scales for the BMSQ and MWMS might also yield different results. These instruments

use a 6-point and 7-point Likert-type rating scale which is broader than that used by the other instruments. The BMSQ and MWMS had the most revisions and the broader rating scale might have contributed to the adaptations.

In retrospect, the researcher is of the opinion that an alternative emotion regulation instrument would have been more beneficial. The ERQ only assesses two techniques of emotion regulation, as discussed above. An instrument providing results for other techniques might have contributed more to the study's findings and shed additional light on the potential impact of emotion regulation techniques on performance. The ability to effectively regulate emotions is central to military performance and the successful outcome of operations (Janelle & Hatfield, 2008). Once a soldier achieves a state of emotional calm, their mind can sense patterns in the environment that might have been supressed by emotional stress (Steadman, 2011). The CERQ-S provides a distinction of nine different techniques and could potentially have provided additional insight into emotion regulation techniques and the impact thereof on performance in an SANDF sample. Hence, it is recommended that further research considers the use of the alternative and more comprehensive CERQ-S.

The study investigated numerous psychological characteristics and therefore included several instruments. In order to avoid potential test fatigue of the participants, the researcher selected concise and short instruments without compromising validity and reliability. A more comprehensive instrument related to mental toughness, such as the MTQ48 (Clough et al., 2002), might have proven to be a superior alternative, although the financial cost pertaining to the MTQ48 were also a limitation.

7.7.3 Practical Limitations

At the time of the study, South Africa and the SANDF faced the COVID-19 pandemic and therefore certain practical limitations were instituted. Travel and group gathering restrictions were applied and consequently the researcher could not visit every unit himself.

The assistance of qualified psychologists in the SANDF had to be relied on in order to assist in the collection of the necessary data.

7.8 Recommendations and Future Areas for Research

As discussed above, this study has provided integrative psychological models of potential performance enhancement and inhibition which can be used to develop an assessment tool and contribute to training and interventions. Further research is warranted on a larger sample and aid in the development of SANDF-specific norms. Norms could then be developed for unique environments and areas of specialisation where deemed necessary. As illustrated by the significant differences between airborne- and non-airborne-qualified military personnel, specific norms will be beneficial for use with specific groups to develop focused training and intervention programmes.

In order to evaluate the aptness of a newly developed assessment derived from the results of this study, appropriate monitoring and evaluation processes should be in place. In such a scenario, the psychometric properties of the assessment tool and chosen intervention should be evaluated and coupled with an objective measurement of the desired outcome. This will result in an objective evaluation of the assessment tool and the impact on the area of performance identified.

Applications and interventions that build upon the current study's findings should be cognisant of the cultural background of the target group. Therefore certain appropriate cultural adaptations should be considered before implementation. Coupled to the interventions, building on the results from the current study, research focusing on specific cultural adaptations should also be conducted. Research incorporating a civilian sample is also recommended in order to ascertain whether the results can be generalised to samples outside of a military environment.

Analysis of the results indicated the presence of several significant differences between the airborne- and non-airborne-qualified groups. A discussion and potential

explanation of some of the results have already been provided, as pointed out. Some differences might be a consequence of the environment whilst others might be characteristic of the individual. Utilisation of the original and revised instruments that assess factors where significant differences manifested might have application in a selection context. The current study did not use the instruments in a selection context and further research would have to be carried out to investigate the applicability of the revised and original instruments in a selection context. The sample size of airborne-qualified military personnel was not sufficient to develop a psychological model that is uniquely applicable to the airborne grouping. However, the results indicate the existence of several significant differences. Therefore, the development of a model that is exclusive to the airborne military individual is a recommended avenue for further research. It is also recommended that further research be conducted in order to investigate potential significant psychological differences between the respective sub-groupings that make up the airborne-qualified personnel. The current sample did not allow for a meaningful statistical analysis in order to investigate potential differences, due to the small sample size of certain sub-groupings, and therefore future research is recommended. Future research can potentially also adopt a mixed methods design in order to incorporate qualitative data. This could shed additional insight on the psychological characteristics that pertain to performance as well as illuminate differences between the airborne- and non-airborne-qualified personnel in the SANDF.

Several characteristics included in the study such as hardiness, resilience and emotional regulation protect against and assist in the recovery from traumatic experiences (Bartone, 1999; Wang et al., 2019). Although the current study did not place specific emphasis on trauma recovery and post- traumatic growth these are relevant to a military environment. Therefore further research could potentially expand on the current developed models in order to include additional characteristics that specifically pertain to recovery from trauma and post traumatic growth.

To the best knowledge of the researcher, this study was the first to investigate the systems underlying the r-RST of personality on an SANDF sample. As South African research surrounding the r-RST systems and its implication on workplace behaviour is also very limited, further research is recommended. The RST-PQ has also been under-utilised and this study indicates the validity thereof on a South African sample. The utilisation of the RST-PQ on a larger sample would result in the establishment of norms for the SANDF population. Application of the RST-PQ holds significant potential to be used in a screening and selection setting as well as potentially predicting performance in certain circumstances. Appropriate utilisation of the RST-PQ for the screening of psychopathology, coupled with adequate interventions could also contribute to the improvement of psychological health and overall individual well-being (Harnett et al., 2012; Bacon et al., 2018). A health assessment is completed by SANDF military personnel every two years, the purpose of which is continued monitoring of the individual's health in order to maintain a combat-ready force. It also provides an indicator of deployment status and any potential restrictions on work applicable to the individual. A psychological assessment forms part of this process and is conducted by a registered counsellor or psychologist. The health assessment process provides an ideal platform for further data collection and research to be conducted in order to investigate the applicability thereof.

7.9 Conclusion

This study contributes to existing performance and positive psychology literature and provides a comprehensive investigation of performance-related psychological characteristics (dispositional traits, motivation states and performance strategies) as shown by a sample of SANDF military personnel. Numerous differences were highlighted and explanations provided between the SANDF sample and relevant research samples.

The developed models accentuated the impact of relevant psychological characteristics that may potentially be related to enhanced or inhibited performance within

the military context. Further emphasis was placed on how these results may contribute to the development of a measuring tool that holds potential for training and intervention programmes which could optimise performance and combat readiness in the SANDF.

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Appendices

Appendix A: Performance Models' Structures

Figure 1

Single Factor Performance Model

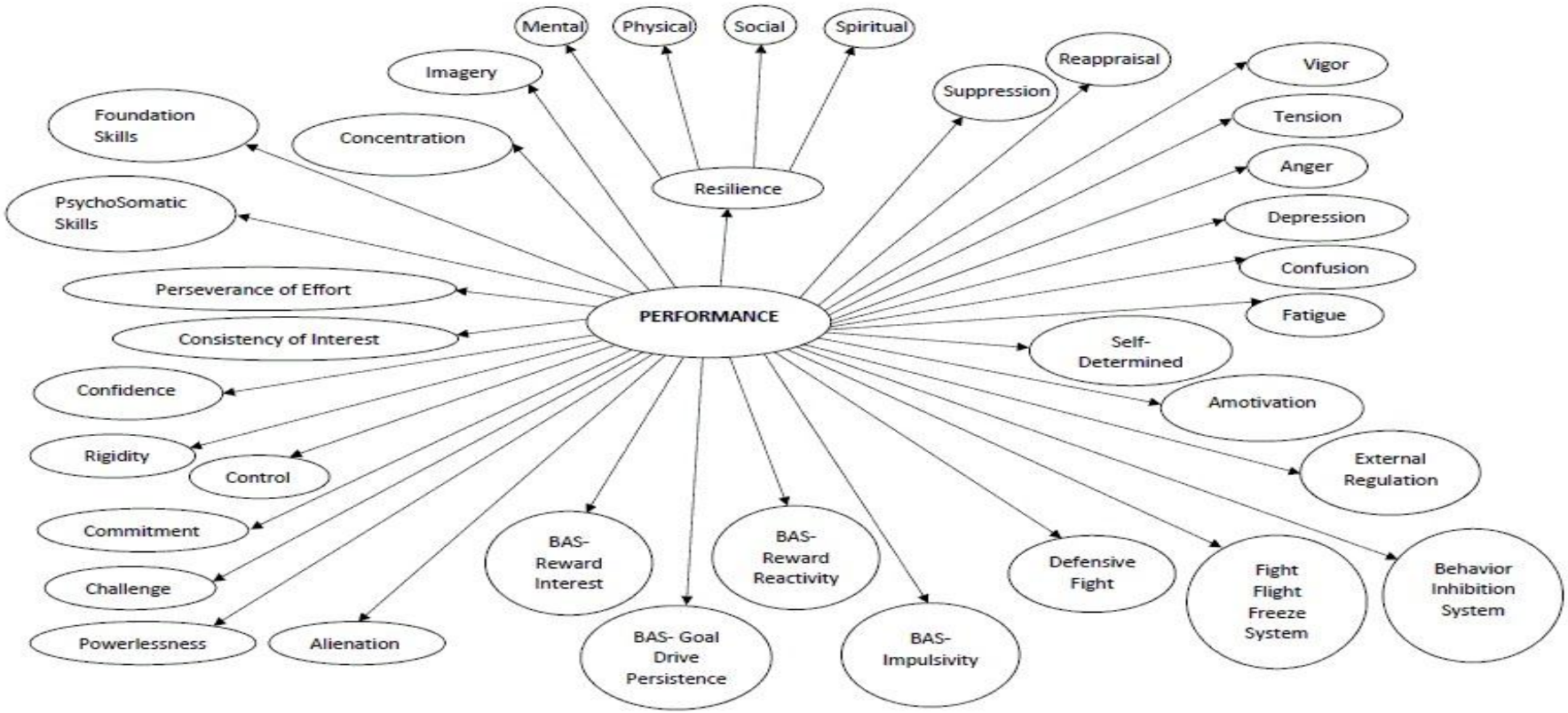


Figure 2

Two Factor Performance Model

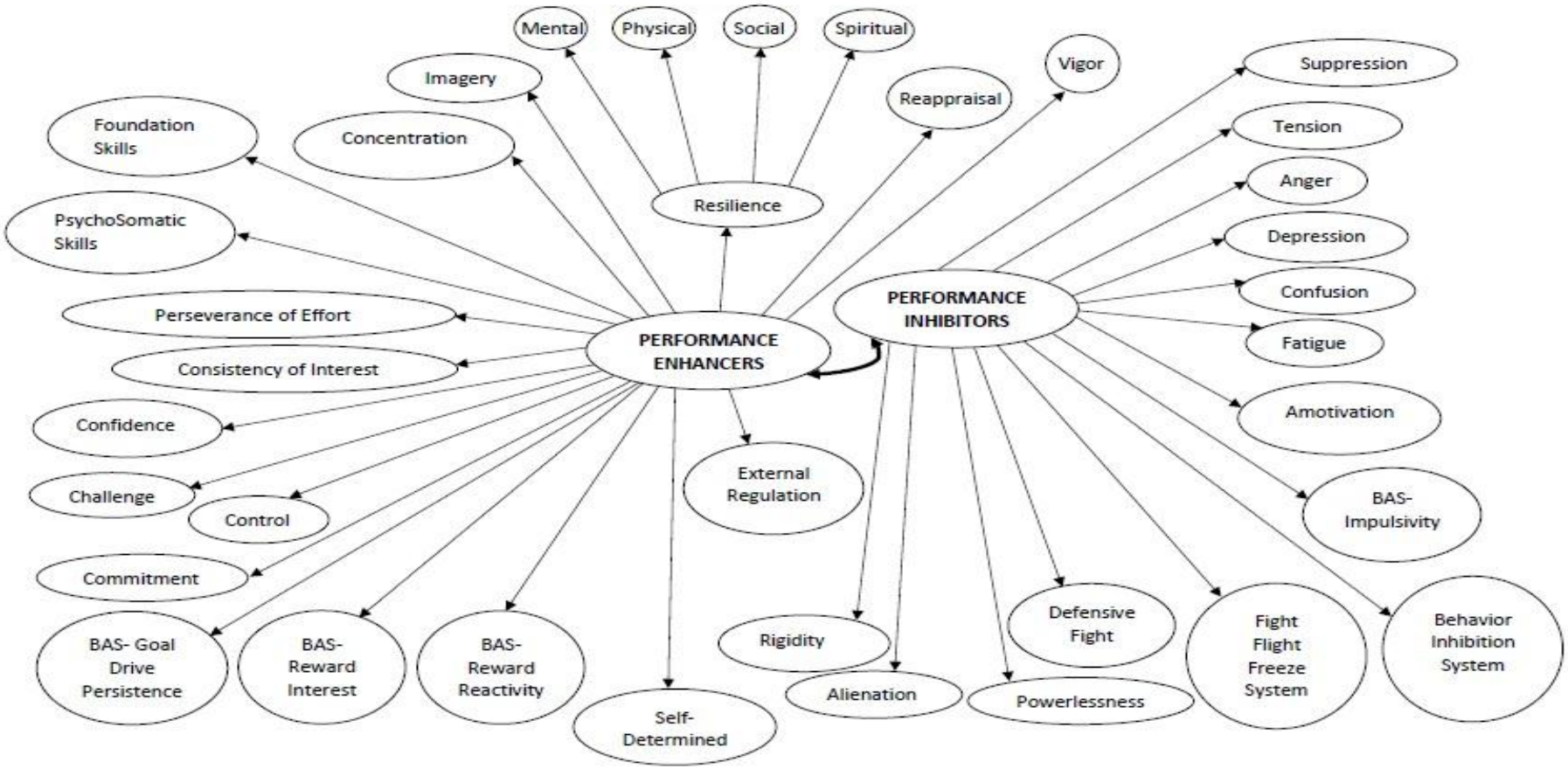


Figure 3

Revised Two Factor Performance Model

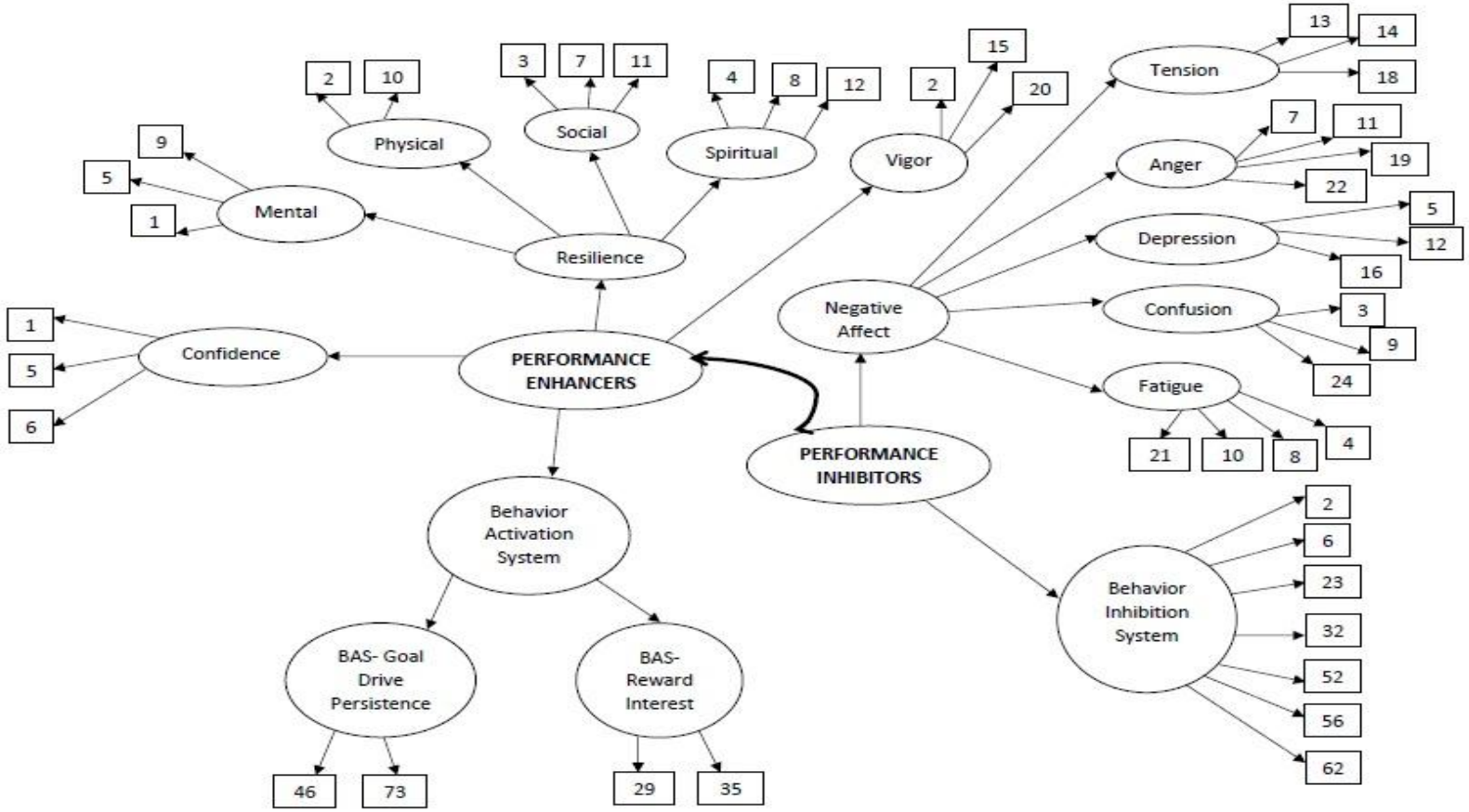


Figure 4

Performance Enhancers Model

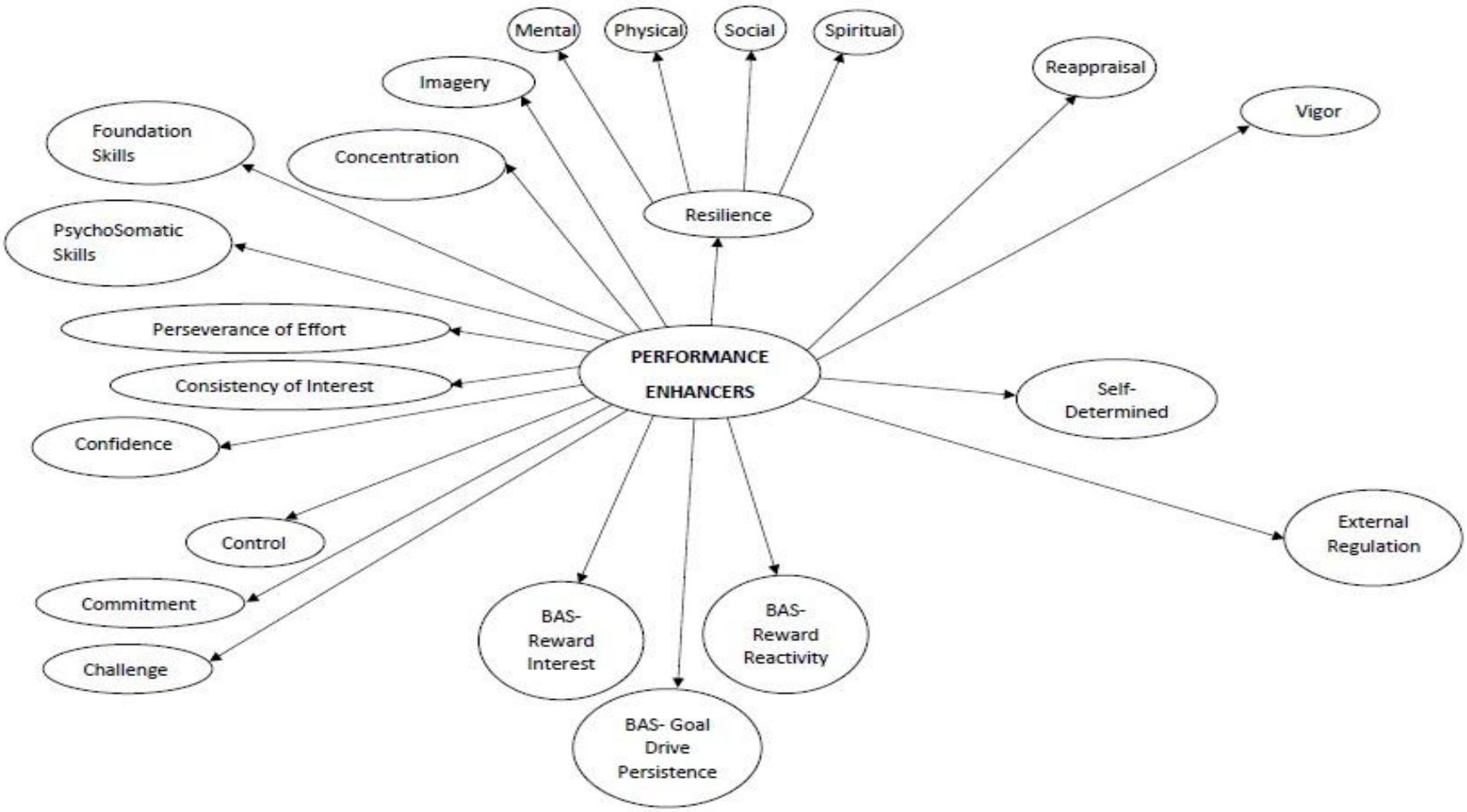
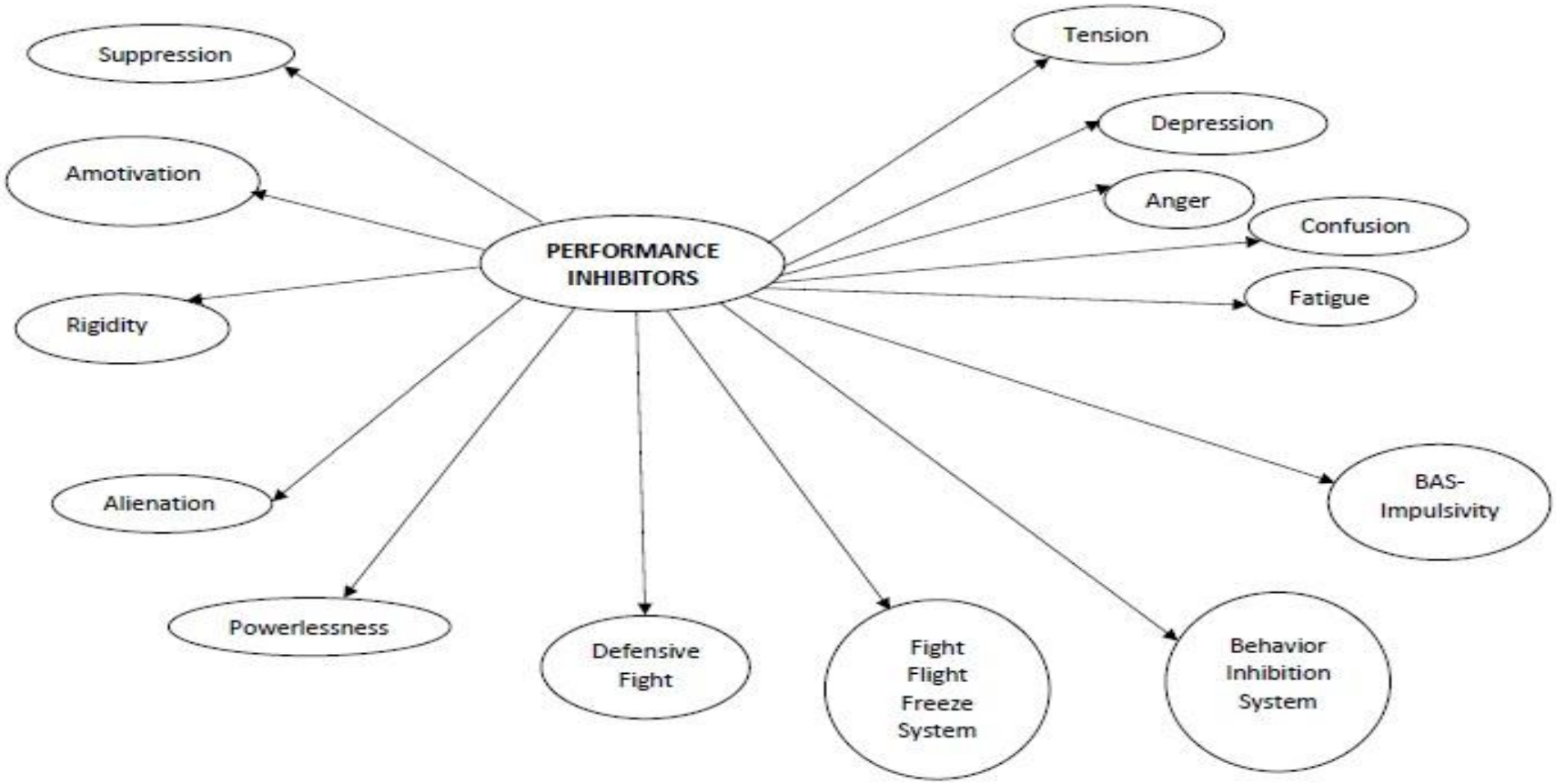


Figure 5

Performance Inhibitors Model



Appendix B: Item and Factor Loadings of Potential Performance Influencing Models

Table 1

Item loadings Revised Performance Enhancers Model

Instrument	Subscale	Item Nr	Loading
BSRS	Mental	1	.609
		5	.707
	Physical	2	.916
		10	.879
	Social	3	.776
		7	.897
	Spiritual	13	.785
		4	.825
		8	.887
		12	.900
SMTQ	Confidence	1	.633
		5	.773
		6	.749
ERQ	Reappraisal	3	.619
		7	.790
		8	.783
		10	.739
RST-PQ	BAS-Reward Reactivity	17	.632
		28	.644
		33	.654

Instrument	Subscale	Item Nr	Loading
	BAS-Reward Interest	12	.637
		15	.655
		29	.616
		35	.654
BMSQ	Concentration	5	.674
		12	.696
		19	.746
		26	.627
BRUMS	Vigor	2	.614
		15	.790
		20	.657
MWMS	Self-Determined	5	.765
		6	.637
		11	.759
		12	.812
		17	.666
		18	.742

Table 2

Individual Factor Loadings on Revised Performance Enhancers Model

Instrument	Subscale/Factor	Higher Order Factor	Loading
BSRS	Resilience	Performance Enhancers	.801
	Mental	Resilience	.834
	Physical	Resilience	.505
	Social	Resilience	.505
	Spiritual	Resilience	.657
ERQ	Reappraisal	Performance Enhancers	.497
SMTQ	Confidence	Performance Enhancers	.782
RST-PQ	Behaviour Activation System	Performance Enhancers	.849
	BAS- Reward Reactivity	Behaviour Activation System	.666
	BAS- Reward Interest	Behaviour Activation System	.865
BMSQ	Concentration	Performance Enhancers	.402

Instrument	Subscale/Factor	Higher Order Factor	Loading
BRUMS	Vigor	Performance Enhancers	.710
MWMS	Self- Determined Motivation	Performance Enhancers	.704

Table 3

Item loadings Revised Performance Inhibitors Model

Instrument	Subscale	Item Nr	Loading
RST-PQ	Behaviour Inhibition System	2	.638
		23	.702
		32	.626
		52	.675
		55	.611
		56	.734
		61	.601
		62	.702
BRUMS	Tension	13	.689
		14	.834
		18	.686
	Depression	5	.670
		12	.755
		16	.711
	Anger	7	.730
		11	.659
		19	.790
		22	.873
	Fatigue	4	.671
		8	.834
		10	.833
		21	.835

Instrument	Subscale	Item Nr	Loading
	Confusion	3	.628
		9	.735
		24	.714

Table 4

Individual Factor Loadings on Revised Performance Inhibitors Model

Instrument	Subscale/Factor	Higher Order Factor	Loading
RST-PQ	Behaviour Inhibition System	Performance Inhibitors	.777
BRUMS	Tension	Performance Inhibitors	.847
	Depression	Performance Inhibitors	.895
	Anger	Performance Inhibitors	.813
	Fatigue	Performance Inhibitors	.785
	Confusion	Performance Inhibitors	.946