DEVELOPMENT AND EVALUATION OF A WELLBEING STRUCTURAL MODEL

FOR HEALTH SCIENCES STUDENTS

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DECLARATION

I, the undersigned, hereby declare that this thesis is my own work, and that all sources used have been indicated and acknowledged. This document has not previously, in its entirety or in part, been submitted at any university in order to obtain an academic qualification.

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Date: December 2019

ABSTRACT

Health sciences students experience a great amount of personal distress throughout their training. This has potential adverse effects on their professionalism, competence, academic performance, and personal wellbeing. For instance, studies have found medical students to have a higher rate of depression and suicidal ideation than their age-matched peers. Students adopt various coping mechanisms to manage this stress, and often these coping mechanisms are maladaptive. These challenges have consequences for our society as a whole: not only does South Africa have a shortage of healthcare professionals, but if these issues remain unresolved, they can endanger the lives of health sciences students and seriously jeopardise patient care. It is thus essential to take a deeper look at the wellbeing of health sciences students in order to solve the dilemma.

The focus of past industrial psychology literature on the wellbeing of health sciences students has typically highlighted the negative aspects of wellbeing, such as burnout. This is understandable, as burnout is a major area of concern, especially amongst health sciences students. However, one cannot help but be curious why some health sciences students do not develop burnout, regardless of high job demands. Instead, they may experience a sense of academic engagement. These students are better able to cope than their peers under highly demanding and stressful work conditions. The following research-initiating question is therefore the driver of this study: *"Why is there variance in the wellbeing (engagement and burnout) of health sciences students at Stellenbosch University?"*

The job demands-resources (JD-R) model (Bakker & Demerouti, 2018) was used as a framework to investigate the wellbeing of health sciences students at Stellenbosch University.

The primary objective of this study was to develop and empirically test a partial structural model to portray the network of variables that affect the wellbeing (engagement and burnout) of health sciences students at Stellenbosch University (based on the JD-R model). The antecedents comprise social support (as a job resource), mindfulness and emotional intelligence (as students' personal resources), and work overload (as a job demand), which are present in a health sciences education environment.

An *ex post facto* correlational design was used to test the formulated hypotheses within this research study. Quantitative data was collected from 357 health sciences students by means of non-probability convenience sampling. A self-administered voluntary web-based questionnaire was sent to Stellenbosch University health sciences students. The measuring instruments consisted of (a) the 14-item *Utrecht Work Engagement Scale-Student Survey* (UWES-S) (Schaufeli, Martínez, Pinto, Salanova, & Bakker, 2002a), (b) the 15-item *Maslach Burnout Inventory-Student Survey* (MBI-S) (Schaufeli et al., 2002a), (c) a seven-item *social support scale* devised by Susskind, Kacmar, and Borchgrevink (2003), (d) the 15-item *Mindfulness Attention Awareness Scale* (MAAS) (Brown & Ryan, 2003), (d) the 14-item *Genos Emotional Intelligence Inventory* (Genos EI) (Palmer, Stough, Harmer, & Gignac, 2009), and (e) the eight-item *overload subscale* within the Job Demands-Resources Scale (JDRS) (Rothmann, Mostert, & Strydom, 2006). The data was analysed using item analyses and structural equation modelling (SEM). A partial least squares (PLS) path analysis was conducted to determine the model fit.

From the 11 hypotheses formulated in the study, five of the paths were found to be significant, though only four supported the JD-R theory. It is important to note that four of the insignificant paths were related to the moderating effects (the fifth being significant, but not supporting the JD-R theory – hypothesis 11). Hypotheses 3 and 4 were also found not to be statistically significant. Nevertheless, hypotheses 1, 2, 5, and 9 were all found to be statistically significant and supported the JD-R theory (Bakker & Demerouti, 2018). Additional paths were also found that could contribute to an extension of the JD-R theory.

The findings of the study shed light on the importance of interventions that can foster job resources and personal resources in the pursuit of optimising health sciences student wellbeing, especially in the face of high demands.

OPSOMMING

Gesondheidswetenskapstudente ervaar 'n hoë mate van persoonlike nood tydens hulle opleiding. Dít het potensiële nadelige uitwerkings op hulle professionaliteit, bevoegdheid, akademiese prestasie en persoonlike welsyn. Byvoorbeeld, studies het gevind dat mediese studente 'n hoër persentasie van depressie en selfmoord-ideasie het as hulle eweknieë van dieselfde ouderdom. Studente gebruik verskeie behartigingsmeganismes om hierdie stres te hanteer, en dikwels is hierdie behartigingsmeganismes wanaangepas. Hierdie uitdagings het gevolge vir ons samelewing as 'n geheel: nie net het Suid-Afrika 'n tekort aan gesondheidswerkers nie, maar as hierdie probleme onopgelos bly, kan dit ook die lewens van gesondheidswetenskapstudente in gevaar stel en pasiëntsorg ernstig in gedrang bring. Dit is dus noodsaaklik om die welsyn van gesondheidswetenskapstudente beter te ondersoek ten einde die dilemma op te los.

Die fokus van vorige bedryfsielkundige literatuur oor die welsyn van gesondheidswetenskapstudente het tipies die negatiewe aspekte van welsyn, soos uitbranding, uitgelig. Dít is verstaanbaar, omdat uitbranding 'n belangrike bron van kommer is, veral onder gesondheidswetenskapstudente. 'n Mens kan egter nie help om nuuskierig te wees oor waarom sommige gesondheidswetenskapstudente nie uitbranding ontwikkel nie, ten spyte van hoë werkvereistes. In plaas daarvan kan hulle 'n gevoel van akademiese betrokkenheid ervaar. Hierdie studente is beter in staat as hulle eweknieë om baie veeleisende en stresvolle werksomstandighede te hanteer. Die volgende navorsingsinisiërende vraag is dus die drywer van hierdie studie: *"Waarom is daar variansie in die welsyn (betrokkenheid en uitbranding) van gesondheidswetenskapstudente aan die Universiteit Stellenbosch?"*

Om op hierdie navorsingsinisiërende vraag te kan reageer, is die *job demands-resources* (JD-R) model (Bakker & Demerouti, 2018) gebruik as raamwerk spesifiek om die welsyn van gesondheidswetenskapstudente aan die Universiteit Stellenbosch te ondersoek.

Die primêre doelwit van hierdie studie was om 'n gedeeltelike strukturele model te ontwikkel en empiries te toets om die netwerk van veranderlikes wat die welsyn (betrokkenheid en uitbranding) van gesondheidswetenskapstudente aan die Universiteit

Stellenbosch (gebaseer op die JD-R-model) beïnvloed. Die spesifieke voorafgaande veranderlikes wat in hierdie studie getoets is, was maatskaplike ondersteuning (as 'n werkshulpbron), bewustheid en emosionele intelligensie (as studente se persoonlike hulpbronne), en werkoorlading (as 'n werkseis) wat in 'n gesondheidswetenskappe-onderrigomgewing voorkom.

'n *Ex post facto* korrelasie-ontwerp is gebruik om die geformuleerde hipoteses binne hierdie navorsingstudie te toets. Kwantitatiewe data is by 357 gesondheidswetenskapstudente versamel deur middel van nie-waarskynlikheidsgeriefsteekproefneming. 'n Self-geadministreerde vrywillige webgebaseerde vraelys is aan die Universiteit Stellenbosch se gesondheidswetenskapstudente gestuur. Die meetinstrumente bestaan uit (a) die 14-item *Utrecht Work Engagement Scale-Student Survey* (UWES-S) (Schaufeli et al., 2002a), (b) die 15-item *Maslach Burnout Inventory-Student Survey* (MBI-S) (Schaufeli et al., 2002a), (c) a sewe-item *social support scale* van Susskind et al. (2003), (d) die 15-item *Mindfulness Attention Awareness Scale* (MAAS) (Brown & Ryan, 2003) (d) die 14-item *Genos Emotional Intelligence Inventory* (Genos EI) (Palmer et al., 2009), en (e) die agt-item *werkoorlading subskaal* binne die Job Demands-Resources Scale (JDRS) (Rothmann et al., 2006). Die versamelde data is deur middel van item-analise en strukturele vergelykingsmodellering geanaliseer. 'n PLS roete-ontleding is onderneem om modelpassing te bepaal.

Uit die 11 hipoteses wat in die studie geformuleer is, is vyf van die paaie gevind om statisties beduidend te wees, maar slegs vier het die JD-R-teorie ondersteun. Dit is belangrik om daarop te let dat vier van die onbeduidende paaie verband hou met die matigende effekte (die vyfde is beduidend, maar ondersteun nie die JD-R-teorie nie – hipotese 11). Hipoteses 3 en 4 was ook nie statisties beduidend nie. Tog is hipoteses 1, 2, 5 en 9 almal statisties beduidend en ondersteun hulle die JD-R teorie (Bakker & Demerouti, 2018). Bykomende paaie is ook gevind wat kan bydra tot die uitbreiding van die JD-R-teorie.

Die bevindings van die studie werp lig op die belangrikheid van ingrypings wat werkhulpbronne en persoonlike hulpbronne kan koester in die strewe om gesondheidswetenskapstudente se welsyn te optimaliseer, veral wanneer werkseise hoog is.

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CHAPTER 1

BACKGROUND TO THE STUDY

1.1 INTRODUCTION

The Pareto principle of factor scarcity states that, for many events, roughly 80% of the effects come from 20% of the causes. This 80/20 rule can be applied in various contexts. In the organisational context, the Pareto principle suggests that fewer vital production factors will lead to the greatest outcomes (O'Neill, 2018). The maximisation of social welfare requires that the production of products and services fulfil Pareto optimal conditions (Theron, 2016).

In the broader sense, organisations exist to provide products and services to society. They have earned the right to utilise resources to add value to society and, as a reward, they can make profit. Profit can be seen as a measure of rationality. If an organisation (with the exception of non-profit organisations) does not make profit, it is either (a) not selling the market something of value, or (b) wasting resources. Thus, in both senses, the organisation fails to serve society. In order for organisations to serve the multiple needs of society, scarce production factors need to be combined and transformed into products and services with the greatest economic utility. In other words, the production of products and services must be realised according to socioeconomic efficiency criteria. Social welfare maximisation requires that the production of products and services fulfil Pareto optimal conditions. The organisation is therefore faced with a production possibilities frontier regarding the limited production factors to which it has access. The organisation is thus guided to produce the maximum level of output (i.e. goods and services demanded by society) with the minimum level of input (i.e. factors of production). Compliance with this economic principle enables the organisation to maximise its profit (Theron, 2016).

However, in today's globalised and competitive marketplace, merely focusing on the single bottom line (i.e. profit) is not enough for the organisation to survive and succeed. Instead, the organisation should focus on the triple bottom line – profit, people, and planet. The organisation is merely a subsystem within a larger system. These two systems are co-dependent. People need the organisation to earn money to survive, and the organisation needs the people to be able to exist and succeed. Likewise, the

organisation is dependent on environmental resources provided by the planet. Disregarding the needs of the larger system could lead the organisation into failure. Two additional views exist; the first is that there is an unwritten psychological contract between the organisation and the society it wishes to serve. It is implied within the contract that the organisation can combine and transform scarce production factors in order to add value and serve the needs of society if the organisation agrees to deal responsibly with human and natural resources. An organisation can severely jeopardise its ability to continue operations if it violates this contract. Second, it is the organisation's moral obligation to deal responsibly with human and natural resources so as to ensure the sustainability of the society in the long run, regardless of whether or not short-term benefits are involved (Theron, 2016).

For an organisation to be successful in achieving its objectives, a number of interrelated activities/functions must be performed. The role of a human resource practitioner constitutes one of these functions. Whether an organisation will be successful is largely dependent on the utilisation, management and quality of its workforce. The human resource practitioner attempts to contribute to the organisation's goals by acquiring and maintaining a motivated and competent workforce. Furthermore, the organisation's ability to produce need-satisfying goods and services with maximum economic utility depends largely on the job performance of its workforce, which, in turn, depends on the utilisation, management and quality of its workforce (Theron, 2016).

Since an organisation is managed and run by labour, labour is an essential factor of production. Labour mobilises other production factors and is therefore the production factor that determines how effectively and efficiently the other production factors are utilised. What complicates this notion is the fact that labour, as a production factor, is carried by the nature of the working person. Every individual is unique and performs in a different way, thus, in many cases, performance has to be altered. However, to transform the performance of the working person, a thorough understanding is needed of what determines performance in a certain job, as well as a detailed understanding of the job. Industrial psychology attempts to psychologically explain the behaviour of the working person in order to allow the development of human resource interventions aimed at positively influencing this behaviour of working persons, so as to improve individual and collective job performance in a cost-effective manner that will ultimately benefit society (Theron, 2016).

Job performance can be influenced by a variety of human resource approaches. The decision on which is the suitable approach to be utilised requires an understanding of the typical performance of the working person and an explanation for this performance. Job performance is not simply random; it is determined by a complexly interlinked nomological network of latent variables that describe the nature of a working individual in a particular environment. This nomological network must be understood validly in order to influence the individual's job performance. In addition, there must be a valid understanding of the success with which human resource interventions influence job performance so as to justify the interventions and to enhance the impact of the interventions. Consequently, research conducted by industrial psychologists is aimed at generating valid knowledge on (1) the typical performance of the working person and an explanation for it, (2) the complexly interlinked nomological network of latent variables, and (3) the success of the influence human resource interventions have on job performance (Theron, 2016).

Pertaining to the aforementioned, various studies have found positive links between employee wellbeing and organisational outcomes such as organisational commitment, job performance, turnover intention, organisational citizenship behaviour, and more. Besides, the poor health of one worker may have negative effects on the job performance of his/her peers (Fenton, Pinilla Roncancio, Sing, Sandhra, & Carmichael, 2014) thereby causing a spill-over effect. In addition to affecting organisational outcomes, interventions aimed at supporting the promotion of employee wellbeing have been shown to influence personal outcomes as well, such as improving workers' quality of life and reducing economic losses (due to sickness, disability, absenteeism, low morale, and turnover). Consequently, it is necessary to keep track of and address occupational wellbeing, also simply known as *wellbeing.* According to De Neve, Diener, Tay, and Xuereb (2013), wellbeing is gaining momentum because employees, policy makers and managers have started to realise the importance of wellbeing as a crucial determinant of job performance and human functioning.

Bakker and Demerouti (2018) propose that job demands and resources have independent and unique effects on wellbeing through two processes; job resources may initiate a positive motivational process leading to *engagement,* whereas excessive job demands may initiate a negative health-impairment process leading to *burnout.* In line

with this thinking, Schaufeli and Bakker (2004) state that work engagement and burnout are indicators of employee wellbeing. Wellbeing can therefore be studied in terms of positive outcomes (e.g. eustress) and negative outcomes (e.g. distress). Eustress refers to a positive psychological response to a stressor and consists of positive psychological states, such as absorption and vigour. Distress refers to a negative psychological response to a stressor and involves the manifestation of negative psychological states, such as depersonalisation and exhaustion (Nelson & Simmons, 2003). Influential models from past theory fail to recognise both the motivational and health-impairment processes simultaneously. However, it is argued that these two processes work hand in hand and need to be considered concurrently within the same model.

The concepts of engagement and burnout can be conceptualised and described by using the job demands-resources (JD-R) model of occupational wellbeing (Bakker & Demerouti, 2018). The JD-R model focuses on the interactions between job demands and job resources, as well as a new addition to the JD-R model, namely personal resources, to determine organisational and wellbeing outcomes (Bakker & Demerouti, 2018). Job demands refer to the continuous physical, cognitive and emotional efforts made to perform a job. Examples include work pressure and mental load. A suitable level of job demands can provide a positive challenge that stretches and motivates a worker. However, job demands that exceed a worker's capabilities may be burdensome and lead to strain (Cheng, Chang, & Chan, 2018). Job resources are instrumental in that they equip workers to cope with job demands. Examples include supervisor support and performance feedback. JD-R theory suggests that job resources become particularly instrumental when job demands are high. A similar role to that of job resources is played by personal resources. Personal resources are those perceptions held concerning the degree of control one possesses over one's work environment. Examples include optimism and resilience (Bakker & Demerouti, 2018).

JD-R theory can be applied to various occupational settings, including that of a student university setting (Salanova, Schaufeli, Martinez, & Breso, 2010). It is proposed that the JD-R model can be used to explain the intricate nature of demands and resources, and ultimately their outcomes, in a student university context in the same manner that the JD-R model is typically applied to the occupational/job context. The reason for this is that students are expected to perform tasks that may be considered 'job-like', given that the nature of the tasks are structured and hierarchical, and involve defined deadlines,

responsibilities and duties, such as class attendance and assignment submission (Cotton, Dollard, & De Jonge, 2002). The next section focuses specifically on the context of training health sciences students.

1.2   HEALTH SCIENCES STUDENT TRAINING

The experiences of students commencing their academic careers are twofold – both stimulating and stressful. While the university setting may be characterised by learning, adventure, reward, empowerment and comradeship, this is also accompanied by periods of pressure, anxiety and strain (Providas, 2016). The latter student-life experience is birthed from the notion that, on a daily basis, students are faced with situations that are emotionally, psychologically and physically draining, thereby resulting in greater susceptibility to stress (Cushman & West, 2006). Multiple demands (e.g. assignments, tasks, tests, exams, student loan debt, etc.) and the lack of available resources (e.g. accommodating timetables, adequate tutoring and support, access to sufficient facilities and financial services, etc.) contribute to increased levels of stress in the academic environment (Gauche, 2006; Salanova et al., 2010). In addition, a lack of personal resources (e.g. emotional intelligence, hope, optimism, resilience, etc.) may negatively affect the way students interact with, and adapt to, their environment (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007). As a consequence, an academic environment characterised by increased stress and inadequate adaption may serve to initiate the onset of reduced academic engagement and increased burnout, and thereby diminished overall wellbeing among university students (Friedman, 2014; Kotze & Niemann, 2013).

Healthcare education aims to produce well-rounded healthcare practitioners who are professional, caring and competent. However, healthcare training often comes at a price, both physically and psychologically. For instance, recent studies suggest that healthcare, and particularly medical, education may actually hinder the development of some humanistic qualities described in the Lasagna Oath (modern version of the Hippocratic Oath), ultimately affecting the quality of future patient care (Noori, Blood, Meleca, Kennedy, & Sengupta, 2017). The enchanting words from the Lasagna Oath state: *"I will remember that there is art to medicine as well as science, and that warmth, sympathy, and understanding may outweigh the surgeon's knife or the chemist's drug"* (Noori et al., 2017, p. 10). With these words, the oath taker pledges to care for patients with the kindness, empathy and sincerity that we all hope to receive from a healthcare practitioner.

In a study conducted by Dyrbye, Thomas, and Shanafelt (2006a), it was found that medical students leave university with lower humanitarianism and empathy than what they entered with. Of additional concern, these students also have a higher rate of depression and suicidal ideation than their peers. Other studies have demonstrated a significant correlation between the documented decline in student empathy and an erosion in clinical performance. It has furthermore been postulated that burnout, a measure of distress common among healthcare practitioners, has its origin in medical school. A number of factors have been hypothesised to contribute to the decline in students' mental health, including a high workload, sleep deprivation, exposure to the suffering and death of patients, and financial strain, among other things. This is worrisome, as psychological distress among students has been shown to be related to cynicism, reduced empathy, an unwillingness to care for the sick and dying, inferior quality of patient care, and decreased professionalism. On a personal level, student distress may contribute to poor academic performance, broken relationships, substance and alcohol abuse, declining physical health, improper self-care, and even suicide (Dyrbye et al., 2006a).

The wellbeing of health sciences students has been receiving increased attention, with training institutions being encouraged to implement interventions that seek to prevent burnout amongst health sciences students. The focus has been on burnout, and understandably so, as burnout is a major area of concern. However, a more holistic view of wellbeing does not only encompass the negative. When considering the wellbeing of health sciences students, both engagement and burnout should be taken into account. Influential models from past theory fail to recognise both processes simultaneously, but it has been said that these two processes work hand in hand and need to be considered concurrently within the same model. A countless number of studies have focused on student burnout; however, given Bakker and Demerouti's (2018) description of wellbeing, it can be argued that student engagement is equally important and should be studied in conjunction with burnout in order to capture a more complete image of the complex nature of the wellbeing of health sciences students. This study therefore aimed to determine the key antecedents (based on a literature study) that lead to the wellbeing of health sciences students, taking both engagement and burnout into consideration. Engagement furthermore forms part of the contemporary *positive psychology* trend that focuses on optimal functioning and human strengths, rather than focusing only on

malfunctioning and weaknesses (Schaufeli, Martínez, Pinto, Salanova, & Bakker, 2002a).

It can be argued that students who are engaged in their work are emotionally, cognitively and physically connected with their work roles. They are often immersed fully in their work, possess high levels of energy, and have the dedication needed to reach their performance goals. As a result, work engagement leads to greater levels of performance and is an essential indicator of wellbeing (Bakker, 2011). In contrast, students who are distressed and burnt out typically perform poorer than what they are capable of. On a professional level, this distress contributes to cynicism, which subsequently may affect patient care and faculty relationships, as well as the culture of the healthcare profession as a whole. On a personal level, student distress can contribute to attrition from the profession, broken relationships, substance abuse, depression and suicide (Dyrbye et al., 2005).

1.3   RESEARCH PROBLEM

Health sciences students experience a high level of personal distress throughout their training. This has potential adverse effects on their professionalism, competence, academic performance, and health. Stress generally arouses feelings of incompetence, anger, fear, and guilt and is related to both physical and psychological morbidity. Factors that lead to health sciences students experiencing distress and the consequences of such distress are presented in Figure 1.1.

Students adopt various coping mechanisms to manage this stress, and often these coping mechanisms are maladaptive. Strategies that focus on disengagement, such as social withdrawal, problem avoidance, self-criticism, and dreaming, have adverse consequences that relate to anxiety, depression and poor mental health. On the other hand, strategies that centre on engagement, such as reliance on social support, problem solving, positive reinterpretation, and emotional expression, allow students to adapt to circumstances, which will result in reduced anxiety and depression, and also will have an impact on their physical and mental health (Dyrbye et al., 2005).
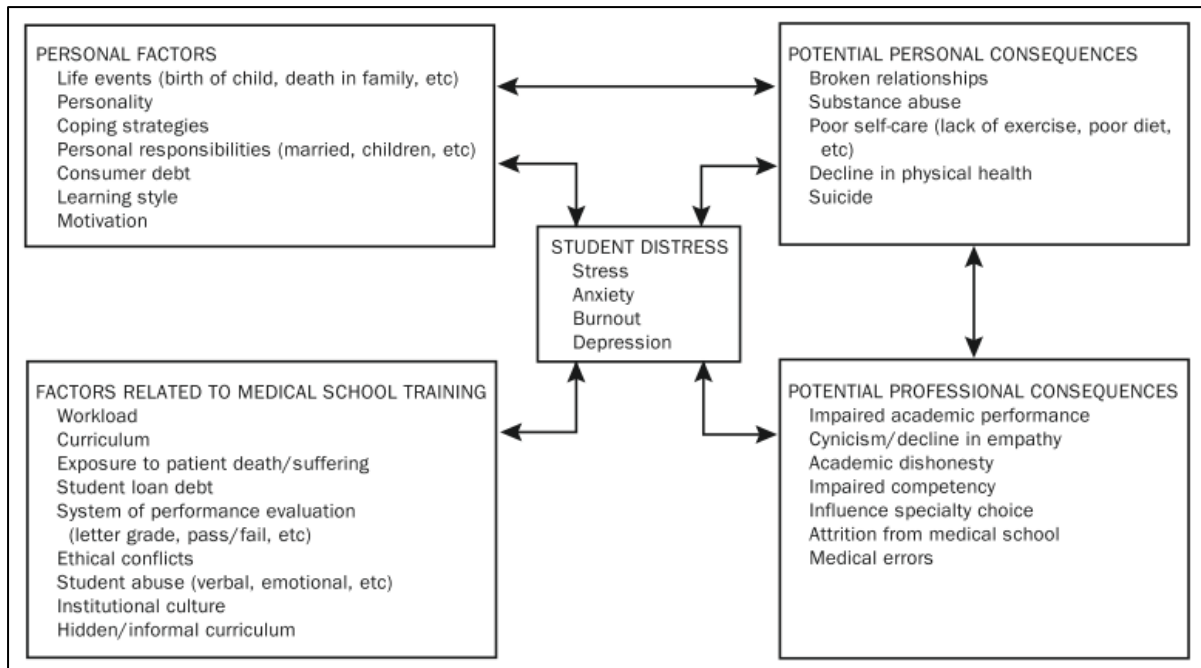
Figure 1.1. Proposed model of causes and consequences of student distress. Reprinted [or adapted] from "Medical student distress: Causes, consequences, and proposed solutions," by L. N. Dyrbye et al., 2005. *Mayo Clinic Proceedings, 80*(12), pp. 1618.

According to Dr S. Snyman (personal communication, May 17, 2016) from the Tygerberg medical campus (the medical school of Stellenbosch University), the curriculum is a major area of concern. The curriculum model emphasises task orientation over patient care, with students being rewarded for academic performance instead of how they treat and care for their patients. This environment encourages cutthroat competitiveness, which, as a consequence, significantly undermines the social support that students are able to gain from one another. Furthermore, the results of an informal questionnaire answered by health sciences students at Stellenbosch University also suggest that, even though most health sciences students are inherently good at helping others, they are not good at admitting when they themselves need help. Furthermore, within the health sciences student community, especially among the medical students, there seems to be a belief that one should "man up" and "get on with it". In this context, asking for help (e.g. seeing a clinical psychologist or counsellor) sometimes is seen as a weakness or failure. This further demonstrates the lack of support typically received by health sciences students, as they are not willing to go out and obtain it. The cutthroat competitive environment, with the simultaneous lack of social support, can have major implications for health sciences student stress and wellbeing.

The reduced wellbeing of health sciences students has consequences for society at large. Unresolved, the dilemma can endanger the lives of health sciences students, jeopardise patient care, and contribute to the shortage of healthcare professionals in South Africa (Hospital Association of South Africa, 2015) and globally. It is thus essential to take a deeper look into the wellbeing of health sciences students in order to investigate ways in which this challenge ultimately can be overcome.

1.4 RESEARCH-INITIATING QUESTION (RIQ)

The following question was thus asked: "Why do some students remain enthusiastic and engaged in their work, while others burn out?" The question on what motivates people and what causes them to burn out has been a topic of interest over the past few decades. To build on the literature, the present research study focuses on the factors that may affect the wellbeing of health sciences students at Stellenbosch University.

The following research-initiating question is the driver of this study:

"Why is there variance in the wellbeing (engagement and burnout) of health sciences students at Stellenbosch University?"

1.5 RESEARCH OBJECTIVES

The study focused on the following research objectives in an effort to address the research-initiating question:

Overall Objective:

- To develop and empirically test a partial structural model to portray the network of variables that effect health sciences student wellbeing (engagement and burnout) at Stellenbosch University (based on the JD-R model).

Specific Objectives:

- To identify the underlying latent variables that contribute to the engagement of health sciences students.
- To identify the underlying latent variables that contribute to the burnout of health sciences students.
- To identify the causal relationships between the latent variables and their outcomes.

- To highlight the results and practical implications of the research findings and recommend interventions that can increase engagement and decrease burnout, and thereby enhance wellbeing amongst health sciences students at Stellenbosch University.

1.6   DELIMITATIONS

The main purpose of this study was to determine the prominent antecedents of the wellbeing of health sciences students (i.e. engagement and burnout), based on the findings from a literature study. Thus, data was gathered on health sciences students from Stellenbosch University. The JD-R model was used as the framework for this study to investigate the effect that personal resources, job resources, and job demands have on health sciences student engagement and burnout. Hypotheses pertaining to the model were tested and additional paths were proposed. Attention was not given to the sub-dimensions of the various variables. For instance, even though engagement comprises three sub-dimensions (absorption, dedication, and vigour), individual hypotheses testing the relationships among the sub-dimensions and endogenous variables were not stated. This is because emphasis was not placed on hypotheses related to the sub-dimensions of the variables in the JD-R model, but rather on the global constructs and how they relate to one another. Thus, no specific hypotheses pertaining to the sub-dimensions of the variables in the JD-R model were tested. Furthermore, the job crafting construct, which constitutes part of the JD-R model (Bakker & Demerouti, 2018) was excluded from this study.

1.7   IMPORTANCE AND CONTRIBUTIONS OF THE STUDY

Past studies have typically ignored positive outcomes, as there was a strong focus on fixing what is wrong, rather than capitalising on what is right. This research study, however, incorporates both the positive and the negative work-related outcomes within a single model, thereby contributing to the *positive psychology* body of knowledge, as well as to the literature concerning 'the positive' and 'the negative' within one and the same model. This study furthermore contributes to the literature on wellbeing, specifically engagement and burnout, in a way that tests the JD-R model in a single research inquiry, versus the norm where researchers tend to focus only on a certain segment of the model.

In addition, the study explores paths with limited evidence to support their inclusion, as little research has been done on them. The inclusion of additional paths within the model was proposed by the researcher. These paths may demonstrate importance in explaining how the JD-R model works. There furthermore is only minimal research available that focuses on the application of the JD-R model within a student context, particularly in South Africa. Furthermore, a countless number of studies have focused on medical students in particular, neglecting other areas within health sciences studies. This study holistically contributes to the body of knowledge on all students studying towards the healthcare profession, including those studying medicine, but not limited to *only* those studying medicine. Finally, the study investigates the condition of wellbeing among health sciences students at Stellenbosch University with the objective of providing practical and relevant interventions to address and improve wellbeing among these students.

1.8 OUTLINE OF THE RESEARCH STUDY

Chapter 1 gives an overview of the study and of healthcare education. Following this is a discussion on the application of the JD-R model to investigate engagement, burnout, and other relevant constructs of health sciences students in an attempt to enhance their wellbeing. The relevance of the research is discussed and the research objectives are outlined.

Chapter 2 satisfies the theoretical objective of the study through a detailed literature review. Existing academic literature is used to defined, explain and discuss each latent variable of interest. The relationships among these variables are investigated, and a conceptual model is developed to depict the theorised paths graphically.

Within Chapter 3, the methodology of the explanatory empirical research study is presented. This encompasses a discussion about the research design, participants to the research, measurement scales/instruments, and the statistical analyses. In addition, the substantive research hypotheses are outlined and the structural model is presented.

Chapter 4 reports on the results of the statistical analyses. This includes reporting on: item analysis, confirmatory factor analysis (CFA), partial least squares (PLS) structural equation modelling (SEM), and regression analyses related to certain hypotheses. The scores are discussed and the hypotheses are interpreted.

Finally, Chapter 5 outlines the practical implications, the limitations of the research, and makes recommendations for future research endeavours.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The purpose of this chapter is to investigate the relevant constructs of the study and the relationships among the constructs. The literature review unfolds with an overview of stress and wellbeing models found in the occupational health literature. Thereafter, the JD-R model of occupational wellbeing and its characteristics are discussed. This is followed by an investigation of the relevant constructs pertaining to this study, as well as the relationships among the constructs. Consequently, the hypothesised paths are stated. In concluding this chapter, a conceptual model portraying the constructs and hypothesised paths is presented.

2.2 OVERVIEW OF STRESS AND WELLBEING MODELS

The aim of this section is to provide a short overview of past stress and wellbeing models. This is followed by a discussion on the JD-R model, which forms the framework of this study.

2.2.1 Job characteristics model

The job characteristics model (JCM), originally developed by Hackman and Oldham (1976), identifies the conditions that workers require to become motivated intrinsically and have high work performance (Allan, Duffy, & Collisson, 2018a). The JCM "examines individual responses to jobs (e.g. job satisfaction, sickness, absenteeism, personnel turnover) as a function of job characteristics, moderated by individual characteristics" (Bakker & Demerouti, 2014, p. 3). Within this model, there are five core job characteristics that are believed to promote three critical psychological states which, in turn, cause numerous positive work and personal outcomes. The five job characteristics are skill variety (degree to which various skills are used at work), task identity (opportunity to be part of the whole value chain when completing a piece of work), task significance (perceived significance and impact of work), autonomy (degree of freedom and independence), and feedback (amount of direct and clear information received regarding performance) (Allan et al., 2018a; Hackman & Oldham, 1976). The three critical psychological states are at the centre of the model and consist of knowledge of work outcomes, experienced responsibility for work results, and meaningfulness of work

(Allan, Duffy, & Collisson, 2018b). Work outcomes, as well as personal outcomes (such as job satisfaction, intrinsic work motivation, work meaningfulness, performance, turnover and absenteeism), are seen to be influenced by the core job characteristics through the accomplishment of the three critical psychological states (Allan et al., 2018b; Robbins & Judge, 2011).

2.2.2 Demand-control model

The demand-control model (DCM) (Karasek, 1979) was one of the first theoretical frameworks established to explain the effects of job strain on wellbeing in the face of high demands (Nell, 2015). The main focus of the DCM is the balance between job demands and job decision latitude, better known as job control. The theory states that high job demands (particularly time pressure and work overload), combined with low job control, which is defined as "the employees' ability to organise their work and adopt their own initiatives" (Del Pozo-Antúnez, Ariza-Montes, Fernández-Navarro, & Molina-Sánchez, 2018, p. 3), is the cause of job strain (e.g. work-related anxiety, dissatisfaction, and exhaustion). Therefore, the DCM proposes that individuals who have the autonomy at work to decide on how they want to go about meeting their job demands are less likely to experience job strain. Put differently, the degree of control that a person has over his/her job acts as the balancing force or buffer against job demands (Del Pozo-Antúnez et al., 2018). The implication of this is that job strain can be reduced by redesigning work processes to allow an increased degree of decision-making freedom for workers, and this can be done without altering job demands (Karasek, 1979). Even though the findings of various studies have been in support of the DCM, Bakker and Demerouti (2007) only found partial support for the hypothesis that job control may act as a buffer against job demands. In contrast to the high-demands low-control jobs, known as *high-strain jobs*, DCM theory suggests that high demands, coupled with high control, results in *active-learning jobs*, which lead to learning, enrichment, personal growth, and task enjoyment. This hypothesis was empirically supported (Karasek, 1979).

2.2.3 Conservation of resources model

The conservation of resources (COR) model of Hobfoll (1988) is built on the premise that people have a learned and innate need to conserve their resources and to prevent any circumstance that may jeopardise the security of their resources. Appropriate resources are invested to meet work demands, and excess resources are accumulated to avoid possible future strain (Hobfoll, 2011). COR theory therefore focuses on the investment,

acquisition, and protection of resources (Zhou, Ma, & Dong, 2018). Hobfoll (1988, p. 26) defines resources as "(a) those objects, personal characteristics, conditions, or energies that are valued by the individual or (b) the means for attainment of those objects, personal characteristics, conditions, or energies". Resources are important to people because they have instrumental value and help define for people who they are, and thus also have symbolic value. Within COR theory, it is postulated that people are mainly concerned with the gain and loss of their resources, which is what causes them stress. Environmental circumstances can threaten the longevity of resources, such as loved ones, time, self-esteem, happiness, job, home, and the like. The importance of these resources is not only tied to their face value, but also to the fact that together they define for people who they are. The COR model introduces the concept of investing resources with the aim of obtaining a net gain in resources as time passes, thus using resources to obtain more resources (Zhou et al., 2018). Furthermore, following the threat of potential or actual loss of resources, people respond by attempting to limit the loss and maximise the gain of resources. They do so by using other resources, typically at a cost (Hobfoll, 1988).

2.2.4 Effort-reward imbalance model

The effort-reward imbalance (ERI) model of Siegrist (1996) delivers an alternative approach to theoretically explaining occupational wellbeing. Rather than emphasising the control structure of work, like what was done by the DCM (point 2.2.2), the ERI model emphasises the reward. The general assumption in the ERI model is that the disequilibrium between effort exerted (extrinsic job demands and intrinsic motivation to meet these demands) and reward received (intrinsic and extrinsic motivators that drive effort – e.g. esteem reward, salary, and career opportunities) results in job strain, particularly when high effort is paired with low reward. Therefore, an example of imbalance that can cause stress includes working hard without receiving a proper reward. If the conditions stay this way for a long time, it will eventually cause autonomic nervous system disorder, as well as mental and physical illness (Roshangar, Davoudi, Hasankhani, & Babapour, 2018).

In line with this theory, a study carried out by Van Veldhoven, Taris, De Jonge, and Broersen (2005) found that high effort combined with low reward at work was indeed linked to adverse outcomes, such as mild psychiatric disorders, compromised cardiovascular and subjective health, and burnout. Furthermore, in contrast to the DCM,

a person element is included in the ERI model. An individual's personality can moderate the relationship between effort-reward imbalance and wellbeing. For instance, over-commitment as a personality trait, defined as "a set of attitudes, behaviours and emotions reflecting excessive striving in combination with a strong desire of being approved and esteemed" (Bakker & Demerouti, 2007, p. 310), may act as a moderator by magnifying the impact that effort-reward imbalance has on health and wellbeing.

2.3 JOB DEMANDS-RESOURCES MODEL

Regardless of some critique of the aforementioned models, which will be discussed later in this section, each model played a critical and unique role in the establishment of the J-DR model developed by Demerouti, Bakker, Nachreiner, and Schaufeli (2001). From the JCM, the job characteristics element was incorporated into the JD-R model. There are two categories of job characteristics in the JD-R model, namely job demands and job resources. For instance, when a health sciences student perceives his/her tasks to make a meaningful impact (task significance), he/she may feel motivated by this job characteristic. In contrast, if the health sciences student experiences his/her tasks to have no meaning or significance, he/she may feel demotivated, resulting in the job characteristic becoming an emotional demand. Even though the JD-R model has the flexibility to include a great variety of job characteristics in contrast to the limited number that were included in the JCM, the JCM established a basis that could be used to evaluate job characteristics in terms of job demands and job resources.

The main contribution of the DCM to the JD-R model was that, when job control (i.e. resources) is exceeded by job demands, job strain results. The contribution of the COR model to the JD-R model was that of investing resources with the aim of obtaining a net gain in resources. JD-R theory explains that there are cyclical interactions between job resources, personal resources, and engagement, and that these interactions generate further resources, which ultimately result in a positive-gain spiral (Bakker & Demerouti, 2018). The unique influence of the ERI model included the incorporation of a person element, which happens to be a key contributor to the JD-R model.

Even though the aforementioned models add value to the literature pertaining to the stress and wellbeing body of knowledge, these models are not without shortcomings. Bakker and Demerouti (2014) criticised the earlier models on the following:

a) One-sidedness – work motivation and job stress research has typically developed in two distinct literatures. Research on stress often ignores motivation, and vice versa. Organisational research trends, for instance, show human resource managers focusing on employee motivation and work satisfaction, and medical officers focusing on job stress and ill-health absenteeism. However, there is evidence for a significant relationship between work motivation and job stress.

b) Simplicity – the models do not acknowledge the full complexity of wellbeing and health-impairment phenomena, as they address only a handful of isolated variables. Furthermore, practical application of the models is limited, since the models do not take account of different occupations or different occupational levels.

c) Static character of models – specific characteristics are considered to be extremely important, whereas other aspects are neglected, without clear reasons for why this is so. For example, the JCM places exclusive focus on five job characteristics, autonomy is considered to be the most important resource in the DCM, and the ERI suggests status control, esteem reward and salary to be the most imperative job resources, while it is quite easy to come up with other, potentially valuable characteristics that were not considered in these models.

d) Dynamic nature of jobs – jobs and work environments are changing rapidly. Contemporary jobs are more complex than before, with the role of information technology and artificial intelligence being more important than ever. It would be an illusion to think that the complex, dynamic nature of the reality of work can be explained by only a handful of work characteristics.

Although past models of stress and motivation have formed valuable insights regarding wellbeing, the influential literature on stress and motivation have neglected one another to a great extent. Bakker and Demerouti (2018) argue that stress and motivation should be considered simultaneously within one model. Therefore, a new and advanced model was established from the theoretical basis of the past models. This model furthermore addresses the shortcomings mentioned above. The model was coined the JD-R model.

The JD-R model is an all-encompassing model that combines the positive and negative outcomes of employee wellbeing into a single, all-inclusive model. Therefore, whilst the model integrates previous theories associated with these outcomes, it also takes two contrasting research arenas and combines them. These arenas are (a) the 'strain'

(burnout) research arena and (b) the 'motivational' (engagement) research arena. Where past models have focused mainly on the negative outcomes of strain, the JD-R model accounts for both the negative and positive outcomes of strain and motivation respectively. Over the past few decades, the JD-R model has developed extensively, so much so that meta-analytical studies have emerged and the model is now considered a theory (Bakker & Demerouti, 2014). Furthermore, the model has been applied in a variety of work settings and has demonstrated itself to be useful as a comprehensive model for investigating and conceptualising employee wellbeing and job performance. The JD-R model has consequently become increasingly popular due its flexibility.

The theory behind the model follows that every work environment is made up of two different categories: job resources and job demands (Bakker & Demerouti, 2018). An all-encompassing taxonomy is formed by the JD-R model, and it can be used to cluster the various job resources and job demands into a single model. Application of the model to any role or occupation, irrespective of its nature or industry, is seamless due to the flexibility of the model (Bakker, 2011). The JD-R model can therefore be tailored to suit any work environment, including those experienced by students. Bakker (2011) highlights the following assumptions behind the JD-R model that makes the model so flexibly implementable and practically useful:

a) Every workplace is characterised by its own unique work environment.
b) Every work environment, with its associated occupations, has its own, unique job resources and job demands.
c) Two simultaneous, underlying psychological processes play a role in the wellbeing of individuals, namely a *health-impairment process* in which excessive job demands and a lack of resources lead to burnout, and a *motivational process* in which high job demands, paired with sufficient resources, lead to work engagement. The health-impairment process accounts for negative health and organisational consequences, whereas the motivational process accounts for positive outcomes.
d) Job resources cushion the effect that job demands have on job strain.
e) Job resources become salient when high job demands are present, and gain motivating potential in the face of challenges.

A schematic representation of the JD-R model is provided in Figure 2.1
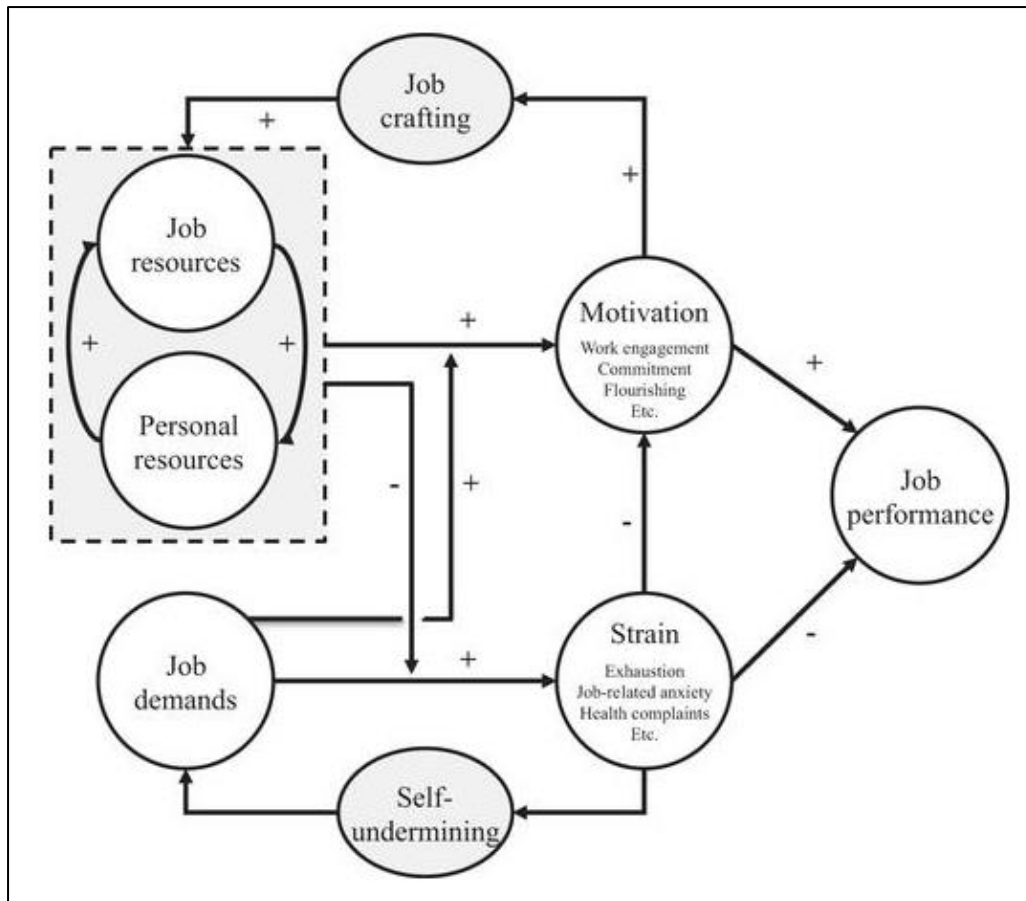
Figure 2.1. The JD-R model of occupational wellbeing (Bakker & Demerouti, 2018).

A noteworthy extension of the original JD-R model was the inclusion of personal resources in the theory. Personal resources are discussed in more detail later in this chapter. The JD-R model suggests that two independent processes are triggered by job demands and resources. These processes are a motivational process and a health-impairment process. In Figure 2.1, it can be seen that resources predict work engagement, and this relationship represents the motivational process in the JD-R model. On the other hand, job demands lead to exhaustion, which is referred to as burnout in this research study. The relationship between job demands and burnout is representative of the health-impairment process. The motivational process typically involves outcomes such as enthusiasm, job satisfaction and engagement; whereas the health-impairment process results in outcomes such as psychosomatic symptoms, depersonalisation and burnout (Bakker & Demerouti, 2014).

A further proposition of the JD-R theory is characterised by an interaction of job demands and resources to predict occupational wellbeing and job performance. There

are two possible ways in which this interaction can occur; firstly, job and personal resources may have a moderating effect on the relationship between job demands and burnout, suggesting that sufficient resources may have a dampening effect on burnout in the face of high demands. Secondly, job demands may act as a moderator in the relationship between resources and engagement, proposing that high job demands in the face of high resources have the potential to provide motivation. Put differently, resources cushion the impact that job demands have on strain and burnout, whereas job demands amplify the impact that resources have on motivation and engagement.

Furthermore, the JD-R theory recognises employees as active creators by modelling cycles of loss and gain that employees initiate at work. Consistent with this theory, longitudinal studies have provided convincing evidence for gain cycles of job resources, wellbeing, and other occupational outcomes. Engaged employees are motivated to remain engaged and will search proactively for work challenges and for the resources they will require to perform well in the face of these challenges. This behaviour is known as job crafting (Bakker & Demerouti, 2018). The latent variables of interest pertaining to this study will now be discussed.

2.4 LATENT VARIABLES OF INTEREST

According to Bakker and Oerlemans (2011), occupational wellbeing occurs when an employee experiences (a) satisfaction in his/her work and (b) frequent positive emotions with infrequent negative emotions. Engagement, satisfaction or happiness indicate the positive emotions individuals experience at work, whereas burnout and workaholism are the result of negative emotions experienced at work. Positive forms of occupational wellbeing include happiness at work, work engagement, and job satisfaction. This study focuses on work engagement as a positive aspect of occupational wellbeing in health sciences students. In contrast, negative forms of occupational wellbeing include burnout and workaholism. This study focuses on burnout as a negative aspect of wellbeing in health sciences students. The purpose of this section is to explain the endogenous and exogenous latent variables of interest, namely engagement and burnout (endogenous variables of interest), and mindfulness, emotional intelligence, social support, and work overload (exogenous variables of interest).

2.4.1 Engagement

Kahn (1990) first coined the concept of engagement to define the "harnessing of organisation members' selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances" (p. 694). Thus, one of the earliest descriptions of engagement as a psychological concept focused on the degree of self-investment in one's work. Subsequent research remained largely focused on illness and burnout, until the trend of positive psychology emerged as researchers were called upon to include positive outcomes (Seligman & Csikszentmihalyi, 2000). Fascinatingly, most contemporary research on work engagement was stimulated by research on burnout. The concept of engagement was revisited in the positive psychology trend and was operationalised in a broader sense as a positive and distinct form of wellbeing alongside burnout (Schaufeli, Salanova, González-Romá, & Bakker, 2002b).

Two different schools of thought exist regarding the conceptualisation of engagement; one considers engagement to lie on the opposite end to burnout on an engagement-burnout continuum, while an alternative view considers engagement to be a distinct, independent concept that typically is negatively related to burnout. This distinctiveness is confirmed by a relatively recent meta-analysis (Halbesleben, 2010). With reference to the latter (alternative) view, Schaufeli et al. (2002b) accordingly define engagement in its own right as "a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication, and absorption" (p. 74). Vigour is characterised by a willingness to invest time and effort in one's work, high levels of mental resilience and energy while working, and perseverance even in the presence of challenges. Dedication refers to a strong involvement in one's work and the experience of a sense of enthusiasm, challenge, meaning and significance. Absorption comprises the feeling of being happily immersed and completely engaged in one's work in a manner that allows time to "fly by" quickly (Bakker, Demerouti, & Sanz-Vergel, 2014; Schaufeli et al., 2002b). Unlike those who suffer from burnout, engaged workers have a sense of energetic and effective connection with their work, and they look upon their work as challenging instead of demanding and stressful (Bakker, Schaufeli, Leiter, & Taris, 2008).

Interest in and research activity relating to work engagement has mushroomed over the past decade. This is not surprising, given the many positive research outcomes linking engagement to organisational success and competitive advantage (Saks & Gruman,

2014). Engagement has been shown to be an excellent predictor of individual and team outcomes (Bakker & Albrecht, 2018). Likewise, engaged workers are more inclined to help their peers resulting in an important ripple effect (Bakker, Van Emmerik, & Euwema, 2006; Gutermann, Lehmann-Willenbrock, Boer, Born, & Voelpel, 2017; Van Mierlo & Bakker, 2018).

Most studies have demonstrated the between-person differences in average levels of work engagement as a function of behavioural strategies, personal characteristic and working conditions (Bakker et al., 2014). However, over the past decade, research has shown how engagement levels may also fluctuate within persons across situations and time. For example, studies have revealed that levels of within-person work engagement tend to peak during challenging two-hour work episodes (Reina-Tamayo, Bakker, & Derks, 2017), throughout a work day preceded by a night of good rest (Sonnentag, 2003), and when a variety of resources are available (Bakker, 2014; Breevaart, Bakker, & Demerouti, 2014). This provides evidence for the malleable nature of work engagement.

Schaufeli (2012) provides a summary of the results obtained from various engagement studies linked to wellbeing outcomes. Firstly, engaged workers experience low levels of job strain, anxiety and depression. Secondly, engaged workers have a high level of perceived physical wellbeing. Lastly, low burnout, resilience and positive emotions after a long day at work are associated with high engagement. Work engagement, however, is not a random occurrence; it is a result of intricate interactions between job resources, personal resources and job demands. Bakker and Demerouti (2007) explain these interactions with their associated probable outcomes as follows:
   a) *Engagement* results from high job demands paired with high resources
   b) *Apathy* results from low job demands paired with low resources
   c) *Burnout* results from high job demands combined with low resources
   d) *Boredom* is the outcome of low job demands combined with high resources

The above ties in with Latham and Locke's (2006) motivational goal-setting theory, which states that motivation and effort exerted to reach a goal will be high to the degree that the goal is difficult. Thus, motivation and effort exerted to reach a goal will be higher when a set goal is more difficult to achieve. In the face of high job demands, workers draw on their personal and job resources so that they can effectively manage the

challenges set by the demands. High demands in the presence of high coping resources to address those demands are seen as a challenge, rather than a threat, and fuel the motivation to succeed in one's job. However, if sufficient coping resources (in the form of job resources and personal resources) are not present, challenges transform into threats, and the resulting strain from the demands could advance into burnout (Bakker, 2011). Therefore, work engagement is a product of high job demands combined with the accessibility of many job resources and employees' ability to draw from their personal resources.

2.4.2 Burnout

The term burnout was used by the psychiatrist Freudenberger in the 1970s to describe the loss of motivation, gradual emotional depletion, and reduced commitment he observed among voluntary workers at the St Mark's Free Clinic in New York's East Village. On the grounds of his observations, Freudenberger (1974, as cited in Bakker et al., 2014) defines burnout as a state of mental and physical exhaustion caused by one's professional life and the loss of motivation, especially where one's devotion to a cause fails to produce the desired results. Therefore, employees who burn out experience a depletion of energetic resources and lose their dedication to work (Bakker et al., 2014). The more widely accepted definition of burnout is "…a state of exhaustion in which one is cynical about the value of one's occupation and doubtful of one's capacity to perform" (Maslach, Jackson, & Leiter, 1996, as cited in Bakker et al., 2014, p. 20). Burnout is a psychological phenomenon, typically in the work context, of prolonged exhaustion and disinterest.

Some have considered burnout a syndrome – one in which the onset is not sudden, but rather emerges over a period of time because of stressful working conditions (Jordaan, Spangenberg, Watson, & Fouché, 2007). According to Maslach, Schaufeli, and Leiter (2001), burnout is a prolonged response to chronic emotional and/or physical stressors at work, and is characterised by three dimensions, namely inefficacy, cynicism and exhaustion. Inefficacy is characterised by an inability to produce a desired outcome. Cynicism refers to a distanced, callous and cynical attitude towards the people with whom one works, or towards work itself. Exhaustion involves a feeling of extreme chronic fatigue resulting from continuous exposure to demanding working conditions (Bakker & Oerlemans, 2016).

Burnout remains an imperative issue in psychology literature that should not be swept under the rug. Research has confirmed that burnout results in issues relating to physical and psychological health, decreased self-esteem, decreased work performance, and many more negative outcomes that are mentioned in this section. According to Zemirah (2000, as cited in Jordaan et al., 2007), individuals who are particularly vulnerable to burnout are those who are highly motivated, are constantly prevented from achieving their goals, and who experience a lack of coping resources. With effective coping, work stressors are less likely to result in burnout. Two fascinating coping strategies that have been confirmed to be effective in coping with burnout include turning to spirituality and making use of humour. A study based on medical students' spirituality and levels of burnout showed a significant inverse relationship between levels of spirituality and burnout. In contrast, a positive correlation was found between spirituality and life satisfaction. Students who had low levels of spiritual wellbeing reported having higher levels of psychological distress and burnout, while students who scored high on spiritual wellbeing described themselves as having a greater level of general life satisfaction (Wachholtz & Rogoff, 2013). Similarly, Talbot and Lumden (2000) reported a positive relationship between humour as a coping strategy and perceptions of personal accomplishment, as well as a negative relationship between humour and the experience of the burnout dimensions depersonalisation and emotional exhaustion.

Furthermore, a study by Schwenk and Gold (2018) shows that higher levels of empathy are inversely correlated with the prevalence of burnout. Similarly, a study on the impact of two empathy dimensions, personal distress and empathetic concern, on burnout in medical students carried out by Von Harscher, Desmarais, Dollinger, Grossman, and Aldana (2017) discovered that students with high levels of personal distress had higher levels of burnout, while students with high levels of empathetic concern had lower levels of burnout over time. Social support was also found to be negatively correlated with burnout (Aragones, 2001). As a variable of interest, social support is discussed in more detail later in this chapter.

Burnout symptoms have been shown to be linked to professional dysfunction and an increased risk of psychiatric disorders (Schwenk & Gold, 2018). In a study by Mahan (2017), physician burnout predicted inferior self-reported quality of patient care, including making medication or treatment mistakes, discharging patients prematurely to make workload more manageable, and feeling guilt for the way they treated patients.

Furthermore, an issue in many areas of health sciences (for example paediatrics) is that highly valued traits such as altruism, perfectionism and compassion predispose to burnout when clinicians are pushed to the extreme. Burnout could also be considered a by-product of the medical education system, which typically encourages expert performance and persistence under difficult circumstances, compelling students to flawless clinical abilities with much less attention being paid to teamwork, leadership and the personal-social skills required to be successful in our complex systems (Mahan, 2017).

Additionally, a South African study conducted on mental health professionals indicated that burnout resulted in issues such as disillusionment regarding the profession, feelings of isolation, loss of empathy, interpersonal relationship problems, fatigue, emotional exhaustion, anxiety, depression, alcohol abuse, and suicidal ideation (Jordaan et al., 2007). Burnout is an important aspect of occupational wellbeing. Subsequently, one almost cannot help to ask why some individuals are enthusiastic and engaged in their work, while others are exhausted and appear to lack interest (Bakker & Demerouti, 2014). According to Alarcon (2011), job demands and resources have demonstrated a crucial role in the development of burnout.

2.4.3 Mindfulness as a personal resource

Personal resources refer to positive evaluations of the self that are related to resilience and a sense of being able to successfully influence and control one's environment (Bakker & Demerouti, 2014, 2018). Psychological capital, emotional intelligence and mindfulness are all examples of personal resources.

Mindfulness is a consciousness attribute that has long been believed to promote wellbeing (Brown & Ryan, 2003). In the late 1970s, mindfulness training started drawing attention as a therapeutic tool to assist healthcare patients to successfully manage chronic illnesses (Kabat-Zinn, 2003). Today, mindfulness is a young, but vibrant, concept in management literature. Interest in the concept is surging as evolving research shows many positive workplace outcomes (e.g. performance, satisfaction and wellbeing). Furthermore, research has demonstrated that a variety of wellbeing outcomes are facilitated through the improvement of mindfulness (Brown & Ryan, 2003). Therefore, well-known organisations such as the Mayo Clinic, the U.S. Army and Google use mindfulness-based training to improve workplace functioning (Good et al., 2016).

Mindfulness can be defined as "paying attention purposefully in the present moment while refraining from judgments and impulsive reactions" (Sahdra, Ciarrochi, & Parker, 2016, p. 819). According to Segal, Williams, and Teasdale (2002), mindfulness is a present-focused, attentive acceptance of all mental, emotional and physical stimuli that enter the conscious awareness. Whereas people typically process a large part of their day on "autopilot" or spend their time primarily thinking about the past or the future, a mindful approach involves consciously paying attention to and accepting present experiences (Baer, 2003; Bishop et al., 2004).

According to Pepping, Cronin, Lyons, and Caldwell (2018, p. 1602), mindfulness is "a process of bringing one's attention to whatever arises in the present moment in a non-judgmental manner, and practicing acceptance of what arises in each moment". Through mindfulness, individuals are encouraged to acknowledge the presence of current thoughts and emotions in an open and accepting way, rather than spending effort to forcibly control negative thoughts (Bishop et al., 2004). This involves the skill of raising awareness of negative emotions, cognitions and physical sensations and responding in a flexible, rather than reactive, manner (Keng, Smoski, & Robins, 2011). A mindful person may have the ability to non-judgmentally observe impulses and urges, without acting impulsively upon those urges. He/she can furthermore maintain mindful attention on emotional experiences without engaging in efforts to escape or avoid them using maladaptive strategies (Pepping et al., 2018). It thus appears that mindful individuals are able to cope with negative emotional experiences in a more functional and healthy manner, as opposed to submitting to toxic impulses.

Thematically, mindfulness is similar to, yet distinct from, other psychological constructs. For example, even though it is related to constructs such as self-awareness and insight, mindfulness is much more general than these constructs (Cooper, Yap, & Batalha, 2018). Mindfulness is a multifaceted construct comprising five interconnected abilities (Sahdra et al., 2016):

a) Observing – paying attention to one's internal sensations, experiences, thoughts and feelings.
b) Describing – having the ability to articulate them.
c) Acting with awareness – responding to the present situation with awareness.
d) Nonjudging – reframing from judgement of one's internal experiences as right or wrong.

e) Nonreactivity – withholding habitual reactions to internal experiences.

Additionally, mindfulness entails experiential processing, involving attention to internal (e.g. emotion, thought) and external (e.g. sensory) stimuli as a registering of observed facts. Habitual responses cause people to derive meaning from events immediately, whereas experiential processing allows the stimulus to be attended to *as is*, instead of immediately trying to make sense of it. Thus, common psychological content (e.g. emotions, impulses, etc.) comprises experiences as an ongoing stream of consciousness. Stimuli and subsequent responses to them therefore are observed as they play out, rather than interpreting them habitually with implications that are positive or negative for the self (Good et al., 2016).

Mindfulness has been found to be associated with psychopathology and wellbeing. A validation study on the Mindful Attention Awareness Scale (MAAS) by Brown and Ryan (2003) found higher levels of trait mindfulness to be related to a sense of self-efficacy, greater self-esteem, satisfaction with life, and optimism. On the other hand, low levels of trait mindfulness were found to be associated with maladaptive emotional regulation, alexithymia (inability to identify and describe one's emotions), dissociation, rumination, anxiety, and depression. These finding are consistent with several other studies on the effects of mindfulness on psychological and physical health (Bohlmeijer, Prenger, Taal, & Cuijpers, 2010; Keng et al., 2011; Khoury, Sharma, Rush, & Fournier, 2015).

Collins, Stritzke, Page, Brown, & Wylde (2018) investigated the protection potential of mindfulness against suicidal ideation by enhancing zest for life when risk and adversity were present. The results of the study indicate that a significant inverse relationship exists between baseline mindfulness and suicidal ideation, as well as suicidal intent. These findings are in line with past clinical trials showing that mindfulness-based interventions decrease suicidal thoughts and behaviours (for example, Barnhofer et al., 2015; Forkmann et al., 2014). The findings in Collins et al. (2018) further suggest that people who experience mindful awareness enjoy a greater degree of zest for life which, in turn, decreases suicidal desire in the presence of risk and adversity.

Furthermore, according to Pepping et al. (2018), people with higher levels of mindfulness fare better than their less mindful counterparts on a wide range of interpersonal and psychological outcomes. Interestingly, emerging research on

mindfulness in leaders suggest that subordinates of mindful leaders experience a sense of being treated fairly, greater job satisfaction, and improved work performance and occupational wellbeing (Reb, Chaturvedi, Narayanan, & Kudesia, 2018). This indicates that mindfulness in one person does not only affect that particular individual, but can have positive outcomes for others too.

It has long been recognised that increased levels of academic and psychological distress are experienced by university students. Study-related stressors also influence the psychological health of social work and medical students (Kuhlmann, Bürger, Esser, & Hammerle, 2015). The use of mindfulness to improve psychological wellbeing in student populations was supported by research done by Cole et al. (2015). They carried out a study on 431 participants and found that a positive relationship existed between academic stress and depression, as well as anxiety. After implementing a mindfulness intervention, it became apparent that mindfulness provided a cushioning effect on the relationship between academic stress and depression. However, interestingly, the same could not be said about the impact of mindfulness on anxiety within this particular study. Another study on university students, carried out by McGillivray and Pidgeon (2015), found a positive correlation between resilience and mindfulness, which in turn resulted in lower levels of psychological distress.

Likewise, mindfulness seems to play a particularly valuable role in the health and wellbeing of students studying social care- and health sciences-related courses, showing promising intervention results for even the elevated risk group (Kelly, 2017). In an earlier study, conducted by Rosenzweig, Reibel, Greeson, Brainard, and Hojat (2003), the mindfulness-based stress reduction (MBSR) programme was introduced for 300 students completing their second year of medical education. The group that completed the programme showed a significant improvement in mental health scores, while the control group showed a marked decrease in mental health. Although the programme did not decrease levels of anxiety, it also did not increase them. In fact, anxiety levels stayed constant for those who underwent the mindfulness programme, whereas anxiety levels in the control group increased. MBSR has not only been shown to be effective in helping students better manage depression and anxiety, it has also been used with first-year midwifery and nursing students as a means to improve concentration, reduce stress levels, and build resilience (Van der Riet, Rossiter, Kirby, Dluzewska, & Harmon, 2015). Furthermore, in a study by Verweij, Van Ravesteijn, Van

Hooff, Lagro-Janssen, and Speckens (2018), MBSR intervention resulted in improvements in perspective, self-compassion and personal accomplishment, and decreased worry, suggesting its potential benefits pertaining to wellbeing more generally. In addition to this, mindfulness benefits seem to reach beyond the enhancement of wellbeing and have also been shown to enable the fostering of empathy, a quality that allows healthcare practitioners to understand and effectively respond to the experiences of their clients (Beddoe & Murphy, 2004).

The MBSR programme was originally designed as an eight-week program. However, shortened, seven-day versions of the programme have also been found to be very effective (Kelly, 2017). This could be beneficial when timetables are particularly busy, as typically found in the academic-practice split found in health sciences education.

To date, mindfulness literature is somewhat limited. Nevertheless, the body of knowledge pertaining to mindfulness and mindfulness-based interventions continues to expand exponentially as the benefits become more evident. Sufficient evidence therefore seems to exist of the value that mindfulness-based interventions can add to the health sciences student community, as well as the client populations they serve (Kelly, 2017).

2.4.4 Emotional intelligence as a personal resource

The study of organisational behaviour has ignored emotions in the past. The workplace was considered a rational environment and emotions were believed to cloud sound judgement. Therefore, emotions were overlooked when explaining workplace phenomena. However, contemporary researchers have found that emotions in the workplace tend to help explain essential organisational and individual outcomes (Grandey, 2000).

Salovey and Mayer (1990, p. 189) define emotional intelligence as "the subset of social intelligence that involves the ability to monitor one's and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions". According to Quoidbach and Hansenne (2009), emotional intelligence can be defined as "the ability to perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and to reflectively regulate emotions so as to promote emotional and intellectual growth" (p. 23). Finally,

Gignac (2010, p. 132) defines emotional intelligence in general terms as "the ability to purposely adapt, shape, and select environments through the use of emotionally relevant processes". Broadly speaking, emotional intelligence is the ability to identify, understand and express emotions, integrate emotions into thought, and reflectively regulate emotions in the self and others (Salovey & Mayer, 1990). In line with these definitions, emotional intelligence is multi-dimensional. It is comprised of several dimensions, depending on which theory of emotional intelligence is used. According to Gignac (2010), emotional intelligence consists of the following seven dimensions:

a) Emotional self-awareness – the ability to consciously identify one's emotions and the awareness that one's emotions may motivate thoughts and behaviours.

b) Emotional expression – the ability to appropriately express one's emotions (i.e. at the right time, in the right way, and to the right people).

c) Emotional awareness of others – the ability to identify the emotions expressed by others (both verbal and non-verbal) and to understand the nature of the emotions that may motivate the behaviours of others.

d) Emotional reasoning – the ability to incorporate emotionally relevant information (or self and others) in the process of decision-making or problem solving. Emphasis is also placed on the use of emotions for the successful engagement of others.

e) Emotional self-management – the ability to manage one's own emotions successfully by effective adjustment to negative emotional states and engagement in activities to maintain positive emotional states. Emotional Self-management often involves moving on from an emotional setback, rather than ruminating or dwelling on the situation.

f) Emotional management of others – the ability to successfully modify or manage the emotions of others.

g) Emotional self-control – one's ability to control one's strong emotions appropriately, such as demonstrable maintenance of focus on the task at hand in the face of emotional adversity. Emotional self-control is different from emotional self-management in that it incorporates an additional focus on the behavioural demonstration of controlling intense reactive emotions, which makes it more reactive, whereas emotional self-management is more proactive.

Emotionally intelligent individuals have a greater capability to alter their emotional expressions to fit display rules. This allows improved quality of social relations with other people and is therefore believed to enhance wellbeing and performance (Brackett, Rivers, Shiffman, Lerner, & Salovey, 2006). Occupations with a high need for emotional labour, such as those found in healthcare and social services, provide a large number of opportunities for individuals high in emotional intelligence to influence others' emotions. Therefore, the emotional intelligence of an individual will have an impact in an occupation to the extent that emotional labour is central to that occupation (Joseph & Newman, 2010). Emotional labour can be defined as a process whereby individuals regulate their emotional expressions in an attempt to meet the emotional standards or expectations of a job (Brotheridge & Lee, 2003).

According to Antonakis, Ashkanasy, and Dasborough (2009), highly stressful occupations and the requirement for emotional intelligence may be related. Occupations that require emotional labour are commonly stressful, since interactions with others are potent triggers for emotions (Gross & John, 2003). Occupations that typically require emotional labour include health care, public safety, and public services (Schmitt, 2006). The degree and frequency of emotion-related interaction with others tends to be a key aspect of these occupations (Kluemper, DeGroot, & Choi, 2013). According to Bono and Vey (2005), emotional labour is associated with outcomes such as poor physical and psychological wellbeing. Brotheridge and Grandey (2002) argue that burnout may be a result of engaging in high levels of emotional labour. This ties in with the fact that employees in human service occupations are known to be particularly vulnerable to high levels of burnout (Kowalski et al., 2010). Emotions form a valuable part of the overall response to stress and burnout (Humpel & Caputi, 2001). Consequently, emotional intelligence may act as an important supportive aspect in performing emotional labour (Van Dusseldorp, Van Meijel, & Derksen, 2011).

Emotional responses are learnt to be controlled by individuals through emotional norms. Emotional norms are anticipations about the emotions that should be revealed and that are acceptable in particular situations. There are, however, situations in which individuals may expect a certain emotion to be appropriate but they are not sure whether the intensity of the emotion is appropriate. In such instances, their emotional reactions may be defined by comparing their responses with those of a reference group in comparable situations. Pogrebin and Poole (1991) believe that professionals are

generally expected to act "personably" and not "personally" with those they serve. Professionals should namely act in a polite and courteous manner in their relations with their clients, without revealing their own personal feelings, and hence promote the maintenance of social distance. Therefore, when interacting with clients, professionals have to develop appropriately controlled affect.

In a study done by Pogrebin and Poole (1991) on the police culture and emotional control, it was noted that, since police officers are trained to protect and serve, it is expected of them to remain poised even under the most tragic of circumstances. Their effectiveness in dealing with tragic events would be compromised to the extent that they are not able to control their emotions. The same can potentially be said for health sciences students, as many of them are at times involved in tragic circumstances (such as exposure to the suffering and death of patients). Even though health sciences students are expected to be warm and caring, the public also tend to expect them to stay calm and to be able to deal with tragic situations in an objective way. Thus, there may often be uncertainty about how health sciences students should handle their own feelings and emotions. This can lead to the suppression of emotions if the display of such emotions is perceived by the individual to be inappropriate under the circumstances.

When individuals feel the need to suppress their true emotions on a routine basis, even in situations where emotional responses are expected and regarded as natural, it can lead to the development of problems in interpersonal relationships. Poor interpersonal relationships with peers (for instance, lack of social support) have been shown to be related to emotional distress (Zhang, Zhang, Zhang, Zhang, & Feng, 2018), thereby causing a vicious downward spiral. The ability to avoid ruminating on negative emotions in order to uphold a positive disposition in oneself and others (emotional management dimension of emotional intelligence) could increase the ability to cope on a personal and social level (Fredrickson, 2003), which may lead to increased emotional health and overall wellbeing (Görgens-Ekermans & Brand, 2012).

A study conducted by Rehman and Sohail (2018) on the perceived emotional intelligence and psychological wellbeing of medical students found that higher levels of emotional intelligence were associated with lower levels of stress, anxiety and depression. It is also important to note that evidence has been found for incremental

validity of emotional intelligence, beyond personality and cognitive ability, in predicting depression (Davis & Humphrey, 2012). In a recent study on academic radiation oncology chairs by Holliday et al. (2017), emotional intelligence was found to be negatively related to the burnout dimensions of depersonalisation and emotional exhaustion, as well as positively related to personal accomplishment and satisfaction with medicine as an occupation. This dovetails with the findings of Petrides and Furnham's (2006) study, which proved a relationship between trait emotional intelligence and organisational variables such as health and job satisfaction.

Furthermore, research pertaining to nurses showed an association between emotional intelligence and effective conflict handling (Morrison, 2008), ethical behaviourism (Deshpande & Joseph, 2009), and adaptive stress-management strategies (Montes-Berges & Augusto, 2007). Likewise, a study by Görgens-Ekermans and Brand (2012) found emotional intelligence to be a significant moderator in the relationship between stress and burnout in a sample of nurses. Mitra et al. (2018) furthermore found a positive correlation between trait emotional intelligence and wellbeing in resident doctors. In addition, higher emotional intelligence led to less burnout and higher job satisfaction.

2.4.5 Social support as a job resource

Job resources can be described as social, psychological, physical or organisational aspects of the job that reduce job demands and the costs (physiological and/or psychological) associated with them, are useful in achieving work objectives, and/or that stimulate development, personal growth and learning (Schaufeli & Bakker, 2004). Effective leadership and role clarity are examples of job resources.

Job resources satisfy rudimentary psychological needs, such as the need for competence, relatedness and autonomy (Bakker, 2011; Nahrgang, Morgeson, & Hofmann, 2011) and are typically the main predictors of motivation, work enjoyment and engagement (Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007; Bakker, Van Veldhoven, & Xanthopoulou, 2010). Social support has been studied as a job resource in various other studies and is also considered as such by Bakker and Demerouti (2014). According to previous studies, as well as an informal questionnaire completed by medical students studying at Stellenbosch University, social support as a job resource seems to have a large influence on work engagement and tends to be regarded as an essential, yet lacking, resource influencing the wellbeing of health sciences students. As

such, it was believed that social support could be investigated as a job resource within the context of this study.

Social support can be defined as the instrumental, informational and emotional support resources accessible to the person from his or her social network (Cohen & Wills, 1985; Langford, Bowsher, Maloney, & Lillis, 1997). A number of studies have documented the positive and robust impact of social support on an individual's psychological and physical wellbeing (Broadhead et al., 1983; Uchino, 2006). Research by Ozbay et al. (2007), for instance, has demonstrated the protective effects of functional and rich social networks, and the negative consequences of a lack thereof, on physical and psychological health.

Low levels of social support have been linked to a greater probability of experiencing mental and physical illness, substance abuse issues, and suicidal ideation (Lamis, Ballard, May, & Dvorak, 2016; Mason, Zaharakis, & Benotsch, 2014). Historical laboratory studies have shown low social support to be associated with physiological and neuroendocrine indices of heightened stress reactivity in humans, such as elevated heart rate (Stansfeld, Fuhrer, Head, Ferrie, & Shipley, 1997), increased blood pressure (Uchino, Cacioppo, & Kiecolt-Glaser, 1996), and exaggerated neuroendocrine and cardiovascular responses to laboratory stressors (Kamarck, Annunziato, & Amateau, 1995; Kirschbaum, Klauer, Filipp, & Hellhammer, 1995; Lepore, Allen, & Evans, 1993). Furthermore, a study conducted by Silva, Cerqueira, and Lima (2014) on medical students demonstrated that insufficient social support was a critical risk factor for developing common mental disorder. Their findings suggest that social interaction interventions could be effective in decreasing the prevalence of common mental disorder among medical students. Similarly, Thompson, McBride, Hosford, & Halaas (2016) found a lack of social support in medical students to be associated with depression and burnout.

In contrast, Hwang et al. (2017) found high levels of social support to be associated with good physical health, psychological health, and quality of life. High levels of social support have been shown to be associated with amplified positive coping, as well as decreased levels of anxiety and stress (Siedlecki, Salthouse, Oishi, & Jeswani, 2014; Uchino, 2006). Gifkins, Loudoun, and Johnston (2017) furthermore found that nurses' coping was influenced positively by social support from management and senior nursing

staff. In addition, Giangrasso and Casale (2014) demonstrated significant correlations between social support and psychological wellbeing.

In a study conducted by Boscarino (1995), high levels of social support decreased the likelihood of Vietnam veterans to develop post-traumatic stress disorder (PTSD) by 180% compared to their counterparts with low levels of social support. Social support seems to create stress resilience, which should lead to a decreased likelihood of developing burnout. According to Thompson et al. (2016), social support has been shown to be linked to mental health resilience. Howe, Smajdor, and Stockl (2012) and Haglund et al. (2009) also found social support to be positively associated with resilience.

It appears that the perceived quality of social support can also play an important role. Hefner and Eisenberg (2009) found higher perceived quality of social support to be strongly related to a decreased risk of anxiety, eating disorders, depression and suicidal ideation among university students. Likewise, according to Rankin, Paisley, Mulla, and Tomeny (2018), support is believed to increase the adequacy of resources available to individuals to deal with circumstances that exceed their coping abilities, and therefore it is also the mismatch between support required and support received in a given situation that predicts the psychological outcomes. For the purpose of this study, only social support will be used. It is important, however, not to disregard that the quality of social support, as well as mismatch between required and received social support, may also play a significant part in student wellbeing outcomes.

For many individuals, the transition from high school to university is a particularly challenging experience, which often involves moving to a new community (and away from a supportive family environment) where one needs to establish a new social network (Rankin et al., 2018). The substantial stress experienced by many individuals in this situation is reflected in the increasing rates of anxiety, depression and suicidal ideation among university students (Benton, Robertson, Tseng, Newton, & Benton, 2003).

According to Popescu and Buzoianu (2017), medical students are more predisposed to mental disorders, including depression. A solid body of evidence demonstrates that healthcare students suffer from high levels of stress; and they are more susceptible to

emotional distress and exhaustion compared to the general population (Dyrbye et al., 2007). The distress leads to serious adverse consequences, such as low quality of life, fatigue, depression, and burnout (Dyrbye et al., 2006b). A deteriorated quality of life in healthcare students is not only associated with poor academic performance by weakening their motivation to learn, but also with a decline in empathy that affects the practitioner-patient relationship (Paro et al., 2014). Ongoing research indicates that factors like social support, work overload and financial stressors, amongst other things, determine mental health during healthcare education (Hwang et al., 2017).

Some evidence suggests that early intervention during medical school may be effective in reducing the anxiety, depression and distress experienced by medical students (Shapiro, Shapiro, & Schwartz, 2000). Effective interventions are therefore needed to improve resilience and mental health in medical students globally (Moir, Henning, Hassed, Moyes, & Elley, 2016). Suicide perceptions, help-seeking behaviours, anxiety and social integration have been found to improve with peer social support programmes among university students (Fontana, Hyra, Godfrey, & Cermak, 1999; Hixenbaugh, Dewart, Drees, & Williams, 2006; Wyman et al., 2010). A study conducted by Lamis et al. (2016) also found social support to play a significant protective role against suicide for severely depressed students.

2.4.6 Work overload as a job demand

Job demands refer to social, psychological, physical or organisational aspects of the job that require sustained psychological and/or physical effort or skills. They are thus associated with costs (physiological and/or psychological) (Schaufeli & Bakker, 2004). Emotional demands at work and work pressure are examples of job demands.

Job demands deplete energetic resources and are typically the main predictors of outcomes such as psychosomatic health complaints, repetitive strain injury, and burnout (Bakker, Demerouti, & Schaufeli, 2003; Hakanen, Bakker, & Schaufeli, 2006). According to the demand-control model (Karasek, 1979, 1998), high work overload is a job demand that contributes to job strain.

Work overload is an understudied, yet essential, work stressor (Kimura, Bande, & Fernández-Ferrín, 2018) that has become increasingly popular in the management field (Ganster & Rosen, 2013). When time pressure and workloads exceed employees'

abilities to perform their work, work overload occurs (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). Thus, employees experience work overload when they perceive that the responsibilities expected of them are too high given the resources available to them (Rizzo, House, & Lirtzman, 1970). Although Caplan (1999) considers work overload to be the extent to which employees are required to do more work than can reasonably be expected in a given period, overload does not only involve the amount of work an employee faces. According to Rothmann, Mostert, and Strydom (2006), overload refers to the amount of work, and the mental load and emotional load tied to work. It is furthermore important to note that the nature of overload can be quantitative (i.e. too much work to do) or qualitative (i.e. work is too difficult) (Cox, 1980; Freeman, Main, & Burke, 1995).

Academics in the field of job stress have considered work overload to be a major work stressor (e.g. Frone, 2008; Jex & Bliese, 1999). The International Labor Organization ([ILO], 2016) also refers to work overload as a chief work stressor that causes impaired mental health. According to Alves, Dos Santos, Oliveira, and Yamaguchi (2018), work overload results in illness due to emotional, psychological and physical exhaustion. A meta-analysis by Ortqvist and Wincent (2006) demonstrates that overload is associated with increased prevalence of the burnout dimensions emotional exhaustion and depersonalisation, and decreased job satisfaction and organisational commitment.

According to Tabassum, Farooq, and Fatima (2017), perceptions of overload damage the efficiency of workers and cause exhaustion. In line with this, a study conducted by Aniţei, Chraif, and Ioniţă (2015) found workload to be positively associated with burnout. Zuberi and NoorDin (2016) furthermore found dissatisfaction with the workload to be one of the major factors for burnout among professionals. Similarly, overload was shown to be the strongest contributing factor to exhaustion in a study conducted by Moore (2000). Even among high performers, work overload was found to lead to exhaustion (Bentzen, Lemyre, & Kenttä, 2016). According to Tabassum et al. (2017), work overload is an important antecedent of work exhaustion in the bank sector. Additionally, poor staffing and work overload explained the major variance in depression and burnout among mental healthcare professionals (Prosser et al., 1997).

Work overload is a dominant stressor for healthcare professionals, and has been shown to be associated with depression (Rau, Morling, & Rosler, 2010; Shirom, Nirel, &

Vinokur, 2010). Results from the study by Weigl et al. (2016) found that work overload correlated positively with depressive state and emotional exhaustion. The authors furthermore found that healthcare professionals experiencing high work overload and low supervisor support are at a greater risk of depleting valuable resources, resulting in a downward spiral of resource loss (Hobfoll, 2001). In contrast, the relationship between emotional exhaustion and depression was lowest for healthcare professionals in work environments with low work overload and high supervisor support (Weigl et al., 2016). Additionally, Nelson (2017) concluded that work overload in healthcare managers can lead to physical symptoms, in addition to the mental strain, and thereby put their physical health in jeopardy.

A study conducted by Altaf, Altaf, Iftikhar, Gohar, and Yusra (2013) found that the repetitive nature of the work and a heavy workload are stress factors among general practitioners and dentists. These findings agree with other studies, which have reported that occupational stress results when dentists find themselves overloaded with work. According to Weigl et al. (2016), supervisor support and work overload are two key job resources and job demands, whose interplay and role in depression and burnout are not yet fully understood. Studies demonstrate that high work demands (such as time pressure or work overload) contribute to exhaustion (Bakker & Demerouti 2007; Bakker, Demerouti, & Verbeke, 2004).

Work overload has furthermore been identified as an important predictor of job performance and turnover intentions (Babakus, Yavas, & Ashill, 2009). Gilboa, Shirom, Fried, and Cooper (2008) found a significant relationship between work overload and job performance. In their study, work overload had a stronger association with job performance than did role ambiguity, another known workplace stressor. Similarly, a study conducted by Kimura et al. (2018) found a significant negative correlation between work overload and performance. This is likely because work overload depletes affective, physical, and cognitive resources, causing one's level of performance to diminish substantially. This relationship, however, was buffered by personal resources such as resilience.

Previous studies have also shown workplace stressors, such as frustration and work overload, to increase the risk of deviant workplace behaviour, such as bullying and aggression (Baillien, De Cuyper, & De Witte, 2011), which are used by some employees

to alleviate their own strain (Baillien et al., 2011). This is probably also because work overload causes irritation and anger (Fox, Spector, & Miles, 2001).

An issue connected to the development of anxiety and depressive symptoms among health sciences students is that of work overload. Work overload is consistently mentioned as a key job demand in the healthcare education environment that is related to burnout. Accordingly, work overload is viewed as a job demand in this study.

2.5 INTERRELATIONS AMONGST THE LATENT VARIABLES OF INTEREST

The purpose of this section is to discuss and motivate the relationships between the various constructs. Engagement and Burnout form the focal constructs of the model, whereas the other constructs represent the antecedents and outcomes of Engagement and Burnout.

2.5.1 Burnout and engagement

Stress and wellbeing research has produced an extensive list of job demands, but lacks job resources as potential predictors of occupational wellbeing. This is where the JD-R model prevails above most other frameworks pertaining to wellbeing. The JD-R model fundamentally assumes that any work environment, regardless of the occupation, can be divided into two distinct categories. namely job demands and job resources (Bakker & Demerouti, 2014; Hakanen et al., 2006). Even though job demands have been described to measure work challenges (Steenland, Johnson, & Nowlin, 1997), they can transform into troublesome stressors when circumstances require a high degree of effort to sustain the expected level of performance, consequently eliciting negative responses such as burnout. Job resources, on the other hand, may decrease job demands and the associated physiological and/or psychological costs, stimulate personal development, learning and growth, and prove to be functional in achieving work goals. Thus, not only are job resources a necessity to cope with job demands and to be productive, but they are also valuable in their own right. Conversely, an absence of job resources may act as factors that increase burnout and have a negative impact on the wellbeing of health sciences students (Hakanen et al., 2006).

Burnout is typically described as a syndrome of reduced professional efficacy, cynicism and exhaustion, whereas engagement can be defined as a work-related, fulfilling, positive state of mind that is characterised by absorption, dedication and vigour

(Schaufeli et al., 2002b). An assumption of the JD-R model is that job resources and job demands may induce two different, albeit related, processes: (1) a motivational process in which job resources foster engagement and (2) an energetic process of tiring out in which high job demands exhaust employees' resources (both mental and physical), which may consequently lead to burnout and eventually to poor health (Schaufeli & Bakker, 2004).

Furthermore, Uludag and Yaratan (2010) suggest that engagement is an antipode of burnout. Specifically, burnout in students can be considered an erosion of academic engagement. However, even though engagement and burnout are considered by Uludag and Yaratan (2010) to be on opposite ends of one continuum, the literature reveals that they are negatively, although not perfectly, related (Schaufeli & Bakker, 2004). Langelaan, Bakker, Van Doornen, and Schaufeli (2006) found that exhaustion was negatively related to vigour. They also observed a negative relationship between cynicism and dedication. Similarly, in a different study, Schaufeli and Bakker (2004) hypothesised that there is a negative relationship leading from cynicism and exhaustion to dedication and vigour. Accordingly, the following hypothesis was formulated:

Hypothesis 1: Burnout has a significant, negative influence on engagement[1].

2.5.2 Social support and engagement

Past studies have consistently demonstrated that work engagement can be cultivated through job resources (Bakker & Demerouti, 2008; Schaufeli, Bakker, & Van Rhenen, 2009). Examples of job resources include opportunities to learn, performance feedback, autonomy and social support (Schaufeli et al., 2009). According to Gorgievski and Hobfoll (2008), social support offers the potential to obtain resources that are beyond those possessed directly by an individual. Employees who perceive an absence of social support will be unable to make the necessary investments for resource gain. Likewise, job resources such as social support are believed to play an extrinsic motivational role, as a work environment that is resourceful will develop the willingness of an individual to dictate his/her abilities and efforts to the work task at hand (Othman & Nasurdin, 2013). According to Schaufeli and Bakker (2004), social support has been demonstrated to be an important antecedent of work engagement.

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[1] Although it is customary in SEM/PLS to use causal expressions that include terminally like 'influence', the research design is not adequate for allowing causal inferences.

According to Bakker and Demerouti (2007, 2008), job resources, including social support, have motivating potential that should lead to the engagement dimensions absorption, dedication and vigour. A study on nurses conducted by Lysaght, Ouellette-Kuntz, and Lin (2012) found that peer social support ensured that work goals were attained and that tasks were completed successfully. Schaufeli et al. (2009) furthermore suggest that peer social support may fulfil the basic need for belonging. Consequently, social support is likely to encourage work engagement through this motivational process. A review of the literature indicates that social support is positively associated with engagement (Bakker, Demerouti & Schaufeli, 2005; Bakker et al., 2006; Saks, 2006; Schaufeli & Bakker, 2004; Xanthopoulou, Baker, Heuven, Demerouti, & Schaufeli, 2008). Similarly, a recent study on nurses showed that organisational support, peer support and supervisor support were found to have significant positive effects on work engagement (Nasurdin, Ling, & Khan, 2018).

Therefore, social support is regarded as a job resource that will, in line with the JD-R model, lead to work engagement in health sciences students. There thus is sufficient evidence to justify the following hypothesis:

Hypothesis 2: Social support has a significant, positive influence on engagement.

2.5.3   Mindfulness and engagement

Mindfulness and the use of mindfulness interventions in an occupational context have attracted increasing attention since the late 1990s, not only for employees suffering from mental health problems and/or stress, but for staff in general as a protective measure against potential issues. A systematic review by Lomas, Medina, Ivtzan, Rupprecht, and Eiroa-Orosa (2017) revealed that mindfulness was mostly associated with positive outcomes. The main significance of mindfulness is that it involves a meta-mechanism known as decentring or "re-perceiving" that is theorised to have a positive impact on wellbeing.

Studies have furthermore demonstrated that mindfulness is positively linked to work engagement (Schaufeli & Salanova, 2011) through individuals' positive affect and authentic functioning (Leroy, Anseel, Dimitrova, & Sels, 2013). Employees who are engaged are psychologically present at work (Kahn, 1992) and fully immersed in their

jobs (Rich, Lepine, & Crawford, 2010). By creating this experience of being "fully there" in the present moment, attentive and immersed in one's job, mindfulness relates positively with engagement. Clarity of experience is enhanced by receptive attention, resulting in individuals becoming positively engaged and more engrossed in their work tasks (Brown & Ryan, 2003). Findings from a recent study on healthcare workers show that mindfulness-based interventions lead to an increase in mindfulness and, consequently, also to increased work engagement (Coo & Salanova, 2018).

According to the JD-R model, therefore, mindfulness can be considered a personal resource that will lead to work engagement in health sciences students. The relationship between mindfulness and engagement is evident from earlier research. However, additional research is required to provide further support for this relationship. In line with the abovementioned, the following hypothesis was formulated:

Hypothesis 3: Mindfulness has a significant, positive influence on engagement.

2.5.4   Emotional intelligence and engagement

Thor (2012) argues that insufficient attention has been paid to internal antecedents of work engagement, such as emotional intelligence, as most research has focused on external factors only. However, researchers have found emotional intelligence and engagement to be related to many of the same outcomes, namely job satisfaction, personal satisfaction, self-esteem, work attitudes, work behaviours, and work outcomes. The view that emotional intelligence is indeed related to work engagement, and that emotional intelligence predicts a proportion of employees' engagement, is supported by Thor (2012).

Brunetto, Teo, Shacklock, and Farr-Wharton (2012) found that emotional intelligence predicts engagement and wellbeing, amongst other things, in police officers. In a healthcare context, personal resources such as emotional competence are closely related to engagement in nursing (Garrosa, Moreno-Jiménez, Rodríguez-Muñoz, & Rodríguez-Carvajal, 2011). Likewise, emotional intelligence has been linked to higher levels of work engagement in nurses (Pérez-Fuentes, Molero, Linares, & Orpesa, 2018; Zhu, Liu, Guo, Zhao, & Lou, 2015). Specifically, emotional intelligence explained 14% of the variance in the absorption dimension, 21.9% of the variance in the dedication

dimension, and 22.8% of the variance in the vigour dimension of nurse engagement (Pérez-Fuentes et al., 2018).

Therefore, according to the JD-R model, emotional intelligence can be considered a personal resource that will lead to work engagement amongst health sciences students. The relationship between emotional intelligence and engagement is made evident by earlier research. However, additional research is needed to provide further support. Based on the aforementioned, the following hypothesis was formulated:

Hypothesis 4: Emotional intelligence has a significant, positive influence on engagement.

2.5.5 Work overload and burnout

Job demands are those aspects of the job associated with adverse health and wellbeing impairments. Employees' physical and mental resources become exhausted by chronic job demands. In turn, this may result in the depletion of energy and in health issues. Thus, a decrease in job demands is likely to promote wellbeing through reducing psychological strain. According to the demand-control model (Karasek, 1979, 1998), work overload is a job demand that is a key contributor to job strain.

As stated by Ziaei, Yarmohammadi, Moradi, and Khandan (2015), one of the organisational risk factors that is linked to work overload is known to be burnout. In their study, Ziaei et al. (2015) found high workload to be a leading cause of burnout in administrative staff. Likewise, Alarcon (2011) found workload to be among the most significant precursors of burnout in teaching staff. This is in line with the findings of a recent study conducted by Avanzi et al. (2018), who found a high workload to be associated with burnout.

Various studies pertaining to the healthcare sector have indicated that healthcare professionals are exposed to a variety of severe occupational stressors, such as high workload, low social support, time pressure, and predisposition to emotional reactions due to their exposure to the suffering and death of patients (Marine, Ruotsalainen, Serra, & Verbeek, 2006; McVicar, 2003). As a result, healthcare professionals are faced with a high risk of experiencing burnout (Portoghese, Galletta, Coppola, Finco, &

Campagna, 2014). Leiter and Maslach (2005) argue that work overload is a main source of the exhaustion that is at the root of burnout.

A recent study, also pertaining to the healthcare context, found that workload correlated significantly with burnout in nurses (Maidasari, Absah, & Siahaan, 2018). However, a noteworthy point to consider is that workload seems to represent a challenge stressor, which means that it is likely connected to both losses and gains for workers. It is the prolonged exposure to high workload or work overload that is associated with emotional and physical depletion (Avanzi et al., 2018). Work overload is regarded as a job demand in this research study that, in accordance with the JD-R theory, should lead to burnout. Consequently, the following hypothesis was formulated:

Hypothesis 5: Work overload has a significant, positive influence on burnout[2].

2.6 MODERATING EFFECTS AMONG VARIABLES

A fundamental assumption of the JD-R theory is that that job demands and resources interact to predict occupational wellbeing in two possible ways. These interaction effects and the hypotheses based on them are discussed in this section.

2.6.1 The first interaction effect

Firstly, job and personal resources can cushion the effect of job demands on burnout. For instance, various studies have demonstrated that job resources (e.g. social support, performance feedback, autonomy, etc.) mitigate the effects of job demands (e.g. work pressure, emotional demands, physical demands, etc.) on burnout (Bakker et al., 2014). A study conducted by Bakker, Demerouti and Euwema (2005) concluded that high demands paired with low job resources add significantly to the prediction of burnout. Specifically, 56% of the moderating affects between job demands and job resources proved to be significant, signifying that workers who have many resources are better equipped to cope with their daily job demands.

In a study on home-care personnel conducted by Xanthopoulou et al. (2007), workers were found to profit the most from work autonomy, knowledge of ways to deal with difficult situations, and managerial support when they were faced with emotionally

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[2] This reference is to the direction of the statistical effect, in that an increase in work overload is associated with an increase in burnout.

charged situations or aggressive behaviour from patients. These employees were able to confront challenging situations more effectively, thereby preventing high levels of burnout. This mechanism may be explained as a form of proactive coping.

Consequently, the cushioning hypothesis aids in the explanation of interactions between job demands and job resources by suggesting a weaker relationship between job demands and burnout for employees enjoying a high degree of job resources. Social support is regarded as a job resource. Therefore, it is hypothesised that social support will act as a buffer by weakening the relationship between work overload and burnout.

Furthermore, a noteworthy extension of the original JD-R model is the inclusion of personal resources in the model and theory (Bakker et al., 2004; Demerouti, Bakker, De Jonge, Jansen, & Schaufeli, 2001). Wellbeing literature has shown personal resources to be related to stress, resilience and wellbeing (emotional and physical) (Chen, Gully, & Eden, 2001; Scheier & Carver, 1992). Studies furthermore indicate that, when employees have high levels of personal resources, they typically also experience greater mastery that helps them deal with demanding circumstances more effectively. This, in turn, prevents negative outcomes such as burnout. This notion incorporates the JD-R model's buffering hypothesis (Bakker et al., 2005) and the COR theory (Hobfoll, 2002) because it acknowledges the potential moderating role of personal (and not only job) resources in the health-impairment process.

Mindfulness and emotional intelligence are regarded as personal resources in this study, and therefore it is hypothesised that they will play a buffering role in the relationship between work overload and burnout. The following hypotheses are thus formulated with regard to the moderating role that job resources and personal resources play in the relationship between job demands and burnout:

Hypothesis 6: Social support has a significant (negative) moderating effect on the relationship between work overload and burnout.

Hypothesis 7: Mindfulness has a significant (negative) moderating effect on the relationship between work overload and burnout.

Hypothesis 8: Emotional intelligence has a significant (negative) moderating effect on the relationship between work overload and burnout.

2.6.2 The second interaction effect

Secondly, job demands amplify the effect that job resources and personal resources have on engagement. According to the JD-R theory of Bakker and Demerouti (2014), job demands have a moderating effect on the relationship between job resources and engagement, as well as on the relationship between personal resources and engagement. Interestingly, resources gain their motivational potential and have the strongest influence particularly when employees are confronted with high job demands (thus, sometimes demands may have a positive effect on an individual by providing a challenge to be overcome rather than an insurmountable obstacle). Therefore, when a student or employee faces challenging job demands, resources become particularly valuable and foster dedication to the tasks at hand (Bakker & Demerouti, 2014). For example, when students experience high emotional demands, social support from peers might become more important.

The results of a study on dentists conducted by Hakanen, Bakker and Demerouti (2005) indicate that dentists benefited most (in terms of work engagement) from their job resources when confronted with high job demands. These findings suggest that resources in dentistry gain relevance and salience under demanding circumstances (i.e. when they are needed most). This is in agreement with past research in other domains and with the COR theory (Hobfoll, 2002).

In this study, work overload is regarded as a job demand. Thus, it can be hypothesised that the work overload experienced by health sciences students will intensify the effect of job and personal resources on students' engagement. In accordance with this, the following hypotheses were formulated relating to the positive influence that job demands have on the relationship between resources and work engagement.

Hypothesis 9: Work overload has a significant (positive) moderating effect on the relationship between social support and engagement.

Hypothesis 10: Work overload has a significant (positive) moderating effect on the relationship between mindfulness and engagement.

Hypothesis 11: Work overload has a significant (positive) moderating effect on the relationship between emotional intelligence and engagement.

In considering the three hypotheses, it became seemingly clear that there is great value to be found in investigating the interactive nature of demands and resources to gain a comprehensive understanding of the emergence of engagement and burnout. Since work overload is not typically experienced in isolation without having some form of interaction with or support from peers and lecturers, it makes sense to investigate combinations of work characteristics when explaining the experience of engagement and burnout (Bakker & Demerouti, 2008).

2.7 CONCEPTUAL MODEL

The hypotheses are illustrated in the following conceptual model (Figure 2.2). This is a simplistic illustration of the hypothesised paths between the variables.
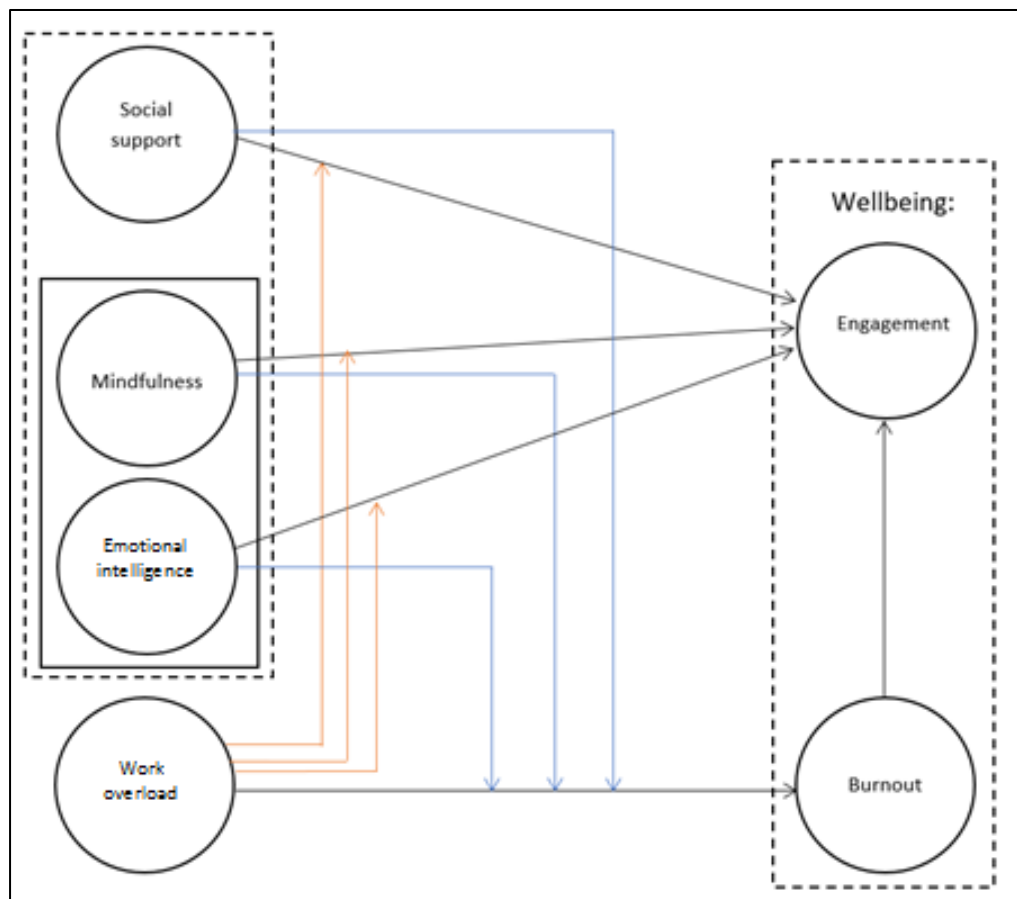
Figure 2.2. Conceptual model for predicting the wellbeing of health sciences students at Stellenbosch University

2.8 CHAPTER SUMMARY

This chapter has provided a brief overview of past stress and wellbeing models. Thereafter, the JD-R model and its components were discussed in a detailed literature review. An in-depth discussion of the theoretical foundations of each construct was also provided. This was followed by an explanation of the various relationships among the constructs, and the study's hypotheses were stated. The research-initiating question that culminated from the literature review and relevant theory therefore asks: "Why is there variance in the wellbeing (engagement and burnout) of health sciences students at Stellenbosch University?" The next chapter comprises the research methodology that was utilised to investigate the stated hypotheses.

CHAPTER 3

RESEARCH METHODOLOGY

3.1   INTRODUCTION

This chapter aims to describe the methodology that was used in the research process to acquire answers to the research-initiating question: "Why is there variance in the wellbeing (engagement and burnout) of health sciences students at Stellenbosch University?" According to Babbie and Mouton (2001), the research methodology should purposefully serve the epistemic ideal, i.e. search for the truth. To justify industrial psychology and human resource management actions, evidence must be credible and valid. Credibility and validity depend on the objectivity of the method used to produce evidence, which is judged by the scientific community. Industrial psychology commits itself to the scientific method because the scientific method maximises the probability of arriving at a correct verdict on the validity of the hypotheses.

The research methodology serves the epistemic ideal of science through two characteristics, namely objectivity and rationality (Babbie & Mouton, 2001). Objectivity refers to the attempt by the scientific method of inquiry to minimise error in decision-making regarding the truth of the hypotheses. When testing the validity of the structural model, there are various critical stages in which the epistemic ideal is threatened by the possibility of derailment. This can have negative implications for the lives of people, as well as for the financial position of a given organisation. It is thus important that appropriate steps are taken to maximise the probability of valid findings. Rationality refers to the attempt by the scientific method of inquiry to ensure (by insisting on it) that experienced peers critically assess the validity of the research findings by evaluating the methodological stringency of the process that was used to arrive at those findings. According to Babbie and Mouton (2001), a model is regarded as valid (or permissible) to the extent that it closely fits the empirical data.

To methodologically answer the research-initiating question, a suitable research design is required. A research design is the plan or method through which the validity of research hypotheses are tested. Before the methodology can be addressed, it is advisable to revisit the study objectives (Nell, 2012). As stated in Chapter 1, the central objective of this study was to develop and empirically test a partial structural model to

portray the network of variables that effect health sciences student wellbeing (engagement and burnout) at Stellenbosch University (based on the JD-R model). The research study furthermore aimed to:

- Identify the underlying latent variables that contribute to the engagement of health sciences students.

- Identify the underlying latent variables that contribute to the burnout of health sciences students.

- Identify the causal relationships among the latent variables and their outcomes.

- Highlight the results and practical implications of the research findings and recommend interventions that can increase engagement and decrease burnout, and thereby enhance wellbeing amongst health sciences students at Stellenbosch University.

This chapter contains an exposition of the research design and research methodology used to answer the research-initiating question. In addition to the research design employed in this study, the research hypotheses, statistical hypotheses, sampling characteristics, data collection and measuring instruments, data analysis and ethical considerations are accounted for in this chapter.

3.2 RESEARCH DESIGN

The research design is an investigation plan designed to obtain answers to research questions. The merit of the overarching and specific research hypotheses is tested by use of the research design. Thus, it is important that the research design delivers unambiguous scientific evidence on the research questions. The design is not randomly chosen, but is rather governed by the type of research-initiating question, the research objectives, and the empirical evidence needed to test the hypotheses. The research design furthermore serves the epistemic ideal of science through the control mechanisms of objectivity and rationality (Theron, 2016).

The aim of the research design was to ensure that accurate empirical evidence is obtained that can be used to determine whether the research hypotheses can be accepted or rejected confidently. In order to evaluate the hypotheses, this study made use of a non-experimental *ex post facto* correlational design with two indicators per latent variable. When using an *ex post facto* correlational design, the researcher does not have direct control over the independent variables because they are either not

inherently manipulable, or the manifestation(s) of the independent variables have already accrued. Measures of the observed variables are obtained and the observed covariance matrix is calculated. The researcher obtains, in an iterative fashion, estimates for the freed measurement and structural model parameters with the aim of reproducing the observed covariance matrix as closely as possible. If the fitted model fails to reproduce the observed covariance matrix accurately, it follows that an acceptable explanation for the observed covariance matrix is not provided by the structural model. It then follows that the structural relationships hypothesised by the model do not provide an accurate portrayal of the psychological process shaping the phenomenon of interest – the wellbeing of health sciences students in the context of this study (Theron, 2016).

The opposite, however, is not true. If the covariance matrix derived from the estimated measurement and structural model parameters closely agrees with the observed covariance matrix, it would not imply that the psychological dynamics hypothesised by the structural model necessarily produced the observed covariance matrix. Therefore, one cannot conclude that the psychological process depicted by the model necessarily produced the levels of endogenous latent variables comprising the phenomenon of interest. A high degree of fit between the observed and estimated covariance matrices would only imply that the psychological processes portrayed in the structural model provide one plausible explanation for the observed covariance matrix. This deduction, however, would only really be warranted if prior evidence exists that the measurement model fits closely (Theron, 2016). Likewise, the nature of the *ex post facto* correlational design allows one to draw inferences from significant path coefficients. However, correlations between variables do not necessarily suggest causation. Significant correlations are evidence that one variable has a relationship with another, but one cannot infer that the one necessarily causes the other (Burger, 2011).

Through the researcher's efforts and the use of certain techniques, the *ex post facto* correlational design was able to control for extraneous variance, maximise systematic error variance, as well as minimise error variance (Theron, 2016). Therefore, this design has the capacity to increase the likelihood of providing unambiguous empirical evidence against which the hypotheses were tested.

The schematic presentation of the proposed *ex post facto* correlational design is depicted below (given four X variables representing four exogenous latent variables, and two Y variables representing two endogenous latent variables):

$[X_{11}]$	$[X_{12}]$	$[X_{13}]$	$[X_{14}]$	$[Y_{11}]$	$[Y_{12}]$
$[X_{21}]$	$[X_{22}]$	$[X_{23}]$	$[X_{24}]$	$[Y_{21}]$	$[Y_{22}]$
$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\vdots$
$[X_{n1}]$	$[X_{n2}]$	$[X_{n3}]$	$[X_{n4}]$	$[Y_{n1}]$	$[Y_{n2}]$

3.3 RESEARCH HYPOTHESES

3.3.1 Substantive research hypothesis

The proposed research methodology should serve the objectives of the study, which are:

Overall Objective:

- To develop and empirically test a partial structural model to portray the network of variables that affect the wellbeing of health sciences students (engagement and burnout) at Stellenbosch University (based on the JD-R model).

Specific Objectives:

- To identify the underlying latent variables that contribute to the engagement of health sciences students.
- To identify the underlying latent variables that contribute to the burnout of health sciences students.
- To identify the causal relationships among the latent variables and their outcomes.
- To highlight the results and practical implications of the research findings and to recommend interventions that can increase engagement and decrease burnout, and thereby to enhance wellbeing amongst health sciences students at Stellenbosch University.

In the literature study, the variables and proposed relationships among the variables were discussed. This was presented in the conceptual model in Figure 2.2. The overarching substantive research hypothesis of this study states that the structural model provides a valid account of the psychological processes that determine the

variance in the wellbeing (engagement and burnout) of health sciences students at Stellenbosch University. The substantive research hypothesis can be divided into 11, more detailed, path-specific research hypotheses.

3.3.2 Path-specific research hypotheses

The proposed JD-R structural model presented in Figure 3.1 schematically portrays the path-specific research hypotheses developed through theorising in the literature study in Chapter 2. The path-specific research hypotheses that were developed are as follows:

Hypothesis 1:   Burnout has a significant, negative influence on engagement.

Hypothesis 2:   Social support has a significant, positive influence on engagement.

Hypothesis 3:   Mindfulness has a significant, positive influence on engagement.

Hypothesis 4:   Emotional intelligence has a significant, positive influence on engagement.

Hypothesis 5:   Work overload has a significant, positive influence on burnout.

Hypothesis 6:   Social support has a significant (negative) moderating effect on the relationship between work overload and burnout.

Hypothesis 7:   Mindfulness has a significant (negative) moderating effect on the relationship between work overload and burnout.

Hypothesis 8:   Emotional intelligence has a significant (negative) moderating effect on the relationship between work overload and burnout.

Hypothesis 9:   Work overload has a significant (positive) moderating effect on the relationship between social support and engagement.

Hypothesis 10:   Work overload has a significant (positive) moderating effect on the relationship between mindfulness and engagement.

Hypothesis 11:   Work overload has a significant (positive) moderating effect on the relationship between emotional intelligence and engagement.

3.4 STATISTICAL HYPOTHESES

The statistical hypotheses are formulated in such a way that depicts the logic underlying the structural model, the proposed research design, and the nature of the envisaged statistical analyses. The proposed partial structural model for predicting the wellbeing of health sciences students consists of two exogenous and four endogenous latent variables. Causal paths among these latent variables were further introduced into the model. The statistical analysis technique appropriate for the analysis of data from an *ex post facto* correlational design is structural equation modelling (SEM) (Jöreskog & Sörbom, 1993). SEM was thus employed as the analysis technique in this study.

The proposed structural model is depicted as a path diagram in Figure 3.1, which portrays the network of variables that affect the wellbeing of health sciences students. The aim was that the structural model be tested in order to determine whether the hypothesised paths among the variables presented in the literature review are of significance.
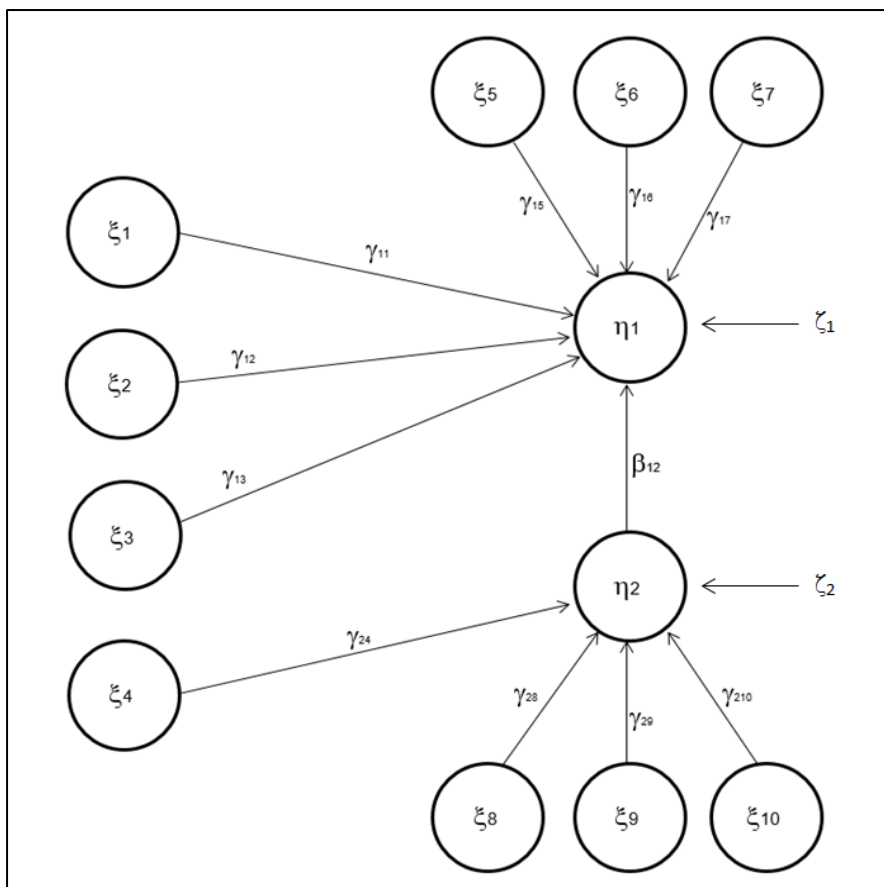
Figure 3.1. Partial structural model for predicting the wellbeing of health sciences students at Stellenbosch University

With regard to Figure 3.1:

ξ_1 =	Social support		ξ_7 =	Work overload * Emotional intelligence
ξ_2 =	Mindfulness		ξ_8 =	Social support * Work overload
ξ_3 =	Emotional intelligence		ξ_9 =	Mindfulness * Work overload
ξ_4 =	Work overload		ξ_{10} =	Emotional intelligence * Work overload
ξ_5 =	Work overload * Social support		η_1 =	Engagement
ξ_6 =	Work overload * Mindfulness		η_2 =	Burnout

The structural model is an adapted version of the JD-R model of occupational wellbeing (Bakker & Demerouti, 2018). Social support (ξ_1) is the job resource, mindfulness (ξ_2) and emotional intelligence (ξ_3) are the personal resources, and work overload (ξ_4) is the job demand. Engagement (η_1) is representative of the motivational process, whereas burnout (η_2) represents the job stress process of occupational wellbeing. Furthermore, when comparing the structural model to the conceptual model, it can be seen that the structural model contains additional variables (ξ_5, ξ_6, ξ_7, ξ_8, ξ_9 and ξ_{10}). These variables are identified as dummy variables (also known as indicator or binary variables), which are representative of the moderating effects. In order to test a moderating effect in SEM, a separate variable needs to be created. This is done by multiplying the score of the moderating variable with the score of the exogenous variable that is hypothesised to influence the endogenous variable (Little, Bovaird, & Widaman, 2006).

The functional relationships of the variables portrayed in the structural model can be described by the set of structural equations below (equations 3.1 and 3.2):

$$\eta_1 = \beta_{12}\eta_2 + \gamma_{11}\xi_1 + \gamma_{12}\xi_2 + \gamma_{13}\xi_3 + \gamma_{15}\xi_5 + \gamma_{16}\xi_6 + \gamma_{17}\xi_7 + \zeta_1 \dots\dots\dots\dots 3.1$$

$$\eta_2 = \gamma_{24}\xi_4 + \gamma_{28}\xi_8 + \gamma_{29}\xi_9 + \gamma_{2.10}\xi_{10} + \zeta_2 \dots\dots\dots\dots 3.2$$

The set of structural equations can further be expressed as the following single matrix equation (equation 3.3):

$$\begin{bmatrix} \eta_1 \\ \eta_2 \end{bmatrix} = \begin{bmatrix} 0 & \beta_{12} \\ 0 & 0 \end{bmatrix} \begin{bmatrix} \eta_1^4 \\ \eta_2 \end{bmatrix} + \begin{bmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} & 0 & \gamma_{15} & \gamma_{16} & \gamma_{17} & 0 & 0 & 0 \\ 0 & 0 & 0 & \gamma_{24} & 0 & 0 & 0 & \gamma_{28} & \gamma_{29} & \gamma_{2.10} \end{bmatrix} \begin{bmatrix} \xi_1^3 \\ \xi_2 \\ \xi_3 \\ \xi_4 \\ \xi_5 \\ \xi_6 \\ \xi_7 \\ \xi_8 \\ \xi_9 \\ \xi_{10} \end{bmatrix} + \begin{bmatrix} \zeta_1 \\ \zeta_2 \end{bmatrix} \quad \text{...3.3}$$

The single matrix equation can be reduced to the basic equation below (equation 3.4):

$\eta = \beta\eta + \Gamma\xi + \zeta$..3.4

In order to estimate the fit of the hypothesised model, it is essential to test the extent to which the model is consistent with the obtained empirical data (Diamantopoulos & Siguaw, 2000). This is done by testing an exact-fit and a close-fit null hypothesis. The overarching substantive research hypothesis states that the structural model provides a valid account of the psychological process that determines the level of wellbeing in health sciences students. If the overarching substantive research hypothesis is interpreted to indicate that the structural model provides a perfect account of the way in which the exogenous latent variables influence the endogenous latent variables of interest, the substantive research hypothesis translates into the following exact-fit null hypothesis:

$$H_0: \text{RMSEA} = 0$$
$$H_a: \text{RMSEA} > 0$$

It is unlikely, however, that the structural model will achieve an exact fit, since it is merely a reproduction of reality and not actual reality. The probability is greater that a close fit

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[3] All off-diagonal elements in phi (Φ) are freed to be estimated.
[4] Psi (Ψ) is defined as a diagonal matrix, thereby assuming that there is no common source of structural error variance.

will be achieved. If the overarching substantive research hypothesis is interpreted to imply that the structural model provides an approximate account of the manner in which the endogenous latent variables influence the exogenous latent variables of interest, the substantive research hypothesis translates into the following close-fit null hypothesis:

$$H_0: \text{RMSEA} \leq .05$$
$$H_a: \text{RMSEA} > .05$$

The overarching substantive research hypothesis was separated into 11 more detailed, specific research hypotheses. These 11 detailed research hypotheses translate into the following path-coefficient statistical hypotheses:

Hypothesis 1: Burnout (η_2) has a significant, negative influence on engagement (η_1)

$$H_{01}: \beta_{12} = 0$$
$$H_{a1}: \beta_{12} < 0$$

Hypothesis 2: Social support (ξ_1) has a significant, positive influence on engagement (η_1)

$$H_{02}: \gamma_{11} = 0$$
$$H_{a2}: \gamma_{11} > 0$$

Hypothesis 3: Mindfulness (ξ_2) has a significant, positive influence on engagement (η_1)

$$H_{03}: \gamma_{12} = 0$$
$$H_{a3}: \gamma_{12} > 0$$

Hypothesis 4: Emotional intelligence (ξ_3) has a significant, positive influence on engagement (η_1)

$$H_{04}: \gamma_{13} = 0$$
$$H_{a4}: \gamma_{13} > 0$$

Hypothesis 5: Work overload (ξ_4) has a significant, positive influence on burnout (η_2)

$$H_{05}: \gamma_{24} = 0$$
$$H_{a5}: \gamma_{24} > 0$$

Hypothesis 6: Social support (ξ_1) has a significant (negative) moderating effect on the relationship between work overload (ξ_4) and burnout (η_2)

$$H_{06}: \gamma_{28} = 0$$
$$H_{a6}: \gamma_{28} < 0$$

Hypothesis 7: Mindfulness (ξ_2) has a significant (negative) moderating effect on the relationship between work overload (ξ_4) and burnout (η_2)

$$H_{07}: \gamma_{29} = 0$$
$$H_{a7}: \gamma_{29} < 0$$

Hypothesis 8: Emotional intelligence (ξ_3) has a significant (negative) moderating effect on the relationship between work overload (ξ_4) and burnout (η_2)

$$H_{08}: \gamma_{210} = 0$$
$$H_{a8}: \gamma_{210} < 0$$

Hypothesis 9: Work overload (ξ_4) has a significant (positive) moderating effect on the relationship between social support (ξ_1) and engagement (η_1)

$$H_{09}: \gamma_{15} = 0$$
$$H_{a9}: \gamma_{15} > 0$$

Hypothesis 10: Work overload (ξ_4) has a significant (positive) moderating effect on the relationship between mindfulness (ξ_2) and engagement (η_1)

$$H_{010}: \gamma_{16} = 0$$
$$H_{a10}: \gamma_{16} > 0$$

Hypothesis 11: Work overload (ξ_4) has a significant (positive) moderating effect on the relationship between emotional intelligence (ξ_3) and engagement (η_1)

$$H_{011}: \gamma_{17} = 0$$
$$H_{a11}: \gamma_{17} > 0$$

Table 3.1

Path-specific Statistical Hypotheses

Hypothesis 1	Hypothesis 5	Hypothesis 9
H_{01}: $\beta_{12} = 0$	H_{05}: $\gamma_{24} = 0$	H_{09}: $\gamma_{15} = 0$
H_{a1}: $\beta_{12} < 0$	H_{a5}: $\gamma_{24} > 0$	H_{a9}: $\gamma_{15} > 0$
Hypothesis 2	Hypothesis 6	Hypothesis 10
H_{02}: $\gamma_{11} = 0$	H_{06}: $\gamma_{28} = 0$	H_{010}: $\gamma_{16} = 0$
H_{a2}: $\gamma_{11} > 0$	H_{a6}: $\gamma_{28} < 0$	H_{a10}: $\gamma_{16} > 0$
Hypothesis 3	Hypothesis 7	Hypothesis 11
H_{03}: $\gamma_{12} = 0$	H_{07}: $\gamma_{29} = 0$	H_{011}: $\gamma_{17} = 0$
H_{a3}: $\gamma_{12} > 0$	H_{a7}: $\gamma_{29} < 0$	H_{a11}: $\gamma_{17} > 0$
Hypothesis 4	Hypothesis 8	
H_{04}: $\gamma_{13} = 0$	H_{08}: $\gamma_{210} = 0$	
H_{a4}: $\gamma_{13} > 0$	H_{a8}: $\gamma_{210} < 0$	

3.5 SAMPLE CHARACTERISTICS

According to Polit and Hungler (1989, p. 169), "sampling refers to the process of selecting a portion of the population to represent the entire population". Sampling aims to select a number of final sampling units (FSU) from the target population in a manner that allows the statistical characteristics of particular attributes of those sampling units to depict the parameters of the population from which they were drawn (Babbie & Mouton, 2001).

The literature differentiates between two types of sampling, namely probability and non-probability sampling. Probability sampling allows each individual in the target population to have an equal chance of being selected for the sample. Therefore, probability sampling is believed to be the best way of selecting a sample that is representative of the population from which it is drawn. Probability sampling furthermore allows the researcher to calculate the desired sample size that corresponds to the margin of error to which the researcher agrees (De Vos, Strydom, Fouche, & Delport, 2005; Polit & Beck, 2004). Examples of probability sampling techniques include simple random sampling, stratified sampling, cluster sampling and systematic sampling. Non-probability

sampling, on the other hand, is a less representative approach. It is used when the population is not completely known. The probability of each individual being selected is unknown, and the method of sampling is based on factors such as common sense or ease, with an effort being made to avoid bias and maintain representativeness (Babbie & Mouton, 2001). Examples of non-probability sampling techniques include convenience sampling, snowball sampling, quota sampling and purposive sampling (Polit & Beck, 2004).

For the purpose of this study, *non-probability convenience sampling* was employed. Convenience sampling involves the researcher drawing a sample that is available at hand; for example, members of a specific organisation (Kerlinger, 1973). The sampling selection included health sciences students from Stellenbosch University. According to De Vos et al. (2005), sampling error is small the larger the sample. Large samples allow the researcher to draw more accurate and representative conclusions and generalisations. If the sample size is too small, it may result in statistical tests being insensitive or oversensitive. Kelloway (1998) suggests that, when SEM is used as the statistical analysis technique, a representative sample consisting of 200 sampling units or more should be sufficient for research purposes. Likewise, additional aspects to consider when SEM is employed as the analysis technique include:

a) the ratio of the sample size to the number of parameters to be estimated (Burger, 2011)

b) the statistical power associated with the probability of correctly rejecting the close-fit hypothesis in favour of the alternative mediocre-fit hypothesis (Burger, 2011; Theron, 2016)

c) practical considerations, such as availability of suitable candidates and costs (Burger, 2011)

d) sampling bias associated with the systematic under- or overrepresentation of certain segments of the population regarding characteristics relevant to the research question (Polit & Beck, 2004)

In the end, the completion rate of the questionnaire was almost 9%. A final valid sample of 357 health sciences students from Stellenbosch University was obtained. This number of subjects is sufficient to arrive at credible results. Figures 3.2 to 3.6 portray the biographical information of the sample.

3.6 DATA COLLECTION AND MEASURING INSTRUMENTS

Measuring the identified variables requires the use of standardised measuring instruments that are able to provide empirical evidence against which the hypotheses can be tested. The measuring instruments operationalise the constructs by making them measurable. However, one must be able to trust the quality of the measures used. Consequently, it is important to assess the psychometric soundness of the instruments.

Six measures were identified through the literature review as being reliable, valid and applicable to this study. A composite self-administered web-based questionnaire was created. For the majority of the variables, validated short forms were made use of for the purpose of time efficiency, while one variable was measured using only the relevant part of a measure as opposed to using the full measure. The composite self-administered questionnaire consisted of seven sections. Sections 1 to 6 measured the six variables of interest, namely burnout, engagement, social support, mindfulness, emotional intelligence, and work overload. Section 7 dealt with the biographical information of the participants. The full composite questionnaire took participants approximately 10 minutes to complete. It consisted of a web-based easy-to-complete questionnaire that could be completed on the computer, a tablet, or a cell phone. This can be considered an effective and efficient method of data collection in today's technologically advanced day and age. Health sciences interns and students across South Africa who volunteered to take part in a pilot study for this research project mentioned that they found the questionnaire quick and easy to complete, and that being able to do it on their cell phones made it very convenient. What follows now is the biographical information, as well as a general discussion of each measuring instrument's properties in terms of content, structure and psychometric features, as presented in the literature.

3.6.1 Biographical information

A biographical section was included in the web-based questionnaire. This was used to gather information about the demographics of the participants. Figures 3.2 to 3.6 below indicate the demographics of the sample population (N = 356 for the demographic information), including age, gender, ethnicity, religious/spiritual beliefs, and year of study.
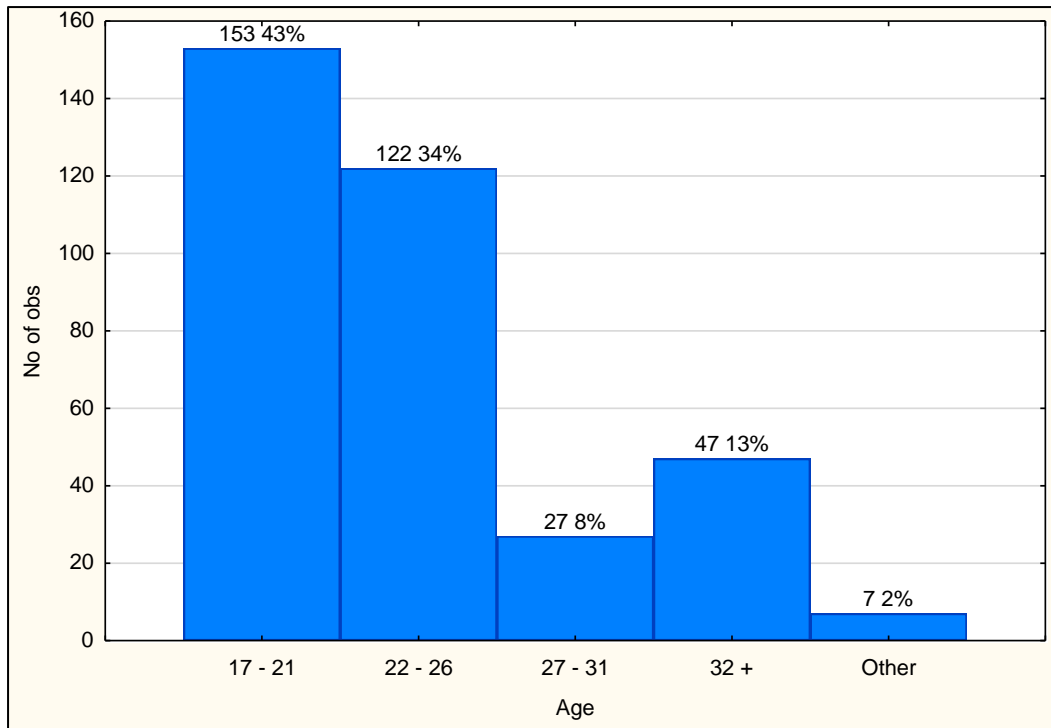
Figure 3.2. Age of the sample
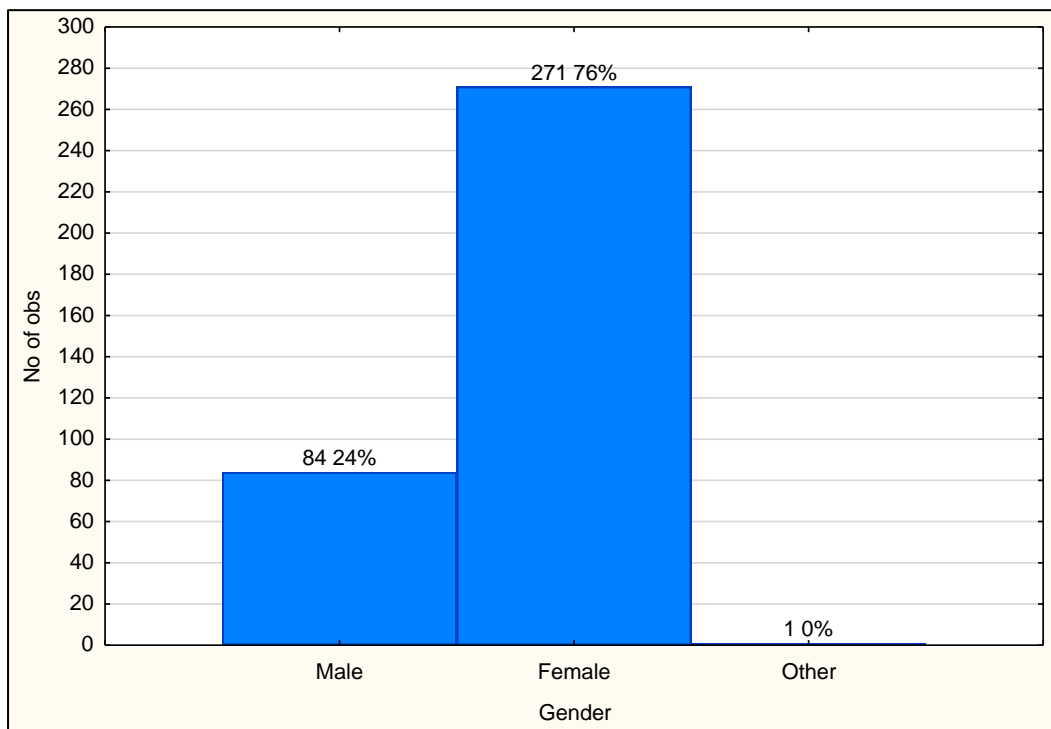
Figure 3.3. Gender of the sample population
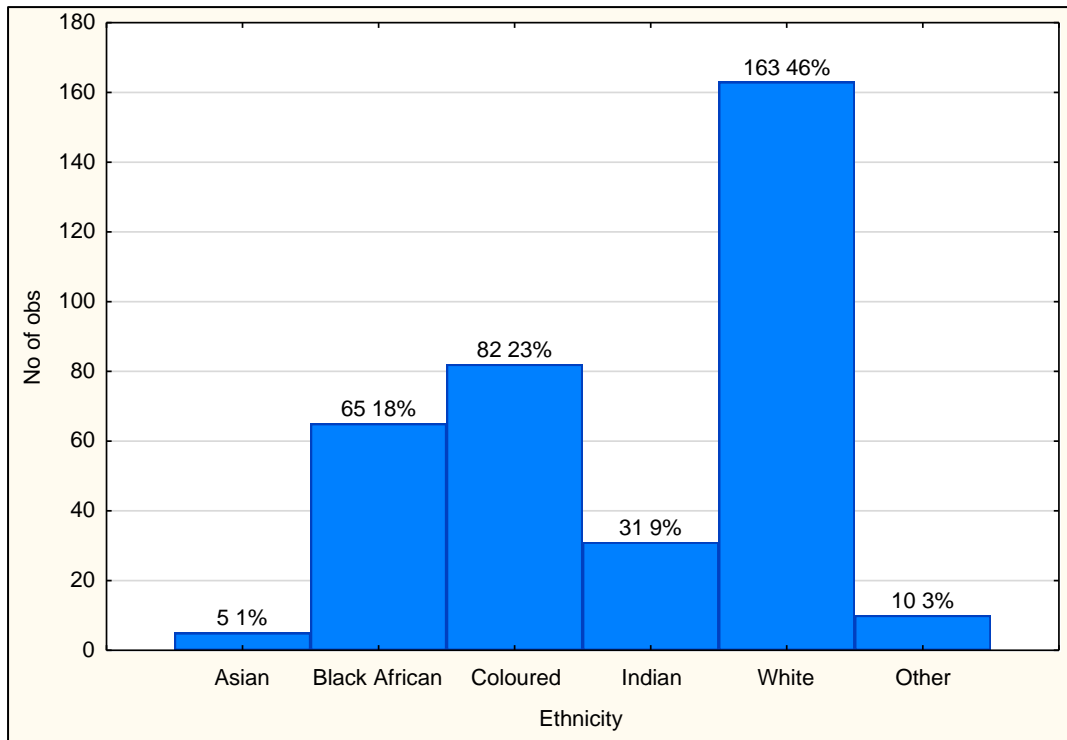
Figure 3.4. Ethnicity of the sample population
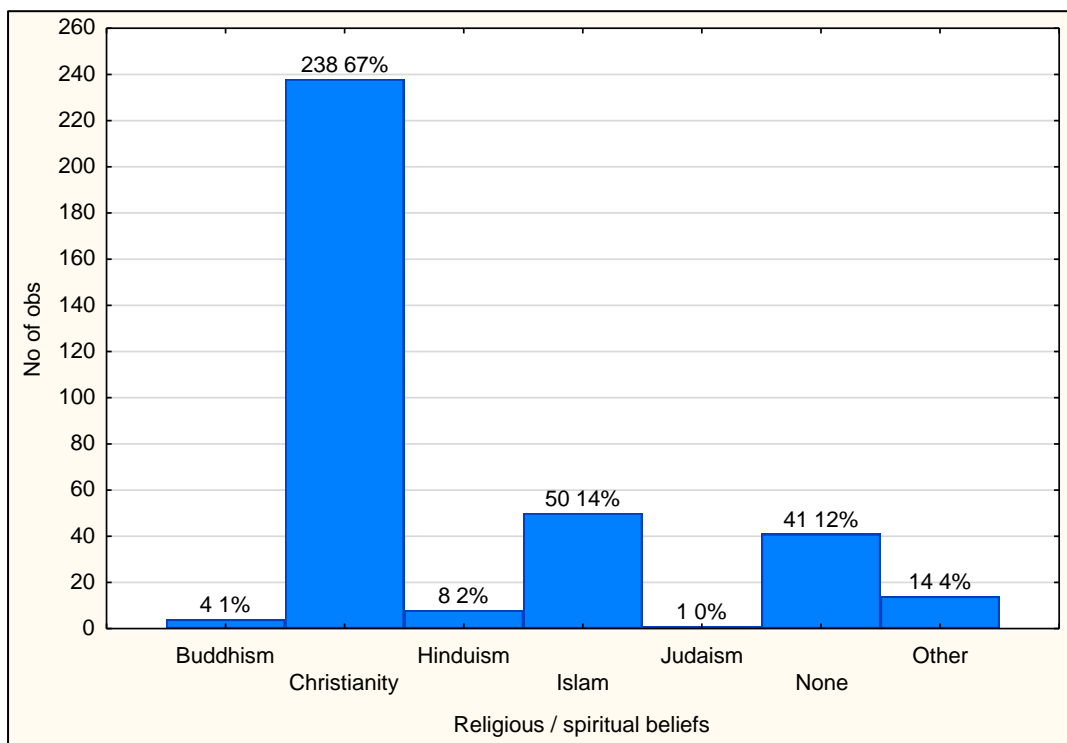
Figure 3.5. Religious/spiritual beliefs of the sample population
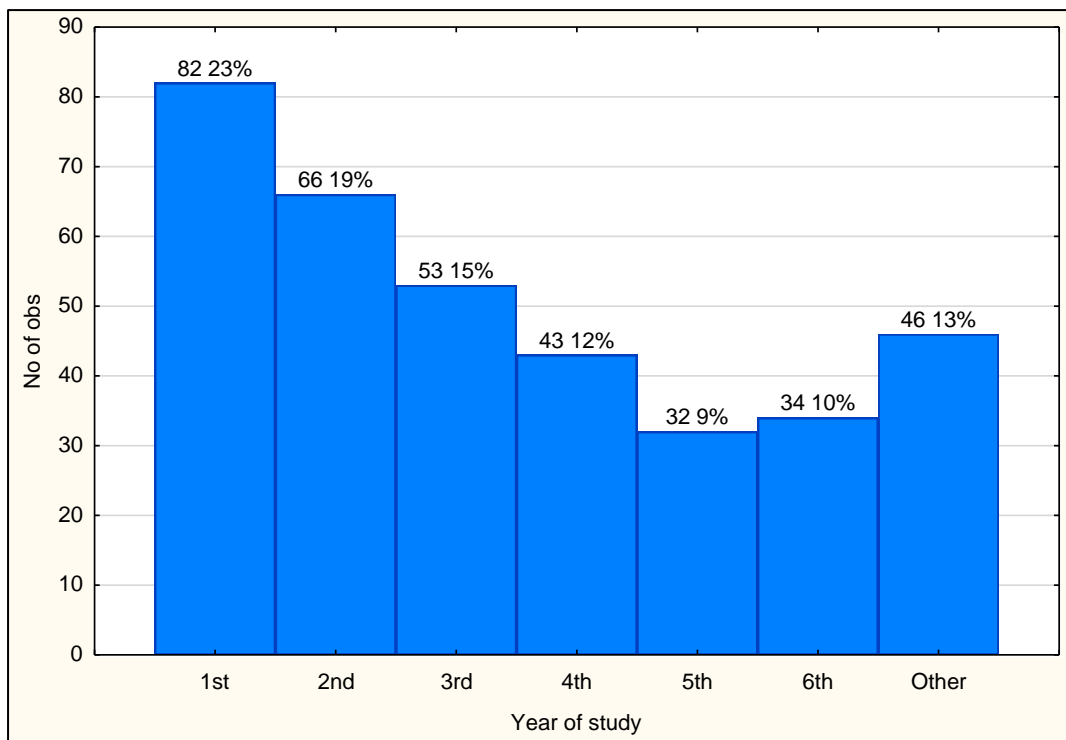
Figure 3.6. Year of study of the sample population

3.6.2 Engagement

The 14-item Utrecht Work Engagement Scale-Student Survey (UWES-S) (Schaufeli et al., 2002a) was used in this study to measure engagement levels in health sciences students. The UWES-S is an adapted version of the 17-item Utrecht Work Engagement Scale (UWES-17). Items in the UWES-17 that refer to *job* or *work* were replaced by *class* or *studies* to form the UWES-S. The UWES-S consists of three subscales: *vigour* (VI; five items), *dedication* (DE; five items), and *absorption* (AB; four items). High scores on all the subscales are indicative of high engagement. The UWES-S originally consisted of 17 items, but a study by Schaufeli et al. (2002a) found that three of the items had non-significant or relatively poor (< .40) factor loadings and were thus removed, leaving a 14-item UWES-S. The full 14-item UWES-S scale was used in this study to measure the global variable, engagement.

The UWES-S has been validated internationally, as well as in South Africa, and has also been shown to be a reliable tool. The internal consistency coefficients were observed as being between .79 and .93. Furthermore, correlations between the latent factors of the 14-item UWES-S are very high, ranging from .71 to .94. The items are scored on a

seven-point Likert scale, ranging from 0 (*never*) to 6 (*always*). An example of an item from each subscale is presented in Table 3.2.

Table 3.2

UWES-S Subscales and Item Examples

Subscale	Item example
1. *Vigour*	*When I study, I feel like I am bursting with energy*
2. *Dedication*	*I am enthusiastic about my studies*
3. *Absorption*	*I can get carried away by my studies*

3.6.3 Burnout

The 15-item Maslach Burnout Inventory-Student Survey (MBI-S) (Schaufeli et al., 2002a) was used to measure the burnout of participants. This is a modified version of the Maslach Burnout Inventory-General Survey (MBI-GS) that was adapted for use in student samples. For example, the item, "I feel emotionally drained by my *work*", was adapted to say, "I feel emotionally drained by my *studies*". The MBI-S is made up of three subscales: *exhaustion* (EX; five items), *cynicism* (CY; four items), and *efficacy* (EF; six items). All EF items are reverse scored, denoted by rEF. Thus, high scores on EX and CY and low scores on EF are indicative of burnout (Schaufeli et al., 2002a). Furthermore, the MBI-S originally consisted of 16 items, but Schutte, Toppinen, Kalimo, and Schaufeli (2000) suggested that one specific item ("when I'm in class or I'm studying I don't want to be bothered") within the CY subscale be removed because it was shown to be ambivalent and thus unsound. The full 15-item MBI-S scale was used in this study to measure the global variable, burnout.

The MBI-S has been validated internationally, as well as in South Africa, and has also been shown to be a reliable tool. Cronbach's alphas for the EX, CY and AE are 88, 90 and 84 respectively and show good internal consistency (Rostami, Abedi, Schaufeli, Ahmadi, & Sadeghi, 2014). The items are scored on a seven-point Likert scale, ranging from 0 (*never*) to 6 (*always*). An example of an item from each subscale is presented in Table 3.3.

Table 3.3

MBI-S Subscales and Item Examples

Subscale	Item example
1. Exhaustion	*I feel emotionally drained from my studies*
2. Cynicism	*I have become less enthusiastic about my studies*
3. Professional efficacy	*I feel stimulated when I achieve my study goals*

3.6.4 Mindfulness

In this research study, the 15-item Mindfulness Attention Awareness Scale (MAAS) was used to measure the mindfulness of health sciences students. This measure assesses individual differences in the frequency of mindful states over time. The MAAS focuses on the presence or absence of attention to and awareness of what is occurring in the present, rather than focusing on attributes like acceptance, gratitude, trust, empathy or various alternative attributes that have often been associated with mindfulness (Brown & Ryan, 2003). The 15-item MAAS scale was used in this study to measure the global variable, mindfulness.

MAAS respondents indicate how frequently they have the experience described in each statement using a six-point Likert scale, ranging from 1 (almost always) to 6 (almost never), where high scores reflect a greater level of mindfulness. The MAAS has excellent psychometric properties, with an internal consistency measure of .82 in a student sample and .87 in a sample from the general adult population. The MAAS furthermore has a test–retest reliability of .82 (Brown & Ryan, 2003). Example items are shown in the Table 3.4.

Table 3.4

MAAS Subscales and Item Examples

Item example
1. *I find it difficult to stay focused on what's happening in the present.*
2. *I forget a person's name almost as soon as I've been told it for the first time.*
3. *I find myself preoccupied with the future or the past.*

3.6.5 Emotional intelligence

The 14-item short form of the original 70-item Genos Emotional Intelligence Inventory (Genos EI) was used. The Genos EI is made up of seven subscales that measure the seven factors of emotional intelligence in the Genos model of EI (Palmer, Stough,

Harmer, & Gignac, 2009). These seven factors are presented in Table 3.5. The 14-item Genos EI scale was used in this study to measure the global variable, emotional intelligence. It is important to take note that the Genos is considered a classified psychological assessment. Therefore, Dr Boonzaier (registered industrial psychologist) acted as supervising psychologist to the researcher (who is an intern psychologist) in conducting and interpreting the Genos short form to ensure it was done in a responsible and appropriate manner, as stipulated by the Health Professions Council of South Africa (HPCSA).

Table 3.5

Genos EI Factor Descriptions

Factor	Description
1. *Emotional Self-Awareness*	*The skill of perceiving and understanding your own emotions*
2. *Emotional Expression*	*The skill of effectively conveying your own emotions*
3. *Emotional Awareness of Others*	*The skill of perceiving and understanding others' emotions*
4. *Emotional Reasoning*	*The skill of using emotional information in decision-making*
5. *Emotional Self-Management*	*The skill of managing your own emotions*
6. *Emotional Management of Others*	*The skill of influencing the emotions of others*
7. *Emotional Self-Control*	*The skill of effectively controlling your own strong emotions*

The Genos EI has been created with professionals and workplace contexts in mind and can thus be argued to be ideally suited for workplace use. The Gonos EI measures the frequency with which an individual exhibits EI behaviours. This focus is based on the notion that organisations tend to be particularly interested in how individuals typically behave in the workplace, as opposed to a once-off demonstration of maximum capacity (Gignac, 2010). The Genos EI is rated on a five-point Likert scale, ranging from 1 (*almost never*) to 5 (*almost always*), and has good psychometric properties. For the South African sample specifically, the internal consistency reliability for the total EI is .94, and the Cronbach's α for the subscales ranges from .67 to .83. The test-retest reliability coefficients of total EI were .83 and .72 at two months and at eight months respectively. Furthermore, the Genos EI has content and factorial validity. Example items of the seven subscales are shown in Table 3.6.

Table 3.6

Genos EI Subscales and Item Examples

Subscale	Item example
1. Emotional Self-Awareness	*I am aware of things that upset me at work.*
2. Emotional Expression	*I effectively express how I feel about issues at work.*
3. Emotional Awareness of Others	*I am aware of the things that make colleagues feel satisfied at work.*
4. Emotional Reasoning	*I ask others how they feel about different solutions when problem-solving at work.*
5. Emotional Self-Management	*I take criticism from colleagues personally [reverse scored].*
6. Emotional Management of Others	*I create a positive working environment for others.*
7. Emotional Self-Control	*I demonstrate enthusiasm appropriately at work.*

3.6.6 Social support

A scale by Susskind, Kacmar, and Borchgrevink (2003) was utilised to measure social support in this study. The scale includes co-worker support (three items) and supervisor support (four items), and is measured on a seven-point Likert scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). According to Susskind, Kacmar, and Borchgrevink (2007), two main sources are responsible for social support in service-based work, namely co-worker support and supervisor support. The Cronbach's alpha coefficients are .94 and .95 for co-worker support and supervisor support respectively. The full seven-item social support scale was used in this study to measure the global variable, social support. Example items are presented in Table 3.7.

Table 3.7

Social Support Subscales and Item Examples

Subscale	Item example
1. Co-worker support	*I find my co-workers very helpful when performing my service duties.*
2. Supervisor support	*I can count on my supervisor to do the "right thing" when assisting patients.*

3.6.7 Work overload

The eight-item overload subscale within the Job Demands-Resources Scale (JDRS), by Rothmann et al. (2006), was used to measure work overload. This subscale has good psychometric properties, with an alpha of .76, showing acceptable internal consistency reliability, in a sample of 2 717 South African employees from various organisations. The overload subscale contains items pertaining to amount and pace of work, mental load

and emotional load. It makes use of a four-point Likert scale, ranging from 1 (*never*) to 4 (*always*). The full eight-item overload subscale of the JDRS was used in this study to measure the global variable, work overload. Example items are presented in Table 3.8.

Table 3.8

JDRS (Overload) Item Examples

Item example
1. *Do you have too much work to do?*
2. *Do you have to be attentive to many things at the same time?*
3. *Does your work put you in emotionally upsetting situations?*

3.7 DATA ANALYSIS

The choice of data analysis techniques is dependent on the type of research questions the study aims to answer. A range of quantitative techniques were used to analyse the data in this study. These techniques included item analysis, confirmatory factor analysis (CFA), and partial least squares (PLS) structural equation modelling (SEM). The purpose of the data analysis is to test the structural model, investigate the research hypotheses, and to examine the psychometric soundness of the measurement instruments. The statistical packages used to perform the data analysis included SmartPLS, Statistica, and LISREL.

3.7.1 Missing values

Before the data can be analysed, it is important to determine and address missing values. This is because missing values may be present as a result of incomplete responses or non-responses by participants. The method used to address the issue of missing values depends on the nature of the data (for instance, whether the indicator variables follow a multivariate normal distribution), as well as the number of missing values. The methods that can be utilised to rectify the problems associated with missing values include: (a) list-wise deletion, (b) pair-wise deletion, (c) imputation by matching, (d) multiple imputations, or (e) full information maximum likelihood (FIML) imputation (Jöreskog & Sörbom, 1996). The statistical software programs used recognised the missing values and accounted for them accordingly.

3.7.2   Item analysis

Various measuring scales/instruments can be utilised to measure the latent variables in the structural model. These scales strive to measure a specific construct, or dimension of a construct, carrying a specific constitutive definition. The researcher needs to closely examine the individual scales to understand why they contain certain levels of reliability and validity, and why others do not. It is essential that the items comprising each scale measure the latent variable or dimensions of the latent variable that they are intended to measure. Thus, it is essential that each item is consistent with the constitutive definition that the variable carries. The items of the various scales have been developed to indicate the individual's standing on a particular latent variable.

Item analysis was used to determine the internal consistency of the responses to the items of the measuring instruments that were utilised to test the proposed structural model. This analysis allows the researcher to detect poor items that do not provide a successful reflection of the intended latent variable. If covariance between, and variance within, the items of a certain subscale cannot be explained in terms of an underlying common latent variable, then the items of that subscale do not reflect the latent variable of interest. Items that fail to discriminate between the different levels of a latent variable should be regarded as poor items and should, consequently, be removed from the scale in order to increase the reliability and validity of the scale (Smuts, 2011).

The item statistics that were used for collecting evidence for the items included: (a) the item-total correlation, (b) possible changes scale reliability and validity due to item elimination, (c) the inter-item correlations, (d) item discrimination, (e) item mean, and (f) item standard deviation.

3.7.3   Confirmatory factor analysis

To evaluate the fit of the measurement instruments, CFA was conducted. CFA allows the researcher to effectively formulate and test hypotheses regarding the underlying factor structure of a construct (Buys, Olckers, & Schaap, 2007). The measurement model is a reflection of the researcher's hypothesis regarding the underlying factor structure, and CFA allows the researcher to test whether this model sufficiently operationalises the structural model.

Operationalisation is successful if the measurement model reflecting the design intention and constitutive definition of the latent variables shows close fit (RMSEA $\leq$ .05), the estimated factor loadings are all statistically significant (p < .05), and (in the completely standardised solution) the factor loadings are large and the measurement error variances are statistically significant (p < .05), but small (Theron, 2016). After the measurement model was specified and the parameters were estimated, a number of goodness-of-fit statistics were used to assess the validity of the measurement model.

The satisfactoriness of fit between the measurement model and the obtained data was investigated by testing the hypotheses of exact fit (RMSEA = .00) and close fit (RMSEA ≤ .05). The root mean square error of approximation (RMSEA) value is indicative of the discrepancy between the observed population co-variance matrix and the estimated population co-variance matrix implied by the measurement model per degree of freedom (Hooper, Coughlan & Mullen, 2008). Typically, good model fit is indicated by values smaller than .05, reasonable fit by values between .05 and .08, and mediocre fit by values between .08 and .10. Values that are larger than .10 indicate poor fit (Diamantopoulos & Siguaw, 2000; Kelloway, 1998).

The researcher also investigated the goodness-of-fit statistics, supplemented by the GFI and AGFI values. The Goodness-of-Fit Index (GFI) measures the amount of variance and covariance explained by the model compared with the null model. The GFI is an absolute measure (Diamantopoulos & Siguaw, 2000). The Adjusted Goodness-of-Fit Index (AGFI) is similar to the GFI; however, it adjusts for the degrees of freedom in the specified model (i.e. accounts for parsimony). Both indices range from 0 to 1. Values close to 1 and > .90 are indicative of good fit (Hooper et al., 2008).

3.7.4 Structural equation modelling

Partial least squares (PLS) was made use of in the present study. PLS is a soft modelling approach of SEM that uses partial least squares (PLS), in contrast with the hard modelling approach of SEM, which uses maximum likelihood (Henseler, Ringle, & Sinkovics, 2009).

PLS has the advantage that it is very well suited to prediction-orientated research. Its strength lies in its exploration and prediction value, since PLS path modelling is recommended at an early stage of theoretical development in order to test and validate

exploratory models. PLS therefore has great value in explaining endogenous constructs (Henseler et al., 2009). Furthermore, when using PLS, the data is not required to be normally distributed, as the PLS approach is distribution free (Chin, 1998). This method can thus accommodate reflective, as well as formative, measurement scales, which differs from the covariance structure analysis approach.

PLS models are formally defined as two sets of linear equations, namely the inner model and the outer model. The inner model analyses the relationships among unobserved/latent variables, whereas the outer model analyses the relationships between unobserved/latent variables and their observed/manifest variables (Henseler et al., 2009). The PLS inner model is similar to the SEM structural model, whereas the PLS outer model is similar to the SEM measurement (conceptual) model.

A series of analyses need to be performed before the PLS model estimation can be done (Charoensukmongkol, 2014). First, the reliability of the latent variables was evaluated so as to estimate the measurement model fit. This was done by looking at the composite reliabilities and average variance extracted (AVE). The composite reliability value measures whether the reliability of the measurement scales is satisfactory. A composite reliability that is greater than .70 is deemed satisfactory. The AVE value measures the amount of variance in the indicator variables, explained by common factors. This value can be compared to the other reliability scores, although the AVE is a stricter measure of reliability. A value of greater than .50 indicates that the indicator variables do indeed measure the relevant construct (Pennstate, 2018).

Once the latent variable scores show evidence of sufficient reliability and validity, the structural model estimates need to be evaluated (Chin, 1998). The analysis of the structural model included testing for multicollinearity, the evaluation of the R squares, as well as evaluating and interpreting the main effects along with the moderating effects.

3.8 ETHICAL CONSIDERATIONS

According to Norkett (2013), it is crucial to assess the ethical implications of research to ensure that the dignity, safety, rights and wellbeing of the participants are protected. Ethics is typically associated with morality and deals with issues of right and wrong in society, communities and groups. Thus, it is important that everyone involved in research should be mindful of ethical concerns (Babbie, 2005). The following was

considered before conducting this study: anonymity and confidentiality, informed consent, violation of privacy, avoidance of harm, concealing of information (deception), respect for human dignity, and interpretation of data. Furthermore, participants were made aware of the fact that their participation is completely voluntary and that they have the right to withdraw from the study at any time should they so wish. Moreover, each participant was provided a consent form to sign that covered the following information: purpose of the research, confidentiality and anonymity, benefit to society, no payment for participation received, potential risks and/or discomforts, and rights of the research participant.

3.9 CHAPTER SUMMARY

Chapter 3 has delivered an explanation of the methodological choices made throughout the research process in order to obtain answers to the research-initiating question and the resultant hypotheses. In summary, the researcher made use of an *ex post facto* correlational research design to collect primary data specifically for the purpose of this research study. Non-probability convenience sampling was used to select the sample. Quantitative data was collected from health sciences students from Stellenbosch University, making use of a self-administered electronic/web-based questionnaire. The following measures were used:

- 14-item Utrecht Work Engagement Scale-Student Survey (UWES-S) (Schaufeli et al., 2002a);
- 15-item Maslach Burnout Inventory-Student Survey (MBI-S) (Schaufeli et al., 2002a);
- seven-item social support scale by Susskind et al. (2003);
- 15-item Mindfulness Attention Awareness Scale (MAAS) (Brown & Ryan, 2003);
- 14-item Genos Emotional Intelligence Inventory (Genos EI) (Palmer et al., 2009); and
- eight-item overload subscale in the Job Demands-Resources Scale (JDRS) (Rothmann et al., 2006).

Item analysis, CFA and PLS methods were used to analyse the collected data. The findings of the statistical analyses in the research and interpretations thereof are presented in the next chapter.

CHAPTER 4

RESULTS

4.1 INTRODUCTION

This chapter takes account of the results that were obtained from the data analysis by use of the statistical methods discussed in Chapter 3. Item analysis was used to determine the reliability of the various measurement instruments that were used to measure the latent variables (engagement, burnout, social support, mindfulness, emotional intelligence, and work overload). After item analysis was performed, confirmatory factor analysis (CFA) and partial least squares (PLS) (SEM) were used to confirm the fit of the measurement model and to support the reliability of the different measurement instruments. Once acceptable measurement model fit was established, PLS (SEM) was used to perform a path analysis so as to confirm the structural model fit. In addition, selected paths were supplemented by regression and multiple regression analyses. Lastly, the final scores and hypotheses were interpreted.

4.2 VALIDATING THE MEASUREMENT MODEL

4.2.1 Item analysis

An item analysis provided an initial indication of the psychometric soundness of the various measurement scales. The validity and reliability criteria[5] normally depend on the nature of the constructs included in the study, whereas item correlations evaluate the consistency between items.[6] Item correlations are a subtype of internal consistency reliability. An item analysis was performed on all items included in the questionnaire. A summary of the item analysis results for each of the measurement scales is presented in Table 4.1.

The Cronbach's alphas of internal consistency were excellent (≥ .74). This was corroborated by acceptable average inter-item correlations.

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[5] The validity and reliability criteria (Cronbach's alphas) adopted and applied in this study are considered satisfactory, i.e. ≥ .70 (Nunnally & Bernstein, 1999).

[6] Inter-item correlations are a subtype of internal consistency reliability. Values between 1.00 and > .50 are considered excellent. Values between .50 and > .00 indicate acceptable reliability (Tabachnick & Fidell, 2013).

Table 4.1

Means, Standard Deviations and Internal Consistency Reliabilities

Scale	Sample size	Number of items	Mean of scales	Standard deviation	Cronbach's α	Average inter-item correlation
Engagement	357	14	49.56	13.52	.90	.40
Burnout	357	15	35.41	16.23	.91	.42
Mindfulness	357	15	53.50	14.75	.89	.37
Emotional intelligence	357	14	49.48	7.49	.80	.23
Social support	357	7	23.00	4.88	.74	.31
Work overload	357	8	25.72	3.96	.78	.31

4.2.1.1 Engagement

The 14-item Utrecht Work Engagement Scale-Student Survey (UWES-S) produced a Cronbach's alpha coefficient of .90, which indicates exceptional internal consistency reliability. None of the individual items affected the coefficient negatively, and therefore no items were deleted. The average inter-item correlation for the total scale was .40, which indicates acceptable reliability. The item total correlations ranged between .44 and .74, with the exception of item 10 (Engage10), which produced an item total correlation of .10 (which, even though still an acceptable item total correlation, may indicate that the particular question is not discriminating that well). When considering the wording of Engage10: "I find my studies challenging", a possible explanation may be that the question is ambiguous and confusing to participants, given that it may look as though it does not "fit in" with the other, positively phrased, questions in the measuring instrument pertaining to work engagement. Removing this item, however, does not significantly increase the Cronbach's alpha. Therefore, it was decided not to remove the item from the scale (M. Kidd, personal communication, November 2, 2018).

4.2.1.2 Burnout

The 15-item Maslach Burnout Inventory-Student Survey (MBI-S) produced a Cronbach's alpha coefficient of .91, which indicates outstanding internal consistency reliability. Once again, none of the individual items affected the coefficient negatively, and therefore no items were deleted. The average inter-item correlation for the total scale was .42, which indicates acceptable reliability. The item total correlations ranged between .37 and .77.

4.2.1.3 Mindfulness

The 15-item Mindfulness Attention Awareness Scale (MAAS) attained a Cronbach's alpha coefficient of .89, which indicates excellent internal consistency reliability. None of the individual items would have increased this coefficient if they had been deleted. Therefore, no deletions were necessary. The average inter-item correlation for the 15-item MAAS was .37, which indicates acceptable reliability. The item total correlations ranged between .28 and .80.

4.2.1.4 Emotional intelligence

The 14-item Genos Emotional Intelligence Inventory (Genos EI) obtained a Cronbach's alpha coefficient of .80, which indicates excellent internal consistency reliability. None of the individual items would have increased this coefficient if they had been deleted. Therefore, no deletions were necessary. The average inter-item correlation for the 14-item Genos EI was .23, which indicates acceptable reliability. The item total correlations ranged between .36 and .56, with the exception of item 9 (EI9), which produced an item total correlation of .19. Though .19 is very close to .20, item EI9 may be slightly problematic. A possible reason for this could be that the question was mis-keyed or that it was slightly ambiguous and confusing to the participants. Removing this item, however, does not significantly increase the Cronbach's alpha. Therefore, the decision was made not to remove the item from the scale (M. Kidd, personal communication, November 2, 2018).

4.2.1.5 Social support

The seven-item scale of Susskind et al. (2003) produced a Cronbach's alpha coefficient of .74, which indicates good internal consistency reliability. Once again, none of the individual items affected the coefficient negatively, and therefore no items were deleted. The average inter-item correlation for the total scale was .31, which indicates acceptable reliability. The item total correlations ranged between .25 and .62.

4.2.1.6 Work overload

The eight-item Overload subscale of the Job Demands-Resources Scale (JDRS) obtained a Cronbach's alpha coefficient of .78, which indicates sound internal consistency reliability. None of the individual items would have increased the internal consistency reliability if they had been deleted. Thus, no item deletions were necessary.

The average inter-item correlation for the eight-item Overload subscale was .31, which indicates acceptable reliability. The item total correlations ranged between .29 and .56.

4.2.1.7 Decision regarding the reliability of latent variables

The preceding item analysis aimed to evaluate the functioning of each latent variable and to assess the psychometric integrity of the indicator variables of each latent variable. The results of the item analysis provide sufficient and satisfactory evidence to support the inclusion of all the items in the measurement instruments. The items were all found to be reliable and internally consistent. The Cronbach's alpha coefficients were all excellent (≥ .74). There were no poor individual items that would significantly increase the Cronbach's alpha coefficient upon deletion, thus no item deletions were deemed necessary or practical. The average inter-item correlations of the scales ranged between .23 and .42. These results are acceptable. Overall, the item analysis results were found to be satisfactory. Consequently, the subsequent analyses were performed and are reported.

4.3 CONFIRMATORY FACTOR ANALYSIS (CFA)

A confirmatory factor analysis (CFA) was conducted to determine the fit of the measurement instruments. The purpose of the CFA was to investigate the goodness of fit between the measurement model and the obtained data by testing the hypotheses of exact fit (RMSEA = .00) and close fit (RMSEA ≤ .05). The root mean square error of approximation (RMSEA) value indicates the discrepancy between the observed population co-variance matrix and the estimated population co-variance matrix implied by the measurement model per degree of freedom (Hooper et al., 2008). Typically, good model fit is indicated by values smaller than .05, reasonable fit by values between .05 and .08, and mediocre fit by values between .08 and .10. Values that are larger than .10 indicate poor fit (Diamantopoulos & Siguaw, 2000; Kelloway, 1998).

The researcher investigated the goodness-of-fit statistics, supplemented by the GFI and AGFI values. The Goodness-of-Fit Index (GFI) measures the amount of variance and covariance explained by the model compared with the null model. The GFI is an absolute measure. (Diamantopoulos & Siguaw, 2000). The Adjusted Goodness-of-Fit Index (AGFI) is similar to the GFI, although it adjusts for the degrees of freedom in the specified model (i.e. accounts for parsimony). Both indices range from 0 to 1. Values close to 1 and > .90 are indicative of good fit (Hooper et al., 2008).

Table 4.2

Goodness-of-Fit Statistics

Degrees of freedom	2 540
Satorra-Bentler scaled chi-square	7 680.55 (p = .00)
Root mean square error of approximation (RMSEA)	.075
90% confidence interval for RMSEA	.073; .077
P-value for test of close fit (RMSEA < .05)	.00
Comparative Fit Index (CFI)	.92
Goodness-of-Fit Index (GFI)	.94
Adjusted Goodness-of-Fit Index (AGFI)	.94

The goodness-of-fit statistics show a Satorra-Bentler chi-square value of 7 680.55 (p = .00). The null hypothesis of exact model fit (RMSEA = .00) was therefore rejected. The null hypothesis for close model fit (RMSEA < .05) was also rejected based on the fact that the RMSEA value was equal to .075. The measurement model did however prove to fit reasonably well (.05 < RMSEA < .08). The GFI (.94) and AGFI (.94) values echoed good model fit. The goodness-of-fit statistics were therefore deemed to be acceptable. In conclusion, although some of the items appeared to be somewhat problematic, the model showed reasonable, and thus acceptable, fit.

4.4 PARTIAL LEAST SQUARE (PLS) ANALYSIS

Chin (1998) recommends a two-step process when using the PLS approach to SEM. Firstly, the measurement model needs to be evaluated. Thereafter, the structural model needs to be evaluated. The structural model refers to the structural component of the model. The evaluation of the measurement model aims to determine the measurement quality of the constructs that will be used in the evaluation of the inner model. Once the reliability of each measurement scale has been confirmed, path coefficients are examined to determine the strength and significance of the hypothesised paths. In other words, once measurement model fit is established, the significance of the relationships among the variables can be tested and evaluated so as to confirm the fit of the structural model.

4.4.1 Evaluation of the measurement model

The reliability analysis aims to examine the measurement model fit, as well as the reliability of the measurement scales. To evaluate and interpret the reliabilities of each latent variable, the composite reliability and average variance extracted (AVE) were

used. The composite reliability value measures whether the reliability of the measurement scales is satisfactory. A composite reliability that is greater than .70 is deemed satisfactory. The composite reliability of each latent variable was greater than .70 (≥ .83) and is thus concluded to be satisfactory.

The AVE value measures the amount of variance in the indicator variables, explained by common factors. This value can be compared to the other reliability scores, although the AVE is a stricter measure of reliability. A value of greater than .50 indicates that the indicator variables do indeed measure the relevant construct (Pennstate, 2018). Most of the AVE values were close to .50, but were all found to be below .50. This indicates that these constructs explained slightly less than 50% of the variance in the items, which could lead one to question the reliability of the measurement scales to some extent. Ideally, one would want the constructs to explain more than 50% of the variance in the items. The reliability statistics can be found in Table 4.3.

Table 4.3

Reliability Statistics of the PLS Model

Scale	Composite reliability	AVE
Engagement	.91	.45
Burnout	.92	.45
Mindfulness	.91	.42
Emotional intelligence	.84	.28
Social support	.79	.40
Work overload	.83	.39

Additional analyses were performed in order to establish the *construct validity*. Construct validity refers to the degree to which a scale measures what it is supposed to measure. In addition, the *discriminant validity* was tested by using the heterotrait-monotrait ratio. A heterotrait-monotrait value of below .90 indicates that discriminant validity has been established between two reflective constructs. Discriminant validity was found between all the constructs. It is evident that all the scales passed the test and therefore it can be concluded that all the constructs are unique and not highly correlated with the other constructs.

4.4.1.1 Outer loadings

The final analysis of reliability of the items included in the scales involved investigating the outer loadings to see whether they were significant. The factor loadings were evaluated by looking at whether zero falls within the 95% confidence interval. If zero does fall within the interval, the factor loadings would not be statistically significant; if zero does not fall within this interval, the factor loadings are significant.

Table 4.4 illustrates the strength of the relationships among the latent variables and the relevant items measuring them in the survey. It can be concluded that the paths between items and their relevant latent variables engagement, burnout, social support, mindfulness, emotional intelligence and work overload were all statistically significant, with the exception of Engage10 and SS2. The statistically significant results are indicated by zero falling outside the 95% confidence interval. This confirms the reliability of each item included in the measurement scales. The results of Engage10 and SS2, however, indicated that zero fell within the 95% confidence interval and they were thus not significant. Consequently, items Engage10 and SS2 seem to be problematic. Engage10 was also deemed problematic in the item analysis. However, the item analysis did not indicate that SS2 was a problem. The researcher had to bear these findings in mind when inferences were made about the results that included these items.

Table 4.4

Outer Loadings

Latent variables	Path	Loading	95% confidence interval (lower)	95% confidence interval (upper)	Significance
Engagement	Engage1 → Engagement	.74	.69	.79	Significant
	Engage2 → Engagement	.62	.53	.70	Significant
	Engage3 → Engagement	.76	.71	.81	Significant
	Engage4 → Engagement	.78	.74	.82	Significant
	Engage5 → Engagement	.61	.53	.68	Significant
	Engage6 → Engagement	.80	.75	.84	Significant
	Engage7 → Engagement	.81	.77	.85	Significant
	Engage8 → Engagement	.83	.80	.86	Significant
	Engage9 → Engagement	.70	.63	.75	Significant
	Engage10 → Engagement	.08	-.06	.21	Not significant
	Engage11 → Engagement	.43	.31	.54	Significant
	Engage12 → Engagement	.54	.43	.62	Significant
	Engage13 → Engagement	.66	.59	.73	Significant

	Engage14 → Engagement	.64	.56	.71	Significant
Burnout	Burn1 → Burnout	.70	.62	.76	Significant
	Burn2 → Burnout	.67	.60	.72	Significant
	Burn3 → Burnout	.77	.72	.81	Significant
	Burn4 → Burnout	.79	.74	.83	Significant
	Burn5 → Burnout	.77	.72	.81	Significant
	Burn6 → Burnout	.82	.77	.85	Significant
	Burn7 → Burnout	.81	.76	.85	Significant
	Burn8 → Burnout	.72	.65	.78	Significant
	Burn9 → Burnout	.59	.52	.67	Significant
	Burn10 → Burnout	.43	.32	.53	Significant
	Burn11 → Burnout	.57	.48	.65	Significant
	Burn12 → Burnout	.57	.48	.65	Significant
	Burn13 → Burnout	.55	.44	.63	Significant
	Burn14 → Burnout	.49	.38	.59	Significant
	Burn15 → Burnout	.70	.63	.75	Significant
Social support	SS1 → Social support	.39	.19	.55	Significant
	SS2 → Social support	.10	-.12	.28	Not significant
	SS3 → Social support	.28	.07	.46	Significant
	SS4 → Social support	.89	.86	.91	Significant
	SS5 → Social support	.75	.68	.81	Significant
	SS6 → Social support	.89	.86	.91	Significant
	SS7 → Social support	.62	.50	.70	Significant
Mindfulness	M1 → Mindfulness	.39	.27	.50	Significant
	M2 → Mindfulness	.54	.43	.62	Significant
	M3 → Mindfulness	.72	.66	.77	Significant
	M4 → Mindfulness	.52	.41	.61	Significant
	M5 → Mindfulness	.58	.48	.66	Significant
	M6 → Mindfulness	.32	.19	.44	Significant
	M7 → Mindfulness	.80	.75	.84	Significant
	M8 → Mindfulness	.83	.79	.87	Significant
	M9 → Mindfulness	.67	.59	.74	Significant
	M10 → Mindfulness	.82	.77	.86	Significant
	M11 → Mindfulness	.62	.52	.69	Significant
	M12 → Mindfulness	.61	.53	.68	Significant
	M13 → Mindfulness	.64	.56	.70	Significant
	M14 → Mindfulness	.84	.80	.88	Significant
	M15 → Mindfulness	.53	.42	.61	Significant
Emotional intelligence	EI1 → Emotional intelligence	.58	.49	.65	Significant
	EI2 → Emotional intelligence	.37	.24	.50	Significant
	EI3 → Emotional intelligence	.52	.41	.61	Significant
	EI4 → Emotional intelligence	.63	.55	.70	Significant

	EI5 → Emotional intelligence	.56	.46	.64	Significant
	EI6 → Emotional intelligence	.60	.49	.68	Significant
	EI7 → Emotional intelligence	.52	.40	.61	Significant
	EI8 → Emotional intelligence	.60	.49	.68	Significant
	EI9 → Emotional intelligence	.18	.04	.03	Significant
	EI10 → Emotional intelligence	.60	.50	.68	Significant
	EI11 → Emotional intelligence	.59	.50	.66	Significant
	EI12 → Emotional intelligence	.44	.31	.54	Significant
	EI13 → Emotional intelligence	.38	.22	.50	Significant
	EI14 → Emotional intelligence	.69	.62	.75	Significant
Work overload	WO1 → Work overload	.75	.68	.80	Significant
	WO2 → Work overload	.67	.58	.74	Significant
	WO3 → Work overload	.54	.41	.65	Significant
	WO4 → Work overload	.50	.36	.61	Significant
	WO5 → Work overload	.35	.18	.50	Significant
	WO6 → Work overload	.69	.62	.75	Significant
	WO7 → Work overload	.63	.52	.72	Significant
	WO8 → Work overload	.74	.67	.79	Significant

Engage = Engagement, Burn = Burnout, SS = Social support, M = Mindfulness, EI = Emotional intelligence, WO = Work overload

Consequently, the results indicate that all the measurement scales were deemed statistically significant (with the exception of two items). This confirms the reliability of all but two of the items included in these measurement scales.

4.4.2 Evaluation of the structural model

The partial structural model was analysed to determine the quality of the relationships among the variables that were used in the survey. The PLS structural model analysis aimed to determine to what extent the latent variables were related to one another. The relationship and influence of the exogenous variables on the endogenous variables, and the endogenous variables on one another were determined. The partial structural model is also referred to as the "inner model", as it determines factors inside the structural model (M. Kidd, personal communication, November 2, 2018). The analysis of the structural model included testing for multicollinearity, evaluation of the R squares, as well as evaluating and interpreting the main effects along with the moderating effects.

4.4.2.1 Multicollinearity

Many predictor variables are typically present during the regression analysis and one must assume that they are all uncorrelated with one another. However, sometimes the predictor variables correlate too highly with one another, which results in unstable regressions determined by the estimated coefficients. Thus, a test for multicollinearity was performed by using a variance inflation factor (VIF). VIFs measure how much the variance of the estimated regression coefficients is inflated compared to when the predictor variables are not linearly related. This information is used to describe how much multicollinearity (correlation between predictors) exists in a regression analysis. Multicollinearity is problematic because it can increase the variance of the regression coefficients, making them unstable and difficult to interpret.

Various recommendations for acceptable levels of VIF have been published in the literature. A VIF value of 10 has most commonly been recommended as a maximum level (Pennstate, 2018). This corresponds with the tolerance recommendation of .10 (i.e. 1 / .10 = 10). Nevertheless, maximum recommended VIF values of 4 and 5 have also been found in the literature (Pennstate, 2018). For the purposes of the present study, a maximum VIF value of 5 was used. Thus, VIF values above 5 would be considered problematic (M. Kidd, personal communication, November 2, 2018). All the VIF scores were below 5 and thus no indication was found of multicollinearity problems.

4.4.2.2 Evaluation of the R square

The R square value determines how much variance in the endogenous variables is explained by the exogenous variables. The R square values for the endogenous variables were: Engagement = .67 and Burnout = .58. This indicates that 67% of the variance in Engagement can be explained by the effect of exogenous variables. Moreover, 58% of the variance in Burnout can be explained by the effect of exogenous variables.

4.4.2.3 Evaluation of the main effects

An important consideration is that PLS path modelling aims to facilitate prediction, not to test a theory (Henseler et al., 2009). Once the reliability of each latent variable instrument was established, the researcher examined the path coefficients to determine the strength and significance of the hypothesised relationships. A coefficient is

considered significant when zero falls outside the confidence interval, and not significant when zero falls within the confidence interval (Davison, Hinkley, & Young, 2003).

Table 4.5 indicates whether the path coefficients were significant or not. Path coefficients were investigated by determining whether zero fell within the 95% confidence interval in order to determine the strength and significance of the hypothesised paths, as proposed in the structural model (Figure 3.1).

Table 4.5

Path Coefficients between Variables

Path	Path coefficient	95% confidence interval (lower)	95% confidence interval (upper)	Description
H1: B → E	-.72	-.81	-.64	Significant
H2: SS → E	.10	.02	.18	Significant
H3: M → E	.02	-.04	.09	Not significant
H4: EI → E	.07	-.01	.15	Not significant
H5: WO → B	.27	.21	.35	Significant

E = Engagement, B = Burnout, SS = Social support, M = Mindfulness, EI = Emotional intelligence, WO = Work overload

Hypothesis 1: Burnout (η_2) has a significant, negative influence on engagement (η_1)

The hypothesised negative relationship between engagement and burnout was found to be statistically *significant* (PLS path coefficient = -.72), with zero falling outside the 95% confidence interval. This corroborates previous research endeavours that studied this relationship (Langelaan et al., 2006; Schaufeli & Bakker, 2004). According to the results of this study, it is evident that health sciences students who are experiencing burnout are highly unlikely to experience engagement.

Hypothesis 2: Social support (ξ_1) has a significant, positive influence on engagement (η_1)

The hypothesised positive relationship between social support and engagement was found to be statistically *significant*. The PLS path coefficient was equal to .10, with zero falling outside the 95% confidence interval. This result supports previous research

endeavours that studied this relationship (Bakker & Demerouti, 2007, 2008; Nasurdin et al., 2018). In conclusion, the results indicate that health sciences students experiencing social support are likely to experience a greater sense of engagement than those who are not experiencing social support. Not only has this finding contributed to research on social support and engagement, but it has also contributed to the research done on the relationship between social support and engagement specifically within the healthcare education environment.

Hypothesis 3:   Mindfulness (ξ_2) has a significant, positive influence on engagement (η_1)

The hypothesised positive relationship between mindfulness and engagement was found *not to be significant* (PLS path coefficient = .02), with zero falling within the 95% confidence interval. This result is in contrast to previous research endeavours that studied this relationship (Coo & Salanova, 2018; Schaufeli & Salanova, 2011). Consequently, mindfulness in health sciences students will not necessarily lead to an increase in the level of engagement experienced by these students. The reason for this insignificant finding might be the small sample size used in the study. The low AVE score of the mindfulness scale should also be taken into consideration.

Hypothesis 4:   Emotional intelligence (ξ_3) has a significant, positive influence on engagement (η_1)

The hypothesised positive relationship between emotional intelligence and engagement was found *not to be significant.* The PLS path coefficient was .07, with zero falling within the 95% confidence interval. This result is in contrast to previous research endeavours that studied this relationship (Pérez-Fuentes et al., 2018; Zhu et al., 2015). Consequently, emotional intelligence in health sciences students will not necessarily lead to an increase in the level of engagement experienced by these students. Once again, the reason for this insignificant finding might be the small sample size used in the study. The low AVE score of the emotional intelligence scale should furthermore be taken into consideration.

Hypothesis 5:   Work overload (ξ_4) has a significant, positive influence on burnout (η_2)

The hypothesised positive relationship between work overload and burnout was found to be statistically *significant*. The PLS path coefficient was equal to .27, with zero falling outside the 95% confidence interval. This result supports previous research endeavours that studied this relationship (Avanzi et al., 2018; Ziaei et al., 2015). In conclusion, the results indicate that health sciences students experiencing work overload are more likely to experience burnout than those who are not experiencing work overload. Not only has this finding contributed to research on work overload and burnout, but it has also contributed to the research done on the relationship between work overload and burnout specifically within the healthcare education environment.

4.4.2.4 Evaluation of the proposed moderating hypotheses

The researcher used path coefficients to determine the strengths, significance and direction of the hypothesised moderating effects in the structural model. The significance of a hypothesised path is determined by whether zero is present between the values of the lower and upper confidence intervals. The analysis was done using a 95% confidence interval, similar to what was explained earlier. The data used to determine the relationships of the hypotheses is presented in Table 4.6.

Table 4.6

Moderating Path Coefficients

Path	Path coefficient	95% confidence interval (lower)	95% confidence interval (upper)	Description
H6: SS*WO → B	-.06	-.11	.00	Not significant
H7: M*WO → B	.02	-.04	.08	Not significant
H8: EI*WO → B	.02	-.05	.08	Not significant
H9: WO*SS →E	.08	.02	.14	Significant
H10: WO*M→E	.00	-.06	.06	Not significant
H11: WO*EI → E	-.09	-.14	-.03	Significant
E = Engagement, B = Burnout, SS = Social support, M = Mindfulness, EI = Emotional intelligence, WO = Work overload				

Hypothesis 6:   Social support (ξ_1) has a significant (negative) moderating effect on the relationship between work overload (ξ_4) and burnout (η_2)

When the moderating effect of social support on the relationship between work overload and burnout was tested in PLS, the hypothesised moderating effect was found to be *not statistically significant*. The PLS path coefficient was equal to -.06, with zero falling within the 95% confidence interval, which indicates that social support does not have a statistically significant moderating effect on the relationship between work overload and burnout in this study. The exact information on the confidence of the lower and upper intervals is provided in Table 4.6.

Hypothesis 7:   Mindfulness (ξ_2) has a significant (negative) moderating effect on the relationship between work overload (ξ_4) and burnout (η_2)

When the moderating effect of mindfulness on the relationship between work overload and burnout was tested in PLS, the hypothesised moderating effect was found to be *not statistically significant*. The PLS path coefficient was equal to .02, with zero falling within the 95% confidence interval. This means that mindfulness did not have a statistically significant moderating effect on the relationship between work overload and burnout in this study. The exact information on the confidence of the lower and upper intervals is provided in Table 4.6.

Hypothesis 8:   Emotional intelligence (ξ_3) has a significant (negative) moderating effect on the relationship between work overload (ξ_4) and burnout (η_2)

When the moderating effect of emotional intelligence on the relationship between work overload and burnout was tested in PLS, the hypothesised moderating effect was found to be *not statistically significant*. The PLS path coefficient was equal to .02, with zero falling within the 95% confidence interval. This means that emotional intelligence did not have a statistically significant moderating effect on the relationship between work overload and burnout in this study. The exact information on the confidence of the lower and upper intervals is provided in Table 4.6.

Hypothesis 9:   Work overload (ξ_4) has a significant (positive) moderating effect on the relationship between social support (ξ_1) and engagement (η_1)

When the moderating effect of work overload on the relationship between social support and engagement was tested in PLS, the hypothesised moderating effect was found to be statistically *significant*. The PLS path coefficient was equal to .08, with zero falling outside the 95% confidence interval. This indicates that work overload had a statistically significant moderating effect on the relationship between social support and engagement in this study. The exact information on the confidence of the lower and upper intervals is provided in Table 4.6. Furthermore, Figure 4.1 portrays a range plot of the moderating effect that high work overload versus low work overload has on the relationship between social support and engagement. Based on Figure 4.1, one can see that the positive relationship between social support and engagement is much stronger when work overload is high, as indicated by a steeper (red) curve, versus when work overload is low, as indicated by the flatter (blue) curve.

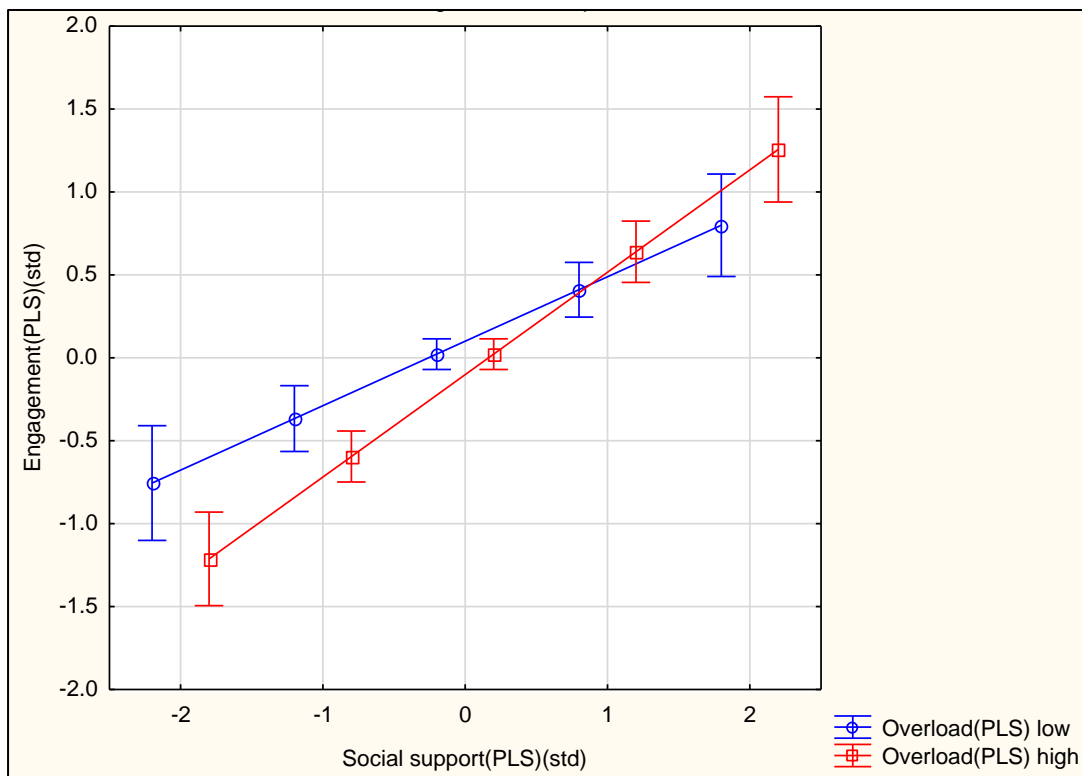*Figure 4.1*. Range plot portraying the interaction effect of work overload and social support on engagement

Hypothesis 10:   Work overload (ξ_4) has a significant (positive) moderating effect on the relationship between mindfulness (ξ_2) and engagement (η_1)

When the moderating effect of work overload on the relationship between mindfulness and engagement was tested in PLS, the hypothesised moderating effect was found to be *not statistically significant*. The PLS path coefficient was equal to .00, with zero falling within the 95% confidence interval. This indicates that work overload did not have a statistically significant moderating effect on the relationship between mindfulness and engagement in this study. The exact information on the confidence of the lower and upper intervals is provided in Table 4.6.

Hypothesis 11: Work overload (ξ_4) has a significant (positive) moderating effect on the relationship between emotional intelligence (ξ_3) and engagement (η_1)

When the moderating effect of work overload on the relationship between emotional intelligence and engagement was tested in PLS, the hypothesised moderating effect was found to be statistically *significant*. The PLS path coefficient was equal to -.09, with zero falling outside the 95% confidence interval. This means that work overload had a statistically significant moderating effect on the relationship between emotional intelligence and engagement in this study. It is important, however, to note that this relationship was negative, rather than positive as suggested by the JD-R theory. Therefore, this significant path was in contradiction to previous research because it had a dampening effect on engagement instead of an amplifying effect. The exact information on the confidence of the lower and upper intervals is provided in Table 4.6.

Hypotheses 6 to 8 were all found to contradict the findings of previous research (Bakker et al., 2014), which states that job and personal resources cushion the impact of job demands on job strain/burnout. Consequently, the relationship between work overload and burnout experienced by health sciences students at Stellenbosch University is not weaker for those students enjoying a high degree of job resources (i.e. social support) and who exhibit a high level of personal resources (i.e. mindfulness and emotional intelligence). The first buffering/moderating/interaction effect, as explained in Chapter 2, therefore seems not to have had any impact on the relationship between work overload and burnout. There may be numerous reasons for these insignificant paths. The results could potentially have been influenced by the small sample size on which the study was conducted. Furthermore, limited studies were found on the specific variables of interest and their interaction effects. Consequently, conducting more research on the specific job

and personal resources, including their interaction/moderating effects on the relationship between work overload and burnout will be of value.

Hypotheses 9 to 11 tested the second interaction effect, as was explained in Chapter 2, in which job demands intensify the effect that job and personal resources have on engagement. Even though two of the paths were found to be statistically significant, one of the significant paths were in contradiction with previous research because it had a dampening effect on engagement instead of an amplifying effect. Therefore, two of the three hypotheses are found to differ from previous research findings (Bakker et al., 2014), whereas the one dovetails with past findings. These research findings state that job resources and personal resources become salient and have the strongest positive impact on work engagement when job demands are high. This confirms that, when health sciences students are faced with challenging job demands, some (but not all) of the resources will become especially valuable. In this study, the job resource social support was found to become valuable in the face of work overload when determining engagement among health sciences students. However, the same could not be said of the personal resources, mindfulness and emotional intelligence.

Consequently, as the findings suggest, work overload will amplify the impact that job resources (in this case, social support) will have on the level of work engagement experienced by health sciences students. Concerning the insignificant and contradictory paths pertaining to engagement and burnout, this could be due to the small sample size obtained for this study, which could have influenced the results. Furthermore, there is minimal previous research on the specific demands and resources, and their interaction effects as described by the JD-R theory (Bakker & Demerouti, 2018). It will thus be beneficial to conduct more research on the specific demands and resources, and their interaction effects on the relationship with engagement and burnout.

4.4.2.5 Additional significant relationships

Noteworthy additional paths that were not hypothesised in the original model were found. Specifically, social support, mindfulness and emotional intelligence were found to have statistically significant negative relationships with burnout. Likewise, and interestingly, work overload was found to have a statistically significant positive relationship with engagement. This could possibly contribute to an extension of the JD-R theory where resources are potentially strong direct negative contributors to burnout and

demands are potentially strong direct contributors to engagement. However, more research would need to be conducted on the additional paths. The path coefficients and confidence intervals of the additional significant paths are presented in Table 4.7.

Table 4.7

Additional Path Coefficients between Variables

Path	Path coefficient	95% confidence interval (lower)	95% confidence interval (upper)	Significance
SS → B	-.27	-.34	-.19	Significant
M → B	-.10	-.17	-.04	Significant
EI → B	-.39	-.46	-.32	Significant
O → E	.08	.01	.15	Significant

E = Engagement, B = Burnout, SS = Social support, M = Mindfulness, EI = Emotional intelligence, WO = Work overload

4.5 CHAPTER SUMMARY

This chapter aimed to provide and interpret the results of the different statistical analyses performed in this study. First, the researcher validated the measurement model through item analysis and CFA. Thereafter, the item reliabilities from each measurement scale were investigated by using PLS. This was followed by an analysis of the structural model in order to determine the quality of the relationships between the variables of interest. After this, the researcher interpreted the final scores and hypothesised relationships (of the main and moderating effects). Lastly, additional significant path findings were stated.

The measurement scales were all found to be satisfactory. However, the AVE values all fell below .50, which could, to some extent, bring the reliability of the scales into question. It is important to note, however, that no individual items were removed after the item analysis was conducted, and no subscales or items were removed subsequent to CFA. No item deletions were deemed necessary, and thus the results could be interpreted exactly as they were gathered by the research questionnaire.

From the 11 hypotheses formulated for the study, five of the paths were found to be significant, although only four supported the JD-R theory. It is important to note that four of the insignificant paths were related to the moderating effects (the fifth being significant, but not supporting the JD-R theory – hypothesis 11). Hypotheses 3 and 4

were also found not to be significant. There may be various reasons for the insignificant paths. Nevertheless, hypotheses 1, 2, 5 and 9 were all found to be statistically significant and supported the JD-R theory (Bakker & Demerouti, 2018). Additional paths were also found that could contribute to an extension of the JD-R theory. However, more research would have to be conducted on the additional paths.

Chapter 5 outlines the practical implications of the study in order to assist South African industrial psychologists, lecturers and the health sciences education system to address problems related to the research findings. The limitations, together with recommendations for future research, are discussed.

CHAPTER 5

PRACTICAL IMPLICATIONS, RECOMMENDATIONS AND LIMITATIONS

5.1 INTRODUCTION

A contextualisation of the current research study, as well as an overview of the research-initiating question and the research objectives, was provided in Chapter 1. In Chapter 2, a detailed literature review of the variables of interest to the study was provided, and the hypotheses derived from the literature were discussed. In Chapter 3, the relevant methodology, sample characteristics and statistical analyses were explained. Chapter 4 discussed the results, the scores of the participants, and the outcomes of the hypotheses. This final chapter outlines the practical implications to assist South African industrial psychologists, lecturers and the healthcare education system in addressing problems related to the research findings discussed in Chapter 4. The results will be extended to the basic JD-R theory and will evaluate to what degree this study's findings agree with the theory. Furthermore, the limitations of the study, together with recommendations for future research, are discussed.

5.2 DISCUSSION

The main goal of this study was to test the complete structural JD-R model using the hypothesised relationships between the variables of interest, and to determine the levels of job resources, personal resources, job demands, engagement and burnout of a sample of health sciences students at Stellenbosch University. In addition, the researcher aimed to highlight the results and practical implications of the research outcomes and to recommend interventions for Stellenbosch University that could increase or decrease the respective variables with the aim to increase the wellbeing of health sciences students. A reflection on the research objectives allowed the researcher to conclude that the objectives were met in this study.

The research-initiating question asked: "Why is there variance in the wellbeing (engagement and burnout) of health sciences students at Stellenbosch University?" From the 11 hypotheses for the study, five were found to be statistically significant and four supported the research. However, four of the six insignificant paths were related to the moderating effects. These insignificant paths may be explained by many reasons. The results could potentially have been influenced by the small sample size on which

the study was conducted. Furthermore, very little research was found on the specific variables and their interaction effects. Accordingly, more research on the interaction effects of the specific job resources, personal resources and job demands used in this study needs to be conducted.

Furthermore, hypotheses 3 and 4 were found to be not significant. Hypothesis 3 inspected the positive relationship between mindfulness and engagement. The results show that mindfulness has no significant impact on the engagement of health sciences students. However, an additional path was found that indicates that mindfulness has a significant, negative impact on health sciences students' levels of burnout. Likewise, hypothesis 4 proposed a positive relationship between emotional intelligence and engagement. Once again, it was found that emotional intelligence has no significant relationship with levels of engagement in health sciences students. However, an additional path was found in the model that indicated that emotional intelligence has a significant, negative relationship with burnout levels in health sciences students. Given these findings, however, the study seems to agree with past research (e.g. Maslach & Leiter, 1997) in the sense that work engagement is a distinct construct that is independent of job burnout.

Hypotheses 1, 2, 5 and 9 were all found to be supported by the research findings and therefore also to support the JD-R theory (Bakker & Demerouti, 2018). Hypothesis 11 yielded a statistically significant path coefficient, but indicated that the interaction had a dampening effect on engagement, as opposed to an amplifying effect as was suggested by the research. Therefore, even though Hypothesis 11 had a significant path coefficient, the negative relationship was not in line with the JD-R theory. Nonetheless, the supported hypotheses indicate that interventions need to be put in place for health sciences students to cope better with the job demands present in their environment. The functioning of job resources and personal resources explored in this study should be taken into consideration by educators and management so that suitable interventions can be developed in order to foster these resources in the pursuit of increasing engagement and decreasing burnout, and thereby optimising the wellbeing of health sciences students.

5.3   LIMITATIONS AND RECOMMENDATIONS

Several limitations exist in spite of the contributions made by this study. Importantly though, the results discussed in Chapter 4 are not significantly undermined by these limitations. Nonetheless, these limitations provide guidelines for the areas on which future studies can improve.

To start off, although the sample of 357 health sciences students was satisfactory, the results of the study would have been more credible if a larger sample was obtained. The small sample size could be cause for concern when considering generalisability, as well as the validity of the inferences made about health sciences students as a population. The use of LISREL was also limited due to the sample size and complexity of the structural model. Additionally, the limited sample size could be a potential reason for the absence of practically significant relationships between some of the variables, which have been proven to have practically significant relationships in other studies. It is thus recommended that future studies strive to obtain a larger sample from a variety of healthcare training institutions.

Furthermore, given that this study focuses on only one training institution (viz. Stellenbosch University), the results cannot be generalised to the larger population. For future studies, perhaps a stratified random sample should be obtained from a number of universities across South Africa that will be more representative and can be generalised. It could potentially also be of value to test this model on other students and not only on health sciences students.

Moreover, there may be more important predictors of health sciences student wellbeing that were not included in this study. These variables may yield results that are more statistically significant. There are many possible factors that may have a significant influence on the endogenous variables included in this study, including personal and environmental factors (Bakker, Albrecht, & Leiter, 2011). This limitation can be circumvented by exploring the possible inclusion of other (theoretically sensible) variables in the JD-R model to explain engagement and burnout among health sciences students. Therefore, future research endeavours can expand on the model in this study.

In addition, the study relied on self-report data. A typical weakness associated with self-report data is that of impression management or method bias. Self-report questionnaires

pose the risk that participants manipulate their answers in order to portray themselves in a positive light, or at least attempt to do so. Consequently, exclusively using self-report questionnaires can cause the predictor correlations to be artificially affected (Avey, 2014). Therefore, it is advisable that future researchers consider incorporating objective measurement instruments to measure the variables. However, in such an event it is important to be mindful of the disadvantages associated with objective measures. These disadvantages include egocentric and observational bias, which could influence the reliability and validity of the measures.

Finally, this study took the form of a cross-sectional research study that allowed only for a 'snapshot' to be taken of the studied phenomenon. This prevents the drawing of causal conclusions by the researcher (Taris & Kompier, 2006). Instead, one could consider conducting a longitudinal study with multiple time waves or a diary design in order to improve the accuracy and consistency of the research findings. This would not only allow the researcher to draw more definitive conclusions, but it would also allow the researcher to identify recurring patterns of behaviour among health sciences students, as well as changes over time.

5.4 PRACTICAL IMPLICATIONS

It has become evident that engagement and burnout develop as a result of intricate interactions. Job demands and resources need to be combined in a manner that will allow their interaction to lead to engagement rather than burnout in health sciences students. JD-R theory distinctly explains the various interactions between job demands and resources, and their associated outcomes (Bakker & Demerouti, 2008). *Apathy* results from a combination of low demands paired with low resources. *Burnout* is caused by high demands combined with low resources. *Boredom* is caused by low demands paired with high resources. Finally, *engagement* results from a combination of both high demand as well as high resources. This is in line with the motivational goal-setting theory of Latham and Locke (2006), which proposes that motivation and effort exerted to attain a goal are high to the degree that the set goal is difficult. Since the job demands in healthcare education are high, health sciences students need to draw on their available personal and job resources so as to effectively manage the challenges set by the high job demands (i.e. work overload).

The JD-R model was used as the basis of this study, for which it was proposed that job resources and personal resources buffer the impact of demands on burnout to ensure that engagement and wellbeing are achieved. Accordingly, the focus should be placed on identifying interventions that will enhance students' engagement and decrease their levels of burnout so as to optimise their levels of wellbeing. The findings of this study show how the job and personal resources (social support, mindfulness, and emotional intelligence) lead to either increased engagement or decreased burnout, or in some instances to both increased engagement and decreased burnout, in the face of high job demands (i.e. work overload). Therefore, it is recommended that these resources be incorporated in interventions aimed at enhancing the wellbeing (i.e. increasing engagement and decreasing burnout) of health sciences students. The proposed implications are based on the findings of the study.

The structure of the proposed implications is as follows: first, general implications are provided that can be implemented by the healthcare education system, lecturers and industrial psychologists to address typical problems associated with healthcare education. Thereafter, implications to address specific interventions are provided that are geared towards the problems that became evident from the statistical outcomes of the health sciences student sample in the present study.

5.2.1   General implications for health sciences students

Due to the high level of burnout experienced by health sciences students, the healthcare education system could focus on how healthcare educators can reduce the level of job burnout experienced by health sciences students and consider how to equip them in a way that enables them to manage their job stress more effectively. Healthcare educators are encouraged to improve social support (i.e. job resources) and manage job demands within the environment in order to enhance engagement and prevent burnout among students. Another crucial area of intervention that can be taken into account by healthcare training institutions is that of appropriate and adequate coping skills (i.e. personal resources) (Bakker & Demerouti, 2008).

It is recommended that training institutions ensure the availability of job resources on a continuous basis and that they support health sciences students with their personal resources through relevant training. Bakker and Demerouti (2014) provide insight into general JD-R interventions, namely (a) job redesign, (b) job crafting, (c) training, and (d)

strengths-based interventions. Figure 5.1 specifies the intervention target and intervention level of each of the interventions.
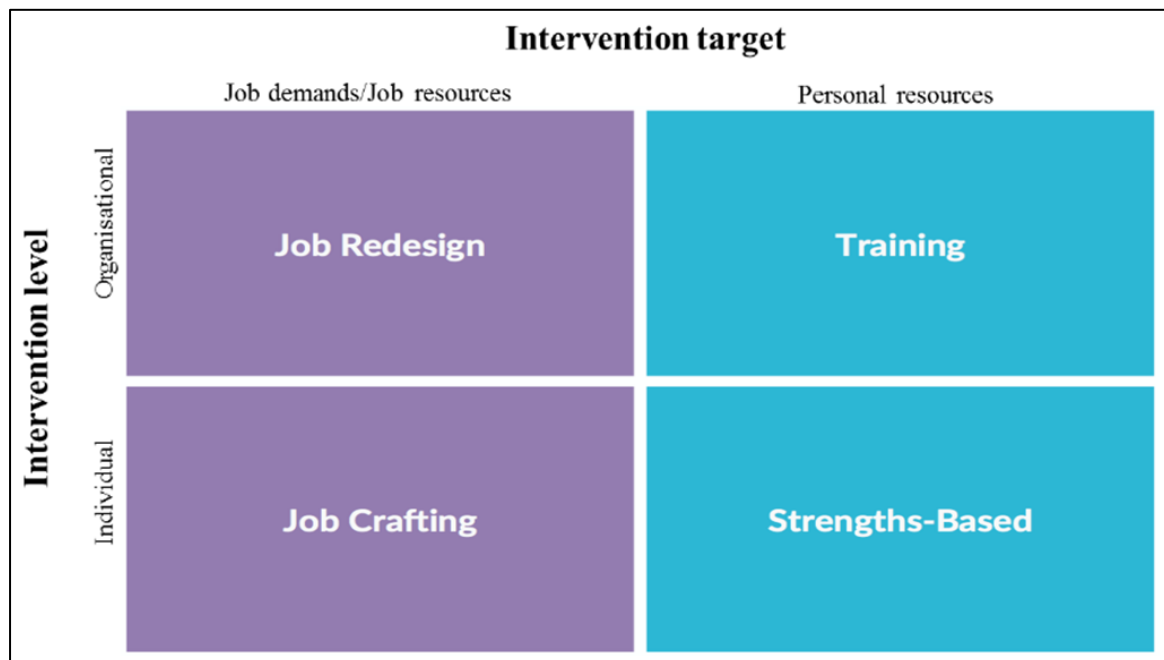

Figure 5.1. JD-R interventions (Bakker & Demerouti, 2014)

5.2.1.1 Job redesign

Job-redesign is an organisation-level structural intervention that aims to address the work environment by proposing job resources and/or job demands. Resourceful, yet challenging, work environments have consistently been found in the JD-R literature to facilitate high job performance and work engagement (Bakker, 2011; Bakker & Demerouti, 2014). This suggests that workplaces should strive to offer their workers sufficient resources for challenging demands.

The hypothesised relationship between work overload (job demand) and burnout was found to be statistically significant (PLS path coefficient = .27). This research finding indicates a strong, positive relationship between work overload and burnout. Consequently, it is important to focus on work overload by implementing interventions in order for health sciences students to deal better with this hindrance demand. However, it is not always possible to eliminate work overload, as overload for one person may not be perceived as such by another. Instead, in such an instance it is important to introduce interventions in the training institution that will help health sciences students to better

cope with the work overload that they experience. An example includes teaching students to combine challenging demands with sufficient job resources.

Consistent with the above, Bakker et al. (2014) suggest two interventions to decrease job demands or increase job resources so as to reduce negative outcomes resulting from job demands. These interventions can broadly be summarised as job redesign and job crafting. However, job crafting is an individual-level intervention and will be discussed later in this chapter.

Job redesign is an organisation-level intervention that aims to change the wellbeing of workers by making use of job demands and job resources. It is a top-down process in which elements of job responsibilities, tasks, conditions, roles, etc. are changed, with the objective of optimising the demands-resources balance (Bakker et al., 2014). Increasing job resources (e.g. supervisor support and regular feedback) in the face of challenging job demands (e.g. assigning additional responsibilities) is an example of job redesign. In this sense, the content and/or structure of the job are redesigned. In this study, job demands (i.e. work overload) amplified the relationship between job resources (i.e. social support) and engagement. Given these positive findings, the training institution should focus on ensuring the optimal level of workload (i.e. not too little or too much), as well as ensuring sufficient social support.

A student survey could also be conducted by the training institution in order to determine the most important job resources and job demands that students would like to see addressed, with the objective of decreasing burnout and increasing engagement (Bakker & Demerouti, 2014). A student wellbeing intervention should start with an assessment of the most crucial job resources and job demands that require attention (Bakker et al., 2014) within the specific healthcare education environment.

5.2.1.2 Job crafting

In contrast to traditional job redesign, job crafting interventions are situated on the individual level and are instigated by the employees themselves. Employees choose proactively to change their job resources, job demands and work environment (Bakker et al., 2014).

When applied correctly, job crafting can be beneficial to health sciences students. It is thus important for training institutions to educate their students on how they can craft their jobs. Workshops on how job crafting works and what it entails can be arranged for students to attend. To an extent, the ability to job-craft in an education environment may be limited, as many elements of training are prescribed. However, how students approach their studies and mobilise resources can play a crucial role in job crafting. Lecturers could perhaps assist students in creating their own, personalised job-crafting plans. The personalised crafting plan can be used to set job crafting goals. These crafting goals would focus on (a) increasing job resources, (b) increasing challenging job demands, and (c) decreasing troublesome job demands.

Finally, educators could organise reflective meetings in which health sciences students can discuss problems, challenges and successes related to their personalised crafting plans. Furthermore, reasonable action should be taken by educators in order to monitor the ability of health sciences students to deal with demands in an effort to ensure that students' work remains challenging and meaningful, instead of becoming overwhelming.

5.2.1.3 Training

Research has shown that personal resources can be taught (Bakker & Demerouti, 2008). Training can therefore be arranged to enhance personal resources, such as mindfulness and emotional intelligence, in health sciences students. In this way, health sciences students can develop new competencies and coping skills that can help them execute their daily tasks more effectively and in a way that does not lead to decreased wellbeing.

Even though the hypothesised paths between mindfulness and engagement, as well as those between emotional intelligence and engagement, were not found to be significant in this study, mindfulness and emotional intelligence were both found to be significantly negatively related to burnout. The PLS path coefficients were -.10 for the path leading from mindfulness to burnout, and -.39 for the path leading from emotional intelligence to burnout. These findings indicate the importance of exploring the development of mindfulness and emotional intelligence in health sciences students in order to decrease burnout. Training in mindfulness and emotional intelligence will be discussed in more detail under the specific implications for health sciences students.

5.2.1.4 Strengths-based approaches

Strengths-based interventions are positioned on the individual level and also aim to develop the personal resources of students (Bakker & Demerouti, 2014). According to Park et al. (as cited in Bakker & Demerouti, 2014, p. 21), individual strengths can be defined as "positive traits reflected in thoughts, feelings, and behaviours". Whereas personal resources training is situated on an organisational level, strengths-based approaches take the form of a one-on-one coaching-type intervention and are therefore more personalised. Through strengths-based training, the individual is taken on a development journey that starts out by allowing the individual to identify his or her personal strengths. Thereafter, the coach guides the individual over a specific period to explore various ways in which he or she can develop and apply his or her strengths in the work environment. This intervention attempts to stimulate authentic behaviours and feelings that lead the individual on a path of personal growth and work engagement. Even though potentially very effective, this type of intervention could be time intensive and expensive, and therefore might not be feasible for the student population group.

5.2.2 Specific implications for health sciences students

Apart from the general interventions suggested by the JD-R theory, some specific implications pertaining to the job resources and personal resources used in this study are discussed below.

5.2.2.1 Interventions to enhance social support

Evidence from more than 100 studies as of 2002 clearly indicates that social support interventions can be extremely helpful to individuals managing stressors (Taylor, 2008). The creation of workgroups is effective in enhancing perceptions of social support. Belonging to a workgroup and sharing in group goals can lead to a sense of empowerment. For example, Jackson (1983) created a social participation intervention for a hospital that involved assisting employees to form work groups to discuss departmental activities on a weekly basis. This fairly basic intervention led to decreased levels of self-reported emotional strain (Taylor, 2008).

Social support research focuses most prominently on the extent to which workers have supportive peers. However, considerable research has now demonstrated the importance of supervisor support for helping people manage the demands of their jobs. Social support from one's supervisor has been shown to be associated with lower risk

factors for cardiovascular disease (Karlin, Brondolo, & Schwartz, 2003). For example, a study by Stinglhamber and Vandenberghe (2004) examined how the perceptions of co-worker and supervisor social support related to blood pressure, both throughout the workday and during particularly high-stress periods. The results indicated that social support from both co-workers and one's supervisor was associated with lower blood pressure at both time points (Taylor, 2008). Supervisors and lecturers are therefore encouraged to be supportive, and students also need to make an effort to cultivate a healthy student-supervisor relationship. Furthermore, health sciences students should be taught how to seek and foster social support and should be willing to offer social support to their fellow classmates.

Another way to improve social support is through social skills training. Such training may include helping individuals understand what appropriate social behaviour in the work context consists of, even focusing on simple behaviours such as greeting people. Additionally, students could be coached through what might be awkward or difficult situations, for example how to communicate to someone that their instructions are unclear. Furthermore, behavioural rehearsal or role-playing prior to encountering difficult social interactions is another effective way to enhance social skills. For example, practice can include how to apologise to others, ask for assistance, accept consequences of own behaviour and so on. Constructive feedback on the improvement of social skills is also of critical importance. Although such interventions will not transform an introvert into a social butterfly, often only modest improvements in social skills may be required to reduce social isolation and enhance a sense of social support (Taylor, 2008).

5.2.2.2 Interventions to enhance mindfulness

Mindfulness-based training is increasingly applied in organisational settings, particularly shortened versions of the original training interventions. A well-validated programme often used in the work setting is the Mindfulness-Based Stress Reduction (MBSR) programme (Good et al., 2016). The MBSR was developed by Jon Kabat-Zinn at the University of Massachusetts Medical School and is perhaps the most renowned mindfulness intervention in the scientific literature (Creswell, 2017). The original MBSR is an eight-week programme consisting of weekly group classes with a trained instructor lasting two to two and a half hours, daily 45-minute audio-guided home practice, and a one-day mindfulness retreat during the sixth week of training (Kabat-Zinn, 1990). A great

proportion of the MBSR programme focuses on learning how to attend to bodily sensations mindfully using body scans, gentle mindfulness-based stretching-type exercises, along with practices and discussions aimed at applying mindful awareness to everyday life experiences, including how one manages stressful situations. Initially, the MBSR programme was used to treat patients suffering from chronic pain, but it has since been applied successfully to various other populations, including adult community populations (Creswell, 2017).

Formal mindfulness training typically involves meditation practices such as physical movement (e.g. tai chi and yoga) or sitting meditation. These practices help to train the mind's attentional capacity and to keep it steady, while simultaneously increasing the mind's span of focus. Participants are taught to focus their attention on the present moment. Using an "anchor", such as a breath, can help with this. When the mind wanders, the focus is gently brought back to the experience of the present moment. The aim is to focus on the present moment, without modifying or judging the experience (Zenner, Herrnleben-Kurz, & Walach, 2018).

Mindfulness is likewise cultivated in day-to-day activities, such as walking and eating, and by using it as a resource for dealing with physical pain or emotionally challenging situations (Zenner et al., 2018). Mindfulness-based interventions also typically incorporate psycho-education, as well as approaches like non-judging, acceptance, trust, non-striving, patience, letting go, and the adoption of a beginner's mind (Kabat-Zinn, 1982, 1990, 2003). Another potential mechanism that can be used in mindfulness-based interventions is decreasing the tendency to avoid unwanted experiences, thus generally improving positive affect (Sauer, Walach, & Kohls, 2011).

Mindfulness-based programmes have mostly been delivered by means of face-to-face interactions, although Querstret, Cropley, and Fife-Schaw (2018) say mindfulness-based interventions can also be delivered online to reduce costs, increase accessibility and reduce waiting times. An example of a successfully implemented mindfulness-based intervention is the six-week online mindfulness-based cognitive therapy (MBCT) course developed by Teasdale et al. (2000), which was found to significantly lower levels of perceived stress, depression and anxiety in a non-clinical adult population. Importantly, the large effect sizes associated with completing the intervention were maintained for all the outcome variables at a three- and six-month follow-up (Querstret et al., 2018).

It is suggested that a tailor-made mindfulness programme be developed for health sciences students that will suit their unique needs. This programme can incorporate the various aspects used in other successful mindfulness-based programmes. The program should then be tested and tweaked accordingly so that future application of the tailored programme can derive a notable return on investment.

5.2.2.3   Interventions to enhance emotional intelligence

The diminishing relevance of professionals' operational and technical skills and the increasing relevance of their emotional skills, particularly in the artificial intelligence era, is being recognised in the literature (Fernández-Gámez, Rosales-Pérez, Molina-Gómez, & Mora-Lucena, 2018). The malleability of emotional intelligence therefore holds great value. Unlike the intelligence quotient, which was considered by Goleman (1998) to be relatively resistant to change, emotional intelligence can be enhanced through coaching, instruction, and practise. In fact, appropriate emotional intelligence training can be just as flexible as training in other skill sets (Ashkanasy, Hartel, & Daus, 2002; Brownell & Jameson, 2004).

As transpired in this study, emotional intelligence has implications for the wellbeing of health sciences students, particularly the burnout component of wellbeing. Therefore, paying attention to the improvement of emotional intelligence among health sciences students is recommended. Emotional intelligence can be considered during two phases – (a) selection, and (b) development. Considering emotional intelligence during the selection phase involves assessing the university applicants on emotional intelligence dimensions before admitting them to the university for a particular course. The development phase involves developing the emotional intelligence of students who are already studying at the university. Emotional intelligence should perhaps mainly be considered for development purposes in the university setting, because students typically start their university careers at an age when the temporal lobe, which is responsible for the emotions, is not yet fully developed (Leaf, 2015).

Various studies have recorded positive results relating to the development of emotional intelligence on a tertiary level (Görgens-Ekermans, Delport, & Du Preez, 2015). Many of these studies used adapted versions of Gardner's (2005) emotional intelligence development programme, based on the Swinburne University emotional intelligence test (SUEIT) model, which has been proven to be effective in enhancing levels of emotional

intelligence in individuals. Specifically, a study by Burger (2009) that investigated the relationship between emotional intelligence and teacher wellbeing found a positive relationship between the two constructs, as well as an increase in levels of emotional intelligence as a result of the emotional intelligence training intervention. However, the small sample size caused the results to not be statistically significant, even though the trends were evident. Görgens-Ekermans and Swart (2011) conducted a follow-up study that investigated the effects of the emotional intelligence intervention on the stress management of a sample of postgraduate students. A significant increase in emotional intelligence scores was evident for the group that received the training, even after a six-month follow-up period. Therefore, the impact as well as the longevity of the impact of the training intervention are supported. In addition, a significant decrease in the level of self-reported stress, with a further drop at the six-month follow-up after implementation of the intervention, was reported. These findings dovetail with the notion that emotional intelligence is malleable and that the development of emotional intelligence leads to positive outcome interventions (Görgens-Ekermans et al., 2015). It is therefore not surprising that researchers recommend emotional intelligence training programmes as part of universities' curricula (Vandervoort, 2006) due to the potential personal, social and societal benefits they hold.

Various experiential learning programmes have also been used as a successful means of increasing emotional intelligence. These programmes include: problem-based learning, emotional intelligence-based leadership training, and the mastering emotional intelligence (MEI) workshop (Fernández-Gámez et al., 2018). Perhaps a creative and exciting way to improve emotional intelligence is through the outdoor training (OT) intervention. OT is an experiential learning technique, based on Kolb's (1984) experiential learning theory, which uses an open-air methodology to develop emotional intelligence skills and self-awareness (Fernández-Gámez et al., 2018). OT programmes involve individuals and teams in new emotional and intellectual challenges and are characterised by the following: perception of risk, excitement, reality, uncertainty, interaction with nature, and encouragement to extend one's limits to achieve goals beyond what was believed could be achieved (Fernández-Gámez et al., 2018). A combination of techniques is used in OT, including both indoor and outdoor activities. The classroom (indoor) is typically used as a space to reflect and draw central conclusions (Wagner, Baldwing, & Roland, 1991).

OT training has been successful in improving emotional intelligence skills, like self-confidence, self-control, creativity, leadership, motivation, adaptation to change, time management, conflict resolution, teamwork, and communication (Clements, Wagner, & Roland, 1995; Dufrene, Sharbrough, Clipson, & Mccall, 1999; McEvoy & Cragun, 1997; Padilla-Meléndez, Fernández-Gámez, & Molina-Gómez, 2014). A recent study conducted on students by Fernández-Gámez et al. (2018) found OT to be highly effective at increasing global levels of emotional intelligence.

It is once again suggested that a tailor-made emotional intelligence programme be developed for health sciences students that will suit their unique needs. This programme can take the form of a hybrid programme that incorporates various aspects used in other successful emotional intelligence programmes. It will be important to keep the programme interesting and relevant; perhaps some fun and creativity can be added such as the use of OT training techniques. A further consideration is potentially to incorporate both mindfulness and emotional intelligence training in one programme that makes use of the various techniques in modules consisting of online learning, classroom learning, and experiential learning (both indoor and outdoor). The programme should then be tested to see what works and what does not work, and should be tweaked accordingly (ideally on a continuous basis) so that future application of the tailored program can derive the optimal return on investment.

5.5 CHAPTER SUMMARY

This research study has contributed to the JD-R literature by testing the entire JD-R model, and by exploring additional paths. Moreover, the study has made a contribution to the understanding of engagement, burnout and wellbeing in general among health sciences students in the Western Cape, South Africa. The effect of job resources, personal resources and job demands on health sciences student wellbeing (i.e. engagement and burnout) was illustrated by the research findings. Furthermore, insight is provided by these findings into how managers, industrial psychologists and educators at Stellenbosch University could address problems associated with these variables, with the goal of optimising the wellbeing of health sciences students.

In conclusion, this chapter covered the results with reference to the JD-R theory, the limitations of the study and recommendations for future research were provided and practical interventions were put forward in order to address the problems that became evident from the statistical findings.

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APPENDIX A: ETHICAL CLEARANCE

UNIVERSITEIT
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NOTICE OF APPROVAL

REC Humanities Amendment Form

14 January 2019

Project number: 7071

Project Title: Wellbeing of Medical Students: the role of Mindfulness & Emotional Intelligence

Amended Project Title: DEVELOPMENT AND EVALUATION OF A WELLBEING STRUCTURAL MODEL FOR HEALTH SCIENCES STUDENTS

Dear Miss Reinette Van Zyl

Your REC Humanities Amendment Form submitted on 16 December 2018 was reviewed and approved by the REC: Humanities.

Please note the following for your approved submission:

Ethics approval period:

Protocol approval date (Humanities)	Protocol expiration date (Humanities)
17 July 2018	16 July 2021

GENERAL COMMENTS:

Please take note of the General Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

If the researcher deviates in any way from the proposal approved by the REC: Humanities, the researcher must notify the REC of these changes.

Please use your SU project number (7071) on any documents or correspondence with the REC concerning your project.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

FOR CONTINUATION OF PROJECTS AFTER REC APPROVAL PERIOD

Please note that a progress report should be submitted to the Research Ethics Committee: Humanities before the approval period has expired if a continuation of ethics approval is required. The Committee will then consider the continuation of the project for a further year (if necessary)

Included Documents:

Document Type	File Name	Date	Version
Research Protocol/Proposal	Proposal R van Zyl 12 12 2018	12/12/2018	Revised

If you have any questions or need further help, please contact the REC office at cgraham@sun.ac.za.

Sincerely,

Clarissa Graham

REC Coordinator: Research Ethics Committee: Human Research (Humanities)

National Health Research Ethics Committee (NHREC) registration number: REC-050411-032.
The Research Ethics Committee: Humanities complies with the SA National Health Act No.61 2003 as it pertains to health research. In addition, this committee abides by the ethical norms and principles for research established by the Declaration of Helsinki (2013) and the Department of Health Guidelines for Ethical Research: Principles Structures and Processes (2nd Ed.) 2015. Annually a number of projects may be selected randomly for an external audit.

Investigator Responsibilities

Protection of Human Research Participants

Some of the general responsibilities investigators have when conducting research involving human participants are listed below:

1.**Conducting the Research**. You are responsible for making sure that the research is conducted according to the REC approved research protocol. You are also responsible for the actions of all your co-investigators and research staff involved with this research. You must also ensure that the research is conducted within the standards of your field of research.

2.**Participant Enrollment**. You may not recruit or enroll participants prior to the REC approval date or after the expiration date of REC approval. All recruitment materials for any form of media must be approved by the REC prior to their use.

3.**Informed Consent**. You are responsible for obtaining and documenting effective informed consent using **only** the REC-approved consent documents/process, and for ensuring that no human participants are involved in research prior to obtaining their informed consent. Please give all participants copies of the signed informed consent documents. Keep the originals in your secured research files for at least five (5) years.

4.**Continuing Review.**The REC must review and approve all REC-approved research proposals at intervals appropriate to the degree of risk but not less than once per year. There is **no grace period**. Prior to the date on which the REC approval of the research expires, **it is your responsibility to submit the progress report in a timely fashion to ensure a lapse in REC approval does not occur.** If REC approval of your research lapses, you must stop new participant enrollment, and contact the REC office immediately.

5.**Amendments and Changes.**If you wish to amend or change any aspect of your research (such as research design, interventions or procedures, participant population, informed consent document, instruments, surveys or recruiting material), you must submit the amendment to the REC for review using the current Amendment Form. You **may not initiate** any amendments or changes to your research without first obtaining written REC review and approval. The **only exception** is when it is necessary to eliminate apparent immediate hazards to participants and the REC should be immediately informed of this necessity.

6.**Adverse or Unanticipated Events.**Any serious adverse events, participant complaints, and all unanticipated problems that involve risks to participants or others, as well as any research related injuries, occurring at this institution or at other performance sites must be reported to Malene Fouche within **five (5) days** of discovery of the incident. You must also report any instances of serious or continuing problems, or non-compliance with the RECs requirements for protecting human research participants. The only exception to this policy is that the death of a research participant must be reported in accordance with the Stellenbosch University Research Ethics Committee Standard Operating Procedures. All reportable events should be submitted to the REC using the Serious Adverse Event Report Form.

7.**Research Record Keeping.** You must keep the following research related records, at a minimum, in a secure location for a minimum of five years: the REC approved research proposal and all amendments; all informed consent documents; recruiting materials; continuing review reports; adverse or unanticipated events; and all correspondence from the REC

8.**Provision of Counselling or emergency support.** When a dedicated counsellor or psychologist provides support to a participant without prior REC review and approval, to the extent permitted by law, such activities will not be recognised as research nor the data used in support of research. Such cases should be indicated in the progress report or final report.

9.**Final reports.** When you have completed (no further participant enrollment, interactions or interventions) or stopped work on your research, you must submit a Final Report to the REC.

10.**On-Site Evaluations, Inspections, or Audits.** If you are notified that your research will be reviewed or audited by the sponsor or any other external agency or any internal group, you must inform the REC immediately of the impending audit/evaluation.