AN ELABORATION AND MODIFICATION OF THE MAY, GILSON, AND HARTER (2004)
EMPLOYEE ENGAGEMENT STRUCTURAL MODEL.

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DECLARATION

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ABSTRACT

Job performance is perhaps the most central and important dependent variable in Industrial/Organisational psychology. A recent plea being directed at researchers is the need for positive organisational behaviour (POB) research, which is interested in not only improving the work performance of employees, but also in the promotion of employee wellbeing/psychological health. Work takes up a significant proportion of people's lives and need not be a disagreeable, painful means of earning the income needed to live after hours and over weekends. Work can and should offer individuals the opportunity to also find meaning in work. Fortunately, the morally justifiable way of utilising employees does also seem to hold advantages in terms of enhanced employee performance, as research has demonstrated that there is a positive relationship between employee wellbeing and performance (Bakker, Schaufeli, Leiter, & Taris, 2008). In response to these pleas for a shift in and/or more positive research, the POB-construct employee engagement has become one of the most important topics in the sphere of Human Resource Management (HRM).

It is clearly evident that employee engagement is both an important and relevant construct in South Africa's current work environment that HR needs to take it into consideration when developing interventions aimed at improving employee performance and employee wellbeing. In order for HRM to successfully cultivate an engaged workforce, it needs to understand why differences in employee engagement exist – that is, why some employees engage their selves in their work, while others disengage from their work. The level of engagement of employees is not a random event. Rather, is it an expression of the systematic working of a complex nomological network of malleable and/or non-malleable person-centred and situational latent variables. To purposefully increase the levels of engagement that employees experience those malleable and/or non-malleable person-centred and situational latent variables have to be manipulated to levels conducive to high employee engagement, and ultimately high performance and wellbeing, through appropriate flow and stock interventions (Milkovich & Boudreau, 1988). Therefore, HR will only be able to successfully and purposefully promote the development of high engagement in employees to the extent that the employee engagement construct is validly understood, the (malleable and non-malleable) person-centred and situational determinants of engagement are known, as well as how these latent variables amalgamate to affect performance on the various dimensions of engagement are validly understood.

To this end, based on the extensive theorising by Kahn (1990) on the psychological conditions that serve as prerequisites for engagement, May, Gilson and Harter (2004) developed a basic employee engagement structural model. However, due to the fact that employee engagement is complexly determined by a nomological network of latent variables characterising the employee and their (perception of their) environment, and that any attempt to influence the level of an individual's work engagement will only succeed so far as this complexity is truly understood, it is really doubtful that

only one explanatory study will surmount to a complete understanding of the comprehensive nomological network of latent variables that underly employee engagement. Rather, the likelihood of making meaningful progress toward a deeper understanding of the psychological dynamics underlying employee engagement becomes more apparent if consecutive research studies will endeavour to elaborate and expand on already existing employee engagement structural models. As such, this study focuses on the modification and elaboration of the May et al. (2004) employee engagement structural model by expanding the model through adding additional latent variables. The objective of this study was to test the proposed expanded employee engagement structural model.

OPSOMMING

Werksprestasie is waarskynlik die belangrikste afhanklike veranderlike in Bedryfs-/Organisasiesielkunde. 'n Onlangse pleidooi wat aan navorsers gerig is, is die behoefte aan positiewe organisasiegedragnavorsing (POB) wat nie net belangstel in die verbetering van die werksprestasie van werknemers nie, maar ook in die bevordering van werknemers se welstand/sielkundige gesondheid. Werk maak 'n aansienlike deel van mense se lewens uit en hoef nie 'n onaangename, pynlike manier te wees om die inkomste te verdien wat nodig is om na-ure en naweke te leef nie. Werk kan en behoort individue die geleentheid te bied om ook betekenis in hul werk te vind. Gelukkig blyk dit dat die morele regverdigbare manier om werknemers te benut, ook voordele bied ten opsigte van verbeterde werknemerprestasie, aangesien navorsing bewys het dat daar 'n positiewe verwantskap bestaan tussen welstand en prestasie van werknemers (Bakker, Schaufeli, Leiter, & Taris, 2008). In reaksie op hierdie pleidooie vir 'n verskuiwing in en/of meer positiewe navorsing, het die POB-konstruk werknemersbetrokkenheid een van die belangrikste onderwerpe in die gebied van Menslikehulpbronbestuur (MHB) geword.

Dit is duidelik dat werknemersbetrokkenheid 'n belangrike en relevante konstruk is in Suid-Afrika se huidige werksomgewing wat menslike hulpbronne in ag moet neem met die ontwikkeling van intervensies wat gemik is op die verbetering van werknemersprestasie en welstand van werknemers. Om te verseker dat MHB suksesvol 'n betrokke werkmag kan kweek, moet hulle verstaan waarom daar verskille in werknemersbetrokkenheid bestaan - dit wil sê, waarom sommige werknemers hulself inleef in hul werk, terwyl ander hulself aan hul werk onttek. Die vlak van betrokkenheid van werknemers is nie 'n ewekansige gebeurtenis nie. Dit is eerder 'n uitdrukking van die sistematiese werking van 'n komplekse nomologiese netwerk van smeebare en/of nie-smeebare persoon-gesentreerde en situasionele latente veranderlikes. Om doelgerig die betrokkenheidsvlakke te verhoog, moet die smeebare en/of nie-smeebare persoon-gesentreerde en situasionele latente veranderlikes gemanipuleer word tot vlakke wat bevorderlik is vir 'n hoë werknemersbetrokkenheid, en uiteindelik hoë prestasie en welstand, deur gepaste vloei- en voorraad-intervensies (Milkovich & Boudreau, 1988). Daarom kan menslike hulpbronne slegs suksesvol en doelgerig die ontwikkeling van hoë betrokkenheid by werknemers bevorder tot die mate waarin die konstruk van werknemersbetrokkenheid korrek verstaan word, die (smeebare en nie-smeebare) persoon-gesentreerde en situasionele bepalers van betrokkenheid bekend is, en die wyse waarop die persoon en situasionele latente veranderlikes kombineer om prestasie op die verskillende dimensies van betrokkenheid te beïnvloed geldig verstaan word.

Met die oog hierop het May, Gilson en Harter (2004) 'n basiese strukturele model vir werknemersbetrokkenheid ontwikkel, gebaseer op die uitgebreide teoretisering deur Kahn (1990) oor die sielkundige toestande wat dien as voorvereistes vir betrokkenheid. Weens die feit dat werknemersbetrokkenheid kompleks bepaal word deur 'n nomologiese netwerk van latente

veranderlikes wat die werknemer en hul (persepsie van hul) omgewing kenmerk, en dat enige poging om die vlak van 'n individu se werksbetrokkenheid te beïnvloed slegs tot die mate sal slaag dat hierdie kompleksiteit akkuraat verstaan word, is dit hoogs onwaarskynlik dat 'n enkele verklarende navorsingstudie sal lei tot 'n akkurate begrip van die uitgebreide nomologiese netwerk van latente veranderlikes wat werknemersbetrokkenheid bepaal. Dit is waarskynliker dat betekenisvolle vordering gemaak word met die oog op 'n meer deurdringende begrip van die sielkundige dinamika onderliggend aan werknemersbetrokkenheid, indien opeenvolgende navorsingstudies sal poog om reeds bestaande strukturele modelle vir werknemersbetrokkenheid uit te brei. Dus fokus hierdie studie op die verandering en uitbreiding van die May et al. (2004) strukturele model vir werknemersbetrokkenheid, deur die model uit te brei met die insluiting van addisionele latente veranderlikes. Die doel van hierdie studie was om die voorgestelde uitgebreide strukturele model vir werknemersbetrokkenheid te toets.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure   **Page**

CHAPTER 1

INTRODUCTION, RESEARCH INITIATING QUESTION AND RESEARCH OBJECTIVE

1.1   INTRODUCTION

South Africa is in a constant struggle to prevent economic stagnation and to alleviate poverty. In order to prevent and overcome these difficulties, to gain a competitive advantage and ultimately to compete successfully in the global environment, the country needs a consistently high economic growth. High economic growth can only be obtained by a country if goods and services are manufactured in an effective, efficient and productive manner (De Goede, 2007). These are objectives that are best achieved by the collective actions of individuals and by grouping resources together. This is why organisations exist.

Organisations are formed so that society can successfully achieve goals which would otherwise be impossible if the individuals acted alone. De Goede (2007, p. 1) proposes that, "the main reason why organisations exist is to produce goods and services in a productive manner, so that real economic value is added to the benefit of shareholders, the government and the broader community." Organisations are allowed to exist in society under the provision that they serve society in a rational manner by efficiently combining and transferring scarce resources into products and services with economic utility that are valued by society. Organisations have to ultimately accept co-responsibility for a country's economic situation and contribute to the country's global effectiveness.

The extent to which an organisation is successful in creating value and ensuring a high economic growth is largely dependent on the performance of its employees, who are the carrier of the production factor labour (Burger, 2011; De Goede, 2007). One can go as far as to say that the competitive advantage that organisations are striving for comes from its employees' performance. It is the actions of employees, which are grouped together and co-ordinated that form an organisation. More so than any of the other factors of production, it is primarily the employees within the organisation that ultimately determine the organisation's success. It is therefore imperative that organisations, in order to increase economic growth and compete globally, realise that it is people (employees) who are the most vital and indispensable resource, and in the final analysis it is human capital[1] that makes the competitive advantage. It is for this reason that organisations, in an attempt to be successful, must strive to acquire and maintain a skilled and inspired workforce, as well as effectively and efficiently utilise such a workforce by providing a work environment conducive to high employee work performance. The question then arises as to how South Africa organisations achieve this primary goal. According to De Goede (2007) the answer lies in effective and efficient Human Resource Management (HRM).

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[1] Human capital is used to collectively refer to the knowledge, experience, skills and expertise of employees.

With the intention of actualising this main goal of the organisation, a host of jointly co-ordinated actions need to take place. These actions can be characterised as a scheme of inter-related organisational functions. The Human Resource (HR) function constitutes one of these organisational functions (De Goede & Theron, 2010). HRM refers to the policies, practices and systems that influence employees' performance in such a way that they are aligned with, and support, the overall objectives of the organisation (Noe, Hollenbeck, Gerhart & Wright, 2010). Thus, the HR function justifies its place in the family of organisational functions through its promise to contribute to the organisation's objectives.

The task of the HR function in the organisation is to contribute to the production of a market-satisfying product or service which has a market value that surpasses the investment necessary to yield it. It aspires to do this through an integrated and co-ordinated network of HRM interventions, aimed at either employee flow or employee stock, that affect the work performance of organisation's most vital and indispensable resource – its employees (De Goede & Theron, 2010). Flow interventions involve ensuring that only the highest performing employees enter into the organisation by controlling the flow of individuals into the organisation in terms of non-malleable determinants of performance. Alternatively, stock interventions involve enhancing existing employees' job performance through the manipulation of malleable determinants of performance. The latter is thus relevant in the case of the study, with the focus being on stock interventions aimed at enhancing employee engagement and ultimately also employee performance. The aim of the interventions is to positively effect and improve employee performance so that the monetary value of improved performance exceeds the initial investment made to affect it. The construct job performance embodies both a behavioural domain and an outcome domain, with the content of both domains being structurally inter-related (Myburgh & Theron, 2014). Employees are required to perform well on specific latent behavioural performance dimensions because it is hypothesised that the behavioural competencies are instrumental in the realisation of the set of latent outcome variables for which the job exists. In the final analysis, jobs are created to achieve specific outcomes. The most penetrating understanding of what success in a specific job means will therefore be achieved if the manner in which the latent behavioural performance dimensions structurally affect each other, the latent outcome variables structurally interlink, and how the former structurally map on the latter, can be formally modelled as a performance structural model (Myburgh & Theron, 2014).

HR interventions are possible because the level of performance that employees achieve is not the outcome of a random event. This implies that, in order for HR interventions to be successful (able to positively influence employee performance in a manner that adds value), empirical research needs to be conducted to pinpoint and understand the factors that determine (i.e. enable or block) high

performance. This empirical research is possible because the behaviour of working man[2] is not a random event. The behaviour of working man is rather methodically, albeit complexly, determined by a nomological network of latent variables characterising the individual and (the perception of) their working environment. The HR function, within the organisation, needs to have a valid understanding of the nature of these latent variables and how they combine so as to successfully derive interventions on how to affect performance.

Job performance is perhaps the most central and important dependent variable in Industrial/Organisational Psychology. Past research relating to the construct almost exclusively focused on predicting job performance whereas in more recent years this focus has shifted to understanding the psychological processes that underlie and determine job performance. Such a shift has enabled the HR function to further expand their understanding of the direct and indirect determinants of job performance, by attempting to develop more comprehensive causal models that explain variance in this possibly single most pervasive outcome variable in organisational behaviour research (Schmidt & Hunter, 1992; Waldman & Spangler, 1989).

This progress in empirical research has led to the continuous development of various job performance theories and models aimed at uncovering[3] its determinants. However, this influx of numerous independent studies has resulted in a common plea for researchers to work rather from a unifying perspective involving numerous theories (Waldman & Spangler, 1989). As stated by Blumberg and Pringle (1982, p. 561), "unfortunately, the focus has been on a few trees, and there has been little or no attempt to show how these trees form the interrelated patterns that are the forest." HR interventions will only succeed if the psychological mechanism operating to affect the level of performance is validly understood and the intervention is informed by this understanding.

A recent plea being directed at researchers is the need for Positive Organisational Behaviour (POB) research. The field of POB emerged from the recently proposed positive psychology which was developed in reaction to the criticism that psychology (in the past) has been primarily concerned with addressing mental illness rather than mental "wellness". Evidence of this can be easily recognised by the fact that the amount of publications on negative states outnumbers that of positive states by a ratio of 14:1 (Bakker & Schaufeli, 2008; Myers, 2000). Positive psychology thus focuses on positive states;

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[2] The phrase 'working man' is used here as a gender neutral term to refer to any member of the species homo sapiens or to all the members of this species collectively.

[3] It should to be recognized that the term "uncover" is to some extent problematic in as far as it suggests a potentially discoverable "truth" as to what determines the phenomenon of interest. Absolute assurance as to the nature of the psychological process underlying the phenomenon of interest is, however, an unattainable ideal (Babbie & Mouton, 2001). At best one can hope to obtain a valid (i.e., permissible) explanation of the phenomenon of interest that can be considered permissible to the extent to which it is able to satisfactorily account for empirical observations made. Moreover, the explanatory constructs in terms of which psychological explanations are constructed to not physically exist. There is therefore nothing in Babbie and Mouton's (2001) World 2 to discover; World 2 is constructed by the abstract thinking capacity of man.

studying and promoting human strengths, optimal functioning, health and wellbeing, which it recognises as more than just the absence of 'unwell-being' or ill-health and as such need to be recognised in their own right (Bakker et al., 2008). This same positive turn is also relevant for occupational health psychology which, similar to conventional psychology, has in the past been framed within a disease model which emphasises dysfunction and negative aspects of work for example, stress and burnout (Balducci, Fraccaroli, & Schaufeli, 2010). As argued by Turner, Barling, and Zacharato (2002, p. 715), "it is time to extend our focus and explore more fully the positive sides, so as to gain full understanding of the meaning and effects of working", hence the emergence of POB and the subsequent need for POB research. POB research involves the uncovering and application of positive psychological conditions and human resource strengths, directly/indirectly related to employee performance and/or wellbeing, which can be measured, developed and effectively managed for performance improvement in today's work environment (Luthans, 2002).

Therefore, POB is interested in not only improving the work performance of employees but also in the promotion of employee wellbeing/psychological health. POB's emphasis on employee wellbeing points to the need to widen the practical mission of HR. HR is first and foremost responsible for contribution towards the core business of the organisation in a way that adds value. At the same time, however, HR has the responsibility to ensure that work contributes to the wellbeing of employees. The challenge facing the HR function is to ensure that work is instrumental in living a fulfilling, worthwhile, and positive life. Work takes up a significant proportion of people's lives and need not be a disagreeable painful means of earning the income needed to live after hours and over weekends. Work can and should offer working man the opportunity to also find meaning in work. This should be the case even if doing so did not translate into performance gains. Fortunately, however, the morally justifiable way of utilising employees does seem to also hold advantages in terms of enhanced employee performance.

Research has demonstrated that there is a positive relationship between employee wellbeing and performance (Bakker et al., 2008). Surely (in terms of the HR function's task to positively influence and improve employee performance, and ultimately business success) having content and satiated employees will be of little to no value to an organisation if they are unable to perform effectively and efficiently, just as having an efficient and effective organisation will be of little value if achieved at the expense of employees' wellbeing. It therefore logically makes sense, from a humanistic and practical point of view, to focus concurrently on both employee performance and wellbeing in order to achieve the competitive advantage all organisations strive for (Cotton & Hart, 2003).

Despite the plea for/growing interest in POB research there is still a limited number of constructs that indicated positive wellbeing at work. Furthermore, and possibly more importantly, those constructs that do exist in current research have yet to be fully understood in terms of the psychological processes underlying and determining them, and how they interact in the overall model/picture with other POB-

constructs to positively affect employee performance (how the trees form the interrelated patterns that are the forest). In response to these pleas/calls for a shift in and/or more positive research, the POB-construct *employee engagement*[4] has become one of the most important topics in the sphere of HRM.

As previously argued, employees (who are the carrier of the production factor) are possibly the most vital and indispensable resource that ultimately determines an organisation's success. Bakker and Schaufeli (2008, p. 147), are in agreement with this position and believe that, "more than ever before, managers would agree that employees make a critical difference when it comes to innovation, organisational performance, competitiveness and thus ultimately business success". As such, in order to achieve organisational goals and to gain a competitive advantage, employers need to provide/create an environment in which the organisation's most vital resource – human capital – can thrive and realise its full potential so as to ensure the highest possible level of production, i.e. an environment conducive to high employee performance. May et al. (2004, p. 12) believe the key to creating such an environment involves fostering employee engagement in that, "for the human spirit to thrive at work, individuals must be able to completely immerse themselves in their work. That is, they must be able to engage the cognitive, emotional and physical dimensions of themselves in their work."

Despite the limited studies on the positive effects of employee (state) engagement on performance, possible due to the fact that it is a relatively new, emerging POB construct, a few quantitative studies have nonetheless shown that the two are positively related (Demerouti & Bakker, 2006). Furthermore, employee (state) engagement is positively related to both in-role and extra-role performance, indicating that employees that experience a state of engagement not only perform well but are also are willing to go the extra mile – thus (state) engaged employees offer the potential for discretionary effort (Bakker, Demerouti, & Verbeke, 2004; Schaufeli, Bakker, & Salanova, 2006). According to Bakker and Demerouti (2006) there are at least four reasons why (state) engaged employees perform better than disengaged employees namely; engaged employees 1) experience positive emotions more frequently, 2) experience better health (psychological and physical), 3) create their own job and personal resources, and 4) transfer their engagement to others. Employees, who are actively engaged in their jobs work with passion, feel a connection to their company and help move the organisation forward.

A review of South Africa's recent history, development and current situation, within the occupational setting, demonstrates why fostering employee engagement (as a means of enhancing employee performance) is especially relevant to the South African workforce – further clarifying why engagement is becoming so popular in today's modern work environment/organisations.

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[4] The term engagement can be interpreted both as a psychological state and as a psychological act. It will subsequently be argued that the psychological state develops from the psychological act. In the introductory argument, aimed at justifying the importance of the proposed research, the terms engagement is used in a manner that incorporates both these interpretations.

In the past, South Africa's work environment was characterised by a loyalty-for-security bargain between employers and employees. Employers expected loyalty to the organisation and in exchange offered lifetime employment. However, with the increase in global completion, resulting from modern developments in the work environment, employers began to find that they required more flexibility in terms of employee deployment in order to remain competitive. Organisational plants were relocated to countries where wages were lower, and as business became global, employers needed more control over wage and benefit costs in order to compete effectively. As a result, the old loyalty-for-security bargain was cast aside and employees had to come to the hard realisation (through layoffs) that their connection to the organisation is more tenuous and loyalty no longer ensures long term employment (Masson, Royal, Agnew, & Fine, 2008; Welbourne, 2007). This redefinition of the social contract surrounding the employment relationship has led to dire consequences for organisations in today's current work environment.

The modern work environment more so than ever (and will probably only continue to increase in the regard) is characterised by constant change and increasing global competition. Organisations and HR managers are continually looking for ways to remain competitive and adapt to the fast-changing environment. Employers, in the face of these modern-day challenges, require their employees to be adaptable, proactive, show initiative, work well with others, take responsibility for their own professional development, and be committed to high quality performance standards. According to Bakker and Schaufeli (2008, p. 147) "employees are needed who feel energetic and dedicated, and who are absorbed by their work. In other words, organisations need engaged workers." Furthermore, in this effort by organisations to continue to improve performance/productivity, in a global environment where continuous, fast change is making it difficult to compete, organisations are running "leaner" with regard to resources – requiring them to do more with less – and one of the only outlets (resources) left for making this happen is employees. However, given the fact that individuals and organisations are now more tenuously connected, Welbourne (2007, p. 46) points out that, "it is not so easy for employers to snap their fingers and simply get employers to do more." Thus, tapping into the discretionary effort offered by engaged employees becomes more and more imperative to organisational success.

According to Masson et al. (2008), a further, related push for the modern emphasis on engagement in organisations comes from the employees themselves. With the above mentioned redefinition of the social contract surrounding the employment relationship in organisations across industries employees have come to the realisation that they are in charge of their own work paths – and definition of career success – resulting in more employees seeking work environments where they can not only be fully engaged but also feel that they are contributing (in a positive manner) to something larger and more meaningful then themselves.

Therefore, it is clearly evident that employee (state) engagement is both an important and relevant construct in today's work environment and that HR needs to take it into consideration when developing interventions aimed at improving employee performance and employee wellbeing. In order for HRM to successfully cultivate an engaged workforce it needs to understand why differences in employee (state) engagement exist – that is why some individuals experience a state of engagement in their work, whereas others experience a state of disengagement from their work. The level of (state) engagement of employees is not a random event. Rather is it an expression of the systematic working of a complex nomological network of malleable and/or non-malleable person-centred and situational latent variables, that all require manipulation to levels conducive to high employee engagement and ultimately high performance and wellbeing. Moreover, the current study argues that these malleable and/or non-malleable person-centred and situational latent variables do not directly determine the level of state engagement, but their effect on state engagement is mediated by the behavioural act of investing (or engaging) the self in the job task (or role). The current study argues that employees have to display competence at investing the self in the job task (or role) to be able to experience the psychological state of engagement at work. Therefore, HR will only be able to successfully purposefully promote the development of high engagement in employees to the extent that the (malleable and non-malleable) person-centred and situational determinants of engagement are known as well as the way in which these latent variables structurally merge to affect the level of self-investment that in turn affect performance on the various dimensions of (state) engagement are understood. A structural model on employee engagement thus needs to be developed that provides a valid description of the psychological mechanism that underpins employee engagement.

Kahn (1990) focused on the behavioural act of investing (or engaging) the self in the job task. Bakker and Schaufeli (2008), Demerouti and Bakker (2006) and others from the European engagement school, in contrast, conceptualised engagement as a psychological state[5]. Based on the extensive theorising by Kahn (1990) on the psychological conditions that serve as prerequisites for engagement at work as a behavioural act, May et al. (2004) developed a basic behavioural employee engagement structural model. In Kahn (1990)'s ethnographic study of a summer camp and an architectural firm, he focused on how "people's experience of themselves and their work contexts influenced moments of personal engagement and disengagement" (p. 702). Through analysing the conditions of each reported moment of engagement he was able to induce three psychological preconditions for self-investment or behavioural engagement, namely; psychological meaningfulness, psychological safety and psychological availability. Kahn (1990) then went on to generate possible determinants of these three psychological conditions through an analysis of interviews he conducted. Kahn's qualitative data indicated that three factors generally influenced psychological meaningfulness; task characteristics, role

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[5] This distinction will be more thoroughly discussed in Chapter 2.

characteristics, and work interactions. Four factors were identified to have the most direct influence on psychological safety, namely; interpersonal relationships, group and inter-group dynamics, management style and process, and organisational norms. And lastly, the data from the two studies indicated four factors that influence psychological availability; physical energy, emotional energy, individual security and outside life. Kahn (1990) never empirically tested these hypotheses via a formal quantitative study.

The behavioural employee engagement model proposed by May et al. (2004) was the product of an investigation into the preconditions, as theorised by Kahn (1990), that have to be met to invest the self in work and to actively engage with one's work, as well as an investigation into the viability of Kahn's proposed antecedents of the psychological conditions. May et al. (2004) found close fit (p>.05) for their proposed model and went on to recommend (for further research) that the possible addition of one or more determinants of and/or paths between the three psychological conditions could possibly improve the model's fit. The question therefore arises, which other variables and/or paths need to be taken into account to extend the May et al. (2004) behavioural employee engagement model into a more comprehensive employee (state) engagement structural model.

Earlier it was argued that employee (state) engagement is complexly determined by a nomological network of latent variables characterising the employee, their (perception of) their environment and their behaviour (specifically self-engagement) under the influence of these determining latent variables. Moreover, it has been argued that any attempt to influence the level of an individual's work engagement will only succeed to the extent that this complexity is correctly understood. The critical question therefore arises; in which ways should the structural network of influences underlying employee (state) engagement be considered complex? Firstly, employee (state) engagement is complexly determined in the fact that numerous person-centred and situational latent variables are simultaneously at work to determine the level of (state) engagement that a specific employee experiences. Secondly, it is complexly determined in that these latent variables are ornately interlocked leaving almost every latent variable directly and/or indirectly affecting one another. Lastly, and linked to the above interconnection, employee (state) engagement should be seen as complex in that feedback loops exist that link latent employee outcome variables that result from the psychological state of engagement to the employee engagement competency potential latent variables, and through them, to the level of self-investment and eventually to the latent dimensions that constitute employee (state) engagement that originally (directly/indirectly) determined the outcome latent variables so as to create a dynamic system (Cilliers, 1998). The last two facets suggest that the structural model will contain few if any exogenous latent variables. The last two facets also suggest that the understanding of the process that regulates the levels of employee engagement is not located in any specific latent variable or path in the model but rather spread across the whole of the nomological net.

It therefore follows, from this forgoing argument that it is really doubtful that only one explanatory study will surmount to a full understanding of the comprehensive nomological network of latent variables that underly employee engagement. It moreover follows that, if the network is taken apart (also therefore when omitting latent variables and/or paths) the structural model starts losing its meaning. The likelihood of making meaningful progress toward a deeper understanding of the psychological dynamics underlying employee engagement becomes more apparent if successive research studies will endeavour to elaborate and expand on an already existing employee engagement structural model. Cumulative structural equation modelling research studies holds the promise of realising Blumberg and Pringle's (1982, p. 561) vision of understanding "how the(se) trees form the interrelated patterns that are the forest."

1.2   RESEARCH-INITIATING QUESTION

The research initiating question setting off the current study is the open-ended second-generation research initiating question: why does variance in employee (state) engagement exist across employees, jobs and organisations given the May et al. (2004) behavioural employee engagement structural model? The research initiating question is purposefully formulated as an open-ended question in an attempt to ensure that the research problem and research hypotheses emerges from the theorising in the literature study presented in Chapter 2. The construction of a valid psychological mechanism that can conceivably regulate the levels of employee (state) engagement becomes more likely if the research is approached in a manner that necessitates a prolonged, authentic, unbridled intellectual wrestling with the research initiating question. Identifying the set latent variables that will be required to elaborate the May et al. (2004) model into a comprehensive state engagement model at the outset of the study, and subsequently focusing the literature study on those latent variables, increases the risk that latent variables will be artificially forced into the research hypothesis while crucial latent variables may be omitted. It would moreover allow the researcher to abdicate her responsibility as the designer of the psychological mechanism. Latent variables should only be incorporated as components in the psychological mechanism if their inclusion has been argued to be indispensable for the construction of a plausible mechanism that regulates the levels of employee (state) engagement across employees, jobs and organisations.

1.3   RESEARCH OBJECTIVE

The key objective of this study is therefore to expand and modify the May et al. (2004) behavioural employee engagement structural model into a comprehensive state engagement structural model. More specifically the objective of the research is to;

- Identify additional latent variables not currently included in the May et al. (2004) behavioural employee engagement structural model that are needed to elaborate the May et al. (2004) model into a comprehensive employee (state) engagement;
- Develop hypotheses on the manner in which the additional latent variables are embedded in the current May et al. (2004) behavioural employee engagement structural model;
- Empirically test the proposed expanded employee state engagement structural model.

1.4 OVERVIEW OF THE STUDY

Chapter 2 presents the literature study in which the elaborated employee engagement structural model is developed, discussed and explained. The study then continues with the research methodology in Chapter 3, which includes the substantive research hypotheses, the development of the measuring instruments, sample selection, as well as the statistical analysis to be performed. Chapter 4 of the thesis describes the results and Chapter 5 finally presents a discussion of the conclusions and recommendations conditional on the results.

CHAPTER 2
LITERATURE STUDY

"The task that will not go away and that, until faced, will sentence (organisational/behavioural)
psychology to the ranks of "would-be science" – is that of unification, of weaving threads together."
– (Staats, 1999, p. 8)

2.1 INTRODUCTION

The introductory argument made the case that job performance is perhaps the most central and important dependent variable in Industrial/Organisational psychology. A recent plea being directed at researchers is the need for POB research, which is motivated by not only the need to improve the work performance of employees, but also by the need to promote employee wellbeing/psychological health. POB's emphasis on employee wellbeing points to the need to widen the practical mission of HR. HR is first and foremost responsible for contribution towards the core business of the organisation in a way that adds value. At the same time, however, HR has the (moral) responsibility to ensure that work contributes to the wellbeing of employees. Work takes up a significant proportion of people's lives and need not be a disagreeable painful means of earning the income needed to live after hours and over weekends. Work can and should offer working man the opportunity to also find meaning in work. Fortunately, the morally justifiable way of utilising employees does seem to hold advantages in terms of enhanced employee performance as research has demonstrated that there is a positive relationship between employee wellbeing and performance (Bakker et al., 2008). In response to these pleas/calls for a shift in and/or more positive research, the POB-construct employee (state) engagement has become one of the most important topics in the sphere of HRM.

The introductory argument presented in Chapter 1 provides convincing evidence that employee(state) engagement is both an important and relevant construct in today's work environment that HR needs to take it into consideration when developing interventions aimed at improving employee performance and employee wellbeing. In order for HRM to successfully cultivate an engaged workforce it needs to understand why differences in employee (state) engagement exist – that is why some individuals experience a state of engagement in their work, whereas others experience a state of disengagement from their work. The level of (state) engagement of employees is not the outcome of a random event. Rather is it an expression of the systematic working of a complex nomological network of malleable and/or non-malleable person-centred, situational latent variables and behavioural variables that all require manipulation to levels conducive to high employee (state) engagement and ultimately high performance and wellbeing. Therefore, HR will only be able to successfully and purposefully promote the development of high (state) engagement in employees to the extent that the (malleable and non-malleable) person-centred, situational and behavioural determinants of (state) engagement are known and how these various latent variables merge to impact performance on the various latent dimensions

that constitute (state) engagement are validly understood. A structural model on employee (state) engagement thus needs to be developed that provides a valid description of the psychological mechanism that underpins employee (state) engagement.

Due to the fact that employee (state) engagement is complexly determined by a nomological network of latent variables characterising the employee and (their perception of) their environment, and that any attempt to influence the level of an individual's work engagement will only succeed so far as this complexity is truly understood, it is really doubtful that only one explanatory study will lead to a full understanding of the comprehensive nomological network of latent variables that determine employee engagement. If the network is taken apart (also therefore omitting latent variables and/or paths) the structural model also starts losing its meaning. Meaningful progress toward a much deeper understanding of the psychological dynamics underlying employee engagement will more likely take place if cumulative research studies will set out to expand an already existing employee engagement structural model. To this end, based on the extensive theorising by Kahn (1990) on the psychological conditions that serve as prerequisites for self-investment, May et al. (2004) developed a basic behavioural employee engagement structural model. The objective of the current study is to elaborate the May et al. (2004) behavioural engagement model into a comprehensive explanatory state engagement structural model.

In this section of the thesis a brief explanation of the contributions of Kahn (1990)'s research on engagement will be given. More specifically, the explanation will discuss his concepts of *personal engagement* and *personal disengagement* and how people's experiences of themselves and their work contexts influence moments of each. The theoretical framework designed to illustrate which preconditions have to be met to display *personal engagement* (or behavioural engagement), namely; *psychological meaningfulness*, *psychological safety*, and *psychological availability* will also be discussed. The section will then go on to explain the May et al. (2004) behavioural employee engagement structural model (developed from Kahn (1990)'s theorising) and thereafter expand it into a comprehensive explanatory state engagement structural model. The latent variables added to the model will each be defined and discussed so as to deliberately uncover the logic underlying the structure of the proposed expanded employee (state) engagement structural model. The precise reasoning behind why each latent variable was added, together with an explanation of the manner in which each added latent variable fits into the nomological model, will be discussed.

2.2   CONTRIBUTIONS OF KAHN'S RESEARCH

Employees occupy various roles in the workplace for example the role of mentor, supervisor, liaison etc. Kahn (1990) believed that when people occupy roles at work they "can use varying degrees of their selves, physically, cognitively and emotionally, in the roles they perform, even as they maintain the integrity of the boundaries between who they are and the roles they occupy" (p. 692). He proposed that the more people are able to draw on their selves, in other words the more they can employ and express their selves while performing their roles within those boundaries, the more likely they are to not only perform better but be content and comfortable with/in the roles they occupy. Think of gears being engaged where two cogs (job role and employee) come together. The function or value of the gears comes from the fact that gears leverage power to push the 'job cart'. With the guiding assumption that people are constantly bringing in and leaving out various depths of their selves during the roles they perform at work, Kahn's (1990) research was designed to generate a theoretical framework within which to understand these "self-in-role" processes. He aimed (by focusing on moments of task performance) to identify variables that explained the processes by which or how people give, render or invest their selves in roles. More than that he sought to get to the core of what it means to be psychologically present in particular moments and situations. As such Kahn's conceptual framework, grounded in both empirical qualitative research and existing theoretical frameworks, was intended to illustrate how psychological experiences of work and work contexts shape the processes by which people give of/immerse the self-verses detach/remove the self from work roles during task performances (Kahn, 1990).

With the work of Goffman (1961) as a conceptual starting point, together with research ideas documented by various psychologists, sociologists, and group theorists, Kahn (1990) came to the understanding that "people are inherently ambivalent about being members of ongoing groups and systems and seek to protect themselves from both isolation and engulfment by alternately pulling away from and moving toward their memberships" (p. 694). He believed these pulls and pushes to be people's calibrations of self-in-role, enabling them to cope with both internal ambivalences and external conditions. Kahn termed these calibrations of self-in-role as *personal engagement* and *personal disengagement*, which "refer to the behaviours by which people bring in or leave out their personal selves during work role performances." (Kahn, 1990, p. 694).

2.2.1   Personal Engagement and Personal Disengagement

Kahn (1990) argued that when given the appropriate conditions, people have various dimensions of themselves that they prefer to employ and express during work role performances. For him "self and role exist in some dynamic, negotiable relation in which a person both drives personal energies into a role (*self-employment*) and displays the self within the role (*self-expression*)" (p. 700). In this context to employ the self refers to driving personal energies into physical, cognitive and emotional labours and

to express preferred dimensions of the self refers to the display of genuine identity, thoughts and feelings. Kahn believed that the combination of both actions yields behaviours that bring alive the relation of self to role promoting connections to work and others, personal presence and active, full role performances. As such Kahn defines *personal engagement* at work as the "harnessing of organisational members' selves to their work roles; in engagement, people employ and express themselves physically, cognitively and emotionally during role performances" (p. 694).

Alternately *personal disengagement* is defined as "the uncoupling of selves from work roles; in disengagement, people *withdraw* and *defend* themselves physically, cognitively, or emotionally during role performances" (Kahn, 1990, p. 694). In essence an actor is harnessed to pull the 'job cart'. In this context to *withdraw preferred dimensions of the self* refers to removing personal energies from physical, cognitive and emotional labours. Such unemployment or disengagement of the self in one's role underlies what researchers have referred to as robotic, apathetic or effortless behaviour/performance (Hackman & Oldham, 1980; Hochschild, 1983). To *defend the self* refers to hiding one's true identity, thoughts and feelings during role performances, what researchers have referred to as impersonal or closed-off behaviours (Gibb, 1961; Hochschild, 1983). As such, both concepts integrate the idea that individuals require both the opportunity for self-employment and self-expression in their work lives as a matter of course.

Kahn's (1990) concept of *personal engagement* refers to a psychological act of committing, rendering, giving or investing the self in the job tasks or roles. This stands in contrast to the stance of Bakker and Schaufeli (2008) and Demerouti and Bakker (2006) that employee *state engagement* refers to a psychological state characterised by *energy*, *dedication*, and *absorption*. This distinction between *engagement* as a psychological act (Kahn, 1990) and *engagement* as a psychological state (Bakker & Schaufeli, 2008); Demerouti & Bakker, 2006) suggest that both *personal engagement* and employee *state engagement* could deserve inclusion in the proposed elaborated May et al (2004) employee engagement structural model.

2.2.2   Psychological Conditions of Engagement

Following his two-fold premise that 1) the psychological experience of work drives people's attitudes and behaviours, and 2) individual, interpersonal, group, intergroup, and organisational factors simultaneously influence these psychological experiences, Kahn (1990), in his ethnographic study of a summer camp and an architectural firm, then went on to focus on "delineating the psychological conditions in which people personally engage and disengage at work" (p. 695). Kahn assumed that people's psychological experiences of the rational and unconscious elements of work contexts, mediated by their perceptions, create the conditions in which they personally engage and disengage. His research thus focused on "how people's experiences of themselves, their work, and its contexts influence moments of personal engagement and disengagement" (Kahn 1990, p. 702). Psychological

conditions are momentary rather than static perceived/interpreted and experienced situational conditions/circumstances that shape behaviours. Such circumstances create momentary, fleeting conditions that contract the employee to engage or disengage. "If certain conditions are met to some acceptable degree, people can personally engage in moments of task behaviours." (Kahn, 1990, p. 703). Through analysing the conditions of each reported moment of engagement as if there were a contract between person and role, Kahn was able to induce three psychological preconditions for *personal engagement*, namely; *psychological meaningfulness*, *psychological safety* and *psychological availability*. These three conditions resemble the logic underpinning people's decision to enter into a formal contract through which they commit themselves to some obligation. An individual is more likely to agree to a contract that offers clear and desired benefits and security guarantees, and when they believe they possess the necessary resources to fulfil the obligations they commit to by entering into the contract. This logic portrays an individual's agreement to invest increasing depths of themselves (personally engage) into role performances to be dependent on how they perceive the benefits (how meaningful), how they perceive the guarantees (how safe) in situations and on the resources they perceive themselves to have to invest (how available) (Kahn, 1990).

2.3 THE MAY, GILSON AND HARTER (2004) EMPLOYEE ENGAGEMENT STRUCTURAL MODEL

May et al. (2004), in agreement with Kahn (1990), believe that "for the human spirit to thrive at work, individuals must be able to completely immerse themselves in their work. That is, they must be able to engage the cognitive, emotional and physical dimensions of themselves in their work." (p. 12). Building on Kahn's (1990) ethnographic work, May et al. (2004) conducted a study in a U.S. Midwestern insurance company to examine the role that psychological conditions play in why some people engage their selves in their work while others become alienated and disengage. More specifically the objective of their research was to explore the determinants and mediating effects of *psychological meaningfulness*, *psychological safety* and *psychological availability* on employees' *personal engagement* in their work. Their study led to the development of the May et al. (2004) behavioural employee engagement structural model which is discussed and defined in the section to follow.

2.3.1 Personal Engagement

As mentioned above, the development of the May et al. (2004) employee engagement structural model, was built on Kahn's (1990) ethnographic work. Therefore, work engagement in their study is equivalent to Kahn's conceptualisation of the construct of *personal engagement* as it has been discussed and defined in Section 2.2.1.

2.3.2   Psychological Meaningfulness

The psychological condition of experienced *meaningfulness* has been well recognised by researchers as an important psychological state or condition at work (e.g. Hackman & Oldham, 1980; Kahn, 1990; Olivier & Rothmann, 2007; Renn & Vandenberg, 1995; Rothmann & Hamukang'andu, 2013). For Renn and Vandenberg (1995, p. 282) "experienced *meaningfulness* refers to the extent to which an individual believes his or her job is important *vis à vis* this individual's own value system." For Rothmann and Hamukang'andu (2013, p. 3) "*psychological meaningfulness* is the significance one attaches to one's existence and encompasses the value one places on the existence of life and on the course of his/her life". Thus, *psychological meaningfulne*ss has to do with how valuable work goals are in relation to an individual's own values, ideals or standards. Aktouf (1992) maintains that a lack of meaning in one's work can lead to alienation or 'disengagement' from one's work.

In line with Kahn (1990) and for the purpose of this study *psychological meaningfulness* is defined as a sense or expectation of a positive return on investments of self-in-role performances that is, of an investment of one's self in a currency of physical, cognitive and/or emotional energy. *Psychological meaningfulness* is influenced by work elements that create incentives or disincentives to personally engage, for example task and role characteristics. Individuals who experience *psychological meaningfulness* feel worthwhile, useful and valuable in that they feel they are able to both give and receive back from others and the work itself, that they are making a difference and not being taken for granted. Thus, the formulation reflects concepts of how people invest themselves in tasks and roles that satisfy personal and existential needs for meaning in work and life (Kahn, 1990). Kahn's qualitative data indicated that three factors generally influenced *psychological meaningfulness*, namely task characteristics, role characteristics, and work interactions. May et al. (2004) chose to model only two determinants of *psychological meaningfulness*. The workplace determinants of psychological meaningfulness explored by May et al. (2004), namely, *job enrichment* and *work role-self fit*[6] are now discussed and defined.

2.3.2.1 Job Enrichment

Kahn (1990) argued that the characteristics of one's job could influence the degree of meaningfulness an employee experiences at work. In support of this, work by various researchers of job design (Johns, Xie, & Fang, 1992; May, 2003; Renn & Vandenberg, 1995) demonstrates that job enrichment in the five core job characteristic dimensions (skill variety, task identity, task significance, autonomy and

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[6] It should be acknowledged that May et al. (2004) in their structural model use to the term work-role-fit. However, due to the fact that this construct refers to the perceived fit between an individual's self-concept and their work role (as conceptualised by Kahn (1990)) this study considers 'work role-self fit' to be a more appropriate term and as such utilises it throughout the study.

feedback) of the Job Characteristics Model (Hackman & Oldham, 1980) can significantly influence the *psychological meaningfulness* that employees experience.

From his studies Kahn (1990) deduced that employees would be more likely to experience *psychological meaningfulness* when performing work that is challenging, clearly delineated, varied, creative and somewhat autonomous. For work to be experienced as meaningful it should encompass both routine and new skills, allowing employees to experience a sense of both competence (from the routine) and growth and learning (from the new) thus facilitating both their personal growth and work motivation (Kahn, 1990; Spreitzer, Kizilos & Nason, 1997). For the purpose of this study *job enrichment* refers to the extent to which job tasks are designed to include greater skill variety (breath of skills used while performing work), task identity (opportunity to complete entire pieces of work), task significance (impact the work has on others), autonomy (depth of discretion allowed while performing work), and feedback (amount of information provided about work performed) (Hackman & Oldham, 1980; Renn & Vandenberg, 1995).[7]

2.3.2.2 Work Role-self Fit

Human beings are not just goal-orientated but also self-expressive and creative. That is, they attempt to authentically express who they are in what they do in life. This is also true with regards to work. Human beings therefore attempt to seek out work roles that allow them to express their true self concepts (Rothmann & Haumkang'andu, 2013; Shamir, 1991). Numerous authors argue that a perceived 'fit' between an individual's self-concept and his/her work role will lead to an experienced sense of meaning at work due to the ability of the individual to express their authentic values, beliefs and self-concept as well as use their signature strengths (Kahn, 1990; May et al., 2004; Olivier & Rothmann, 2007; Rothmann & Haumkang'andu, 2013; Seligman, 2011). According to Kahn (1990) individuals will experience more *psychological meaningfulness*, invest more of the self in attaining work goals, and feel more effective in the job itself when they experience greater congruence between the self and the requirements of the role; when they experience a work role-self fit (Rothmann & Haumkang'andu, 2013).

A number of studies by researchers show that work roles and activities which are aligned with individuals' self-concepts (work role-self fit) are associated with experiences of *psychological meaningfulness*, which also positively impact individuals' work engagement (Kahn, 1990; May et al., 2004; Olivier & Rothmann, 2007; Rothmann & Haumkang'andu, 2013). Van Zyl, Deacon and

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[7] Typically, job enrichment is understood to refer to an intervention aimed at the redesign of a job to enhance the prominence of the job characteristics so as to facilitate the experience of psychological meaningfulness. The term *job enrichment* as used in the current study as a determinant of *psychological meaningfulness* therefore refers to the extent to which the job has been enriched.

Rothmann (2010) also went on to find that work role-self fit predicted *psychological meaningfulness* and work engagement (as a psychological act rather than a psychological state[8]) in a sample of industrial psychologists. In terms of this study *work role-self fit* refers to the perceived fit between an individuals' self-concept and their roles within the organisation.

2.3.3   Psychological Safety

"*Psychological safety* is believed to lead to *personal engagement*, because it reflects one's belief that a person can employ his-/herself without fear of negative consequences." (Olivier & Rothmann, 2007, p. 50). To give or invest the self means that the self has to be revealed, which makes the person vulnerable. Jobs rich in the job characteristics (Hackman & Oldham, 1980) and that offer the potential of high fit between the self and the role that the job requires offers an opportunity to a valued benefit[9] of *psychological meaning*. Whether it is worthwhile grasping the opportunity depends on the perceived *psychological safety* to the self of doing so[10]. According to May et al. (2004) employees feel 'safe' when they perceive that they will not suffer for expressing their true selves at work. When employees are unable to freely express their views and ideas, then creativity, innovativeness and learning, which are essential for performance and effectiveness, are likely to be suppressed (Edmondson, 1996; 1999; 2002). Individuals in an organisation that provides a non-threatening and supportive climate to its employees should be more likely to risk proposing a new idea than in an environment where by doing so could result in the individual being attacked, censored, ridiculed or penalised (Baer & Frese, 2003; West, 1990). Brown and Leigh (1996) argue that "when employees expect that they will incur organisational sanctions for expressions of individuality in their work roles, they are likely to distance themselves from their work roles, resulting in *psychological disengagemen*t." (p. 360). Thus, *psychological safety*'s influence is associated with elements of social systems that forge situations that are more or less non-threatening, predictable, and consistent in which to engage (Kahn, 1990).

In order to experience *psychological safet*y (deem a situation safe to personally engage) employees need to feel that situations are trustworthy and have a clear, precise and consistent understanding of the boundaries between what behaviour is allowed and disallowed together with the potential consequences of their behaviours (Kahn, 1990). A safe environment exists when employees understand the boundaries surrounding acceptable behaviours and unsafe environments, on the other hand, exist when situations

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[8] It should be acknowledged that even though Van Zyl et al. (2010) refer to engagement in their study as state engagement, they measured the construct/based the assessment items on Kahn's conceptualisation of personal engagement as a psychological act.

[9] The extent to which the psychological meaning earned by investing the self in enriched jobs in a manner that authentically expresses the self is valued probably varies across employees. The strength of the need to grow (Hackman & Oldham, 1980) could play a role in determining the valence of psychological meaningfulness. This line of reasoning suggests that the strength of the growth need moderates the effect of enrichment and work role-self fit on psychological meaningfulness.

[10] This line of reasoning suggests that psychological safety moderates the effect of psychological meaningfulness on personal engagement.

are ambiguous, unpredictable and threatening (May et al., 2004). With regards to this study Kahn's (1990) definition of *psychological safety* is adopted and the condition is defined as "feeling able to show and employ one's self without fear of negative consequences to self-image, status or career" (p. 708). May et al. (2004) explored four possible workplace determinants of *psychological safety*; *supervisor relations*, *co-worker relations*, *co-worker norms* and *public self-consciousness* [11]. Kahn (1990) identified interpersonal relationships, group and inter-group dynamics, management style and process, and organisational norms to have the most direct influence on *psychological safety*.

2.3.3.1 Supervisor Relations

The relation with one's supervisor can have a dramatic, direct impact on an individual's perceptions of the safety of a work environment. The supervisor occupies a position of authority. This authority offers control over rewards and sanctions that can be to the detriment or benefit of the employee. It could be argued that a poor relationship with one's supervisor (characterised by for example mistrust and lack of support, concern, fair treatment and encouragement given to employees) increases uncertainty as to whether the supervisor might at any given moment act in a manner that is to the detriment of the employee. It could be argued that this increased uncertainty could negatively impact the *psychological safety* experience by the employee. According to Walumbwa and Schaubroeck (2009, p. 1276) "leaders are pivotal for removing the constraints that often discourage followers from expressing their concerns and own ideas". A number of researchers have maintained that when supervisors exhibit behaviours that are supportive and not controlling in nature the relation should foster perceptions of safety (Edmondson, 1999; Kahn, 1990; May et al., 2004; Oliver & Rothmann, 2007), and enhance creativity (Brown & Leigh, 1996; Deci, Connell & Ryan, 1989). These supervisors cultivate a supportive, trusting, and fair work environment; demonstrate high integrity; are concerned about their employees' needs, thoughts and feelings; and provide them with praise for work well done. Furthermore, they encourage employees to voice their own opinions, develop new skills and solve work-related problems (Deci & Ryan, 1987; May et al., 2004; Olivier & Rothmann, 2007).

A supportive and not-controlling management style allows employees to try and fail without fear of negative consequences and it gives employees control over their work and the methods used to accomplish it. In contrast, rigid and inflexible management control over work methods is likely to give off the impression that management has little trust and confidence in its employees' work abilities (Brown & Leigh, 1996; Kahn, 1990). In his study Kahn (1990) found that employees felt safer when they had some control over their work as opposed to their misperception that their managers' reluctance

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[11] It should be acknowledged that May et al. (2004) in their structural model use the term self-consciousness. However, since theorising suggests that public self-consciousness in particular influences psychological safety, together with the fact that the measuring instrument May et al. (2004) used consisted only of items measuring public self-consciousness (Fenigstein, Scheier & Buss, 1975) this study considers the term public self-consciousness to be more appropriate.

to loosen control meant they didn't trust them, and that they should fear over-stepping their boundaries. For the purpose of this study, *supervisor relations* refers to the level of support, concern, encouragement, praise and fair treatment provided to employees; the level of flexibility and control given to employees over their work and the methods they use to accomplish it; as well as the level of trust in the relationship and the extent to which the supervisor exhibits integrity.

2.3.3.2 Co-worker Relations

"Individuals with rewarding interpersonal interactions, as well as the presence of co-worker interactions that foster a sense of belonging and stronger sense of social identity should experience increased *psychological safety*" (Olivier and Rothmann, 2007, p. 50). Kahn (1990) maintains alike that trusting and supportive interpersonal relations among co-workers at work should lead to *psychological safety*. According to McAllister (1995), interpersonal trust can either have cognitive or affective bases. Cognitive based trust is related to the reliability and dependability of others, while affective trust is impacted by the emotional relationships between individuals.

May et al. (2004) were interested in investigating how supportive and affective trust-building co-worker relations could positively impact *psychological safety* and *personal engagement* at work. Edmondson (1996) found in a similar study that the quality of relations in work teams influenced employees' shared beliefs over whether mistakes would be held against them (i.e. *psychological safety*). May et al. (2004) thus argued that co-workers, who are supportive; have mutual respect for each other; and value one another's contributions, generate trust and increase perceptions of *psychological safety* and work engagement. In this study *co-worker relations* refers to the level of support, mutual respect, trust and value placed on each another's' contributions evident in interpersonal relations among co-workers (May et al., 2004).

May et al. (2004) initially theorised that *co-worker relationships* may also affect *psychological meaningfulness*. This links with the Ubuntu idea that we can only truly become who we really are through interaction with other people who are unconditionally there for us (and we for them). May et al. (2004) argued that when employees are regarded with dignity and respect and are valued for their contributions to the organisation, rather than as simply an occupant of a role, they are more likely to gain a sense of meaningfulness from co-worker interactions. They also went on to suggest that employees draw meaning from the social identities they receive from relevant group memberships. That is, "to the extent that co-worker interactions foster a sense of belonging, a stronger sense of social identity and meaning should emerge. Alternatively, loss of a social identity should be associated with meaninglessness." (May et al., 2004, p. 15).

2.3.3.3 Co-worker Norms

Behaviours, attitudes and the emotional dimensions of work tend to be governed by norms within groups and organisations (Hochschild, 1983). Kahn (1990) proposed that individuals who stay within the boundaries of acceptable behaviours (e.g. not questioning the habitual patterns of behaviour, thought and emotions expressed by one's co-workers) will experience *psychological safety*. When operating in an environment in which one is familiar with expectations as to one ought to act should logically increase the feeling of *psychological safety*. However, May et al. (2004) found that individuals who reported adhering to *co-worker norms* experienced less *psychological safety* at work. Maybe when individuals consciously feel they must adhere to normative behaviours set by their co-workers they don't feel that they can truly be themselves at work and thus experience the negative aspects of 'concertive control'[12] systems in teams (Barker, 1993; May et al., 2004). It is possible that a distinction is required between being familiar with the norms governing behaviour in a particular context and the extent to which the norms that that govern behaviour in a specific context is congruent with one's personal values (i.e. the extent to which the behaviours dictated by the norms come naturally or not). Lower levels of *psychological safety* could be expected when one is not familiar with prevailing *co-worker norms* and/or when the *co-worker norms* are not congruent with one's personal values.

Group norms are defined by Feldman (1984, p. 47) as "the informal rules that groups adopt to regulate and regularise group members' behaviours". Norms are generally enforced if they; a) facilitate the survival of a group, b) make group behaviour more predictable, c) aid the group in avoiding embarrassing interpersonal problems, and d) clarify what is unique and original about the group's identity as well as express the group's central values. Even though group norms can aid these essential processes, the regulating process related to the concertive control in self-managing teams can in fact adversely impact group members (Barker, 1993). Barker argues that teams cultivate concertive control through; a) a value based agreement over what constitutes as ethical rational behaviour at work, b) affinity for these shared values and the transference of power and jurisdiction to the team's value system, c) behavioural norms that are systematically established based on this shared value system, d) older members' expectations that new comers should embrace and act in accordance with these norms, e) peer pressure to ensure compliance with these normative rules, and f) the formalisation and sharing of these standardised norms (see Barker, 1993, p. 434). Thus, Barker argues that group norms that form within teams "actually serve to tighten Weber's 'iron cage' of the rational rules of bureaucracy because

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[12] Concertive control (Barker, 1993) refers to the theory that represents a key shift in the locus of control from management to employees. Within such systems, employees get to collaboratively set the core values and norms that shape their behaviour in the workplace. Indeed the word concertive cannot be found in the dictionary, however, one might argue that the origin of the word could stem from 'concerted' – that is, a concerted effort whereby something is planned or accomplished collaboratively. Alternatively, an overlap might be identified with that of 'concert' – that is, in terms of the informal definition, a collaborative performance, and formally concert has been defined as arranging something by mutual agreement or co-ordination.

resisting this new form of control risks employees' human dignity as team members" (May et al., 2004. p. 17). In agreement, Edmondson (1999) argues that such cohesion in groups weakens an individual's willingness to disagree or challenge a co-worker's views, indicating a lack of interpersonal risk taking (low *psychological safety*). In summary, adherence to *co-worker norms* (which is defined in this study as the strength of the normative rules adopted by groups to regulate and govern group members' behaviours) likely leads to less *psychological safety* experienced by employees, decreasing their willingness to engage in their work roles.

2.3.3.4 Public Self-consciousness

According to Fenigstein, Scheier and Buss (1975) people's affinity to direct attention inward or outward is the trait of self-consciousness. Self-consciousness involves the process of self-focused attention; "when the person is focusing on his thoughts, feelings, behaviours or appearance; when he is reflecting, fantasising, or daydreaming about himself; or when he is making decisions or plans that involve himself" (p. 522). Through their study Fenigstein et al. (1975) concluded that there are two psychologically distinct self-focusing tendencies namely; *private self-consciousness* (conscious private mulling over one's inner feelings, thoughts, reflections and physical sensations) and *public self-consciousness* (conscious awareness and concern of the self as a social object and your appearance to others). These self-focusing tendencies should be seen as two dimensions of a construct that each run from low to high. The above definition for *public self-consciousness* is adopted for the purpose of this study.

Kahn (1990) originally theorised that self-consciousness influences an individual's security in their work role and thus affects an individual's perceptions of *availability*. However, May et al. (2004) felt that he may have overlooked the linkage between (*public) self-consciousness* and *psychological safety*. They argued that individuals who are insecure about their work roles may also feel unsafe at work, particularly those who experience *public self-consciousness* (Fenigstein et al., 1975). "Individuals who constantly worry about what others think of them are likely to experience less *psychological safety* at work. They will be inhibited when it comes to trying new ways of accomplishing their tasks" (May et al., 2004, p. 31). People who are publicly self-conscious are particularly aware of the self as a social stimulus. They are concerned about how they present themselves to others, orientated toward gaining approval and avoiding disapproval and worry about how others evaluate them (Carver & Scheier, 1981; Doherty & Schlenker, 1991; Fenigstein et al., 1975). Doherty and Schlenker infer that maybe because individuals with a high *public self-consciousness* have concerns about their social identities, they will also tend to be fearful of receiving negative evaluations from others. This would indicate a lack of risk-taking due to perceptions of an unsafe environment, which would decrease an individual's willingness to engage in work roles.

2.3.4   Psychological Availability

Kahn (1990, p. 714) defines *psychological availability* as "the sense of having the physical, emotional, or psychological resources to personally engage at a particular moment". It is a crucial psychological condition for engaging in specific work tasks because "being available is partly a matter of security in abilities and status and maintaining a focus on tasks rather than anxieties" (Kahn, 1990, p. 716). *Psychological availability*'s influence is associated with individual distractions which preoccupy people to various degrees leaving them with more or fewer resources with which to engage in role performances (Kahn, 1990). In essence, it measures how ready or confident individuals are to personally engage in their work roles, given the distractions or demands of both work and non-work aspects of life that individuals are engaged in as members of social systems (Binyamin & Carmeli, 2010; Kahn, 1990; May et al., 2004).

Psychological availability is believed to lead to *personal engagement* because individuals who experience *psychological availability* feel capable of driving physical, emotional and cognitive energies into role performance. That is, they become physically involved in their tasks, whether alone or with others; they are cognitively alert and vigilant; they're able to empathetically connect to others while performing their work; and they express their true identity, thoughts and feelings (Kahn, 1990). General expectancy theory (Vroom, 1964) on motivation suggests that self-efficacy positively affects the expectancy that effort will successfully translate into performance (P(E$\rightarrow$P)). Expectancy theory (Vroom, 1964) along with Bandura's (1982; 1994) work moreover suggests that successful performance has a positive feedback loop to self-efficacy. For the purpose of this study *psychological availability* is defined as an individual's belief that he or she possesses the necessary physical, emotional, and cognitive resources to successfully engage the self at work. Factors that influence *psychological availability* according to May et al. (2004) include the individual's *resources* and *outside activities*. Kahn (1990) hypothesised that four factors influence *psychological availability*, namely physical energy, emotional energy, individual security and outside life.

2.3.4.1 Resources

When individuals engage themselves at work, they utilise their physical, emotional and cognitive *resources* to achieve role-related tasks. Most jobs require some form of physical exertion. Some are less physically demanding while others can involve more intense physical challenges that could result in injury. According to Hollenbeck, Ilgen and Crampton (1992) even less physically demanding jobs, for example sitting at a desk, can put enormous stress on the back. People differ in terms of their levels of strength, stamina and flexibility to meet these physical demands and if they lack the necessary physical resources, they may become physically disengaged from their work role (May et al., 2004; Olivier & Rothmann, 2007).

Jobs and work roles also vary in terms of emotional demands. Some jobs require much more emotional labour – "the management of feelings to create a publicly observable facial and bodily display" (Hochschild, 1983, p. 7) – than others. For example, service sector jobs when employees try expressing only cheerfulness when interacting with customers, or suppressing their irritation with difficult ones (Chou, Hecker & Martin, 2012; Hochschild, 1983; Sutton, 1991). According to Morris and Feldman's (1996) theoretical work on the dimensions of emotional labour, emotional dissonance together with the frequency, duration and intensity of the emotional display and variety of expressed emotions lead to the depletion of emotional resources (i.e. exhaustion) (May et al., 2004).

Lastly, cognitive demands also vary per job and per person. Some individuals have a 'need for cognition' (Thompson, Chaiken, & Hazlewood, 1993) and desire more complex tasks. However, some individuals occupy work roles that require more information processing than they can handle resulting in what researchers in the stress literature describe as role overload (e.g. Ganster & Schaubroeck, 1991). These individuals "become overwhelmed at the amount of information or 'balls in the air' and lack the ability to think clearly" (May et al., 2004, p. 18).

Thus, in summary, the presence or availability of *resources* (defined in this study as the self-perceived physical, emotional and cognitive resources required to engage in role performances) is likely to lead to greater *psychological availability* (perceived ability to successfully perform the tasks at hand) and increased *personal engagement* (May et al., 2004).

2.3.4.2 Outside Activities

Kahn (1990) argues that peoples' outside lives can influence their levels of *psychological availability* because they have the potential to distract them from their role performances. In today's work environment where companies are streamlining their workforce to get more out of less; expecting more work from fewer employees, it is becoming increasingly difficult for employees to cope with the demands of outside activities (Hall & Richter, 1988). As such "activities outside the workplace have the potential to draw away individuals' energies from their work and make them less *psychologically available* for their work roles" (May et al., 2004, p. 18).

However, Rothbard (2001) in his study of family and work engagement recently found that family engagement can in fact positively influence work engagement for woman employees in that, "such an 'enrichment effect' reinforces the benefits of multiple role involvement which may lead to 'energy expansion' " (May et al., 2004, p. 19)

In May et al.'s study (and for definition purposes) *outside activities* refer to the extent to which an employee is involved in those activities outside the workplace that include membership of outside organisations, for example school, other jobs, church, volunteering etc. They sought to uncover whether

time demands for outside organisational activities had enriching or depleting effects on *personal engagement*. It's argued that time demands due to such outside activities are likely to distract an individual's attention so that they are unable to focus on their role tasks (May et al., 2004). This is similar to what Edwards and Rothbard (2000) refer to as a resource drain perspective.

2.3.5   The Structural Model Proposed by May et al. (2004)

Based on Kahn's (1990) theoretical framework May et al., (2004) explored the determinants and mediating effects of *psychological meaningfulness*, *psychological safety* and *psychological availability* on employees' *personal engagement*. They proposed a structural model that depicts that specific paths or hypothesised causal linkages between the psychological conditions and their determinants, and *personal engagement* as theorised by Kahn is depicted in Figure 2.1. Listed below are the initial sets of substantive path-specific hypotheses offered by May et al. (2004) in their study[13]:

- **Hypothesis 1a:** *Job enrichment* positively influences *psychological meaningfulness*.
- **Hypothesis 1b:** *Work role-self fit* positively influences *psychological meaningfulness*.
- **Hypothesis 1c:** *Co-worker relations* positively influences *psychological meaningfulness*.
- **Hypothesis 2a:** Supportive *supervisor relations* positively influences *psychological safety*.
- **Hypothesis 2b:** Rewarding *co-worker relations* positively influences *psychological safety*.
- **Hypothesis 2c:** Adherence to *co-worker norms* negatively influences *psychological safety*.
- **Hypothesis 3a:** *Resources* positively influences *psychological availability*.
- **Hypothesis 3b:** *Public self-consciousness* negatively influences *psychological availability*.
- **Hypothesis 3c:** *Outside activities* negatively influences *psychological availability*.
- **Hypothesis 4a:** *Psychological meaningfulness* positively influences *personal engagement* at work.
- **Hypothesis 4b:** *Psychological safety* positively influences *personal engagement* at work.
- **Hypothesis 4c:** *Psychological availability* positively influences *personal engagement* at work.
- **Hypothesis 5a:** Experienced *psychological meaningfulness* mediates the effect of *job enrichment*, *work role-self fit*, and *co-worker relations* on *personal engagement* at work.
- **Hypothesis 5b:** Experienced psychological safety mediates the effect of *supervisor relations*, *co-worker relations* and *co-worker norms* on *personal engagement* at work.
- **Hypothesis 5c:** Experienced psychological availability mediates the effect of *resources*, *public self-consciousness* and *outside activities*) on *personal engagement* at work.

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[13] All these hypotheses should be read with the extension … when controlling for all other effects that have been hypothesised to affect the dependent latent variable referred in the hypothesis.

The hypotheses were empirically tested by fitting the explanatory structural model implied by the hypotheses shown in Figure 2.1.
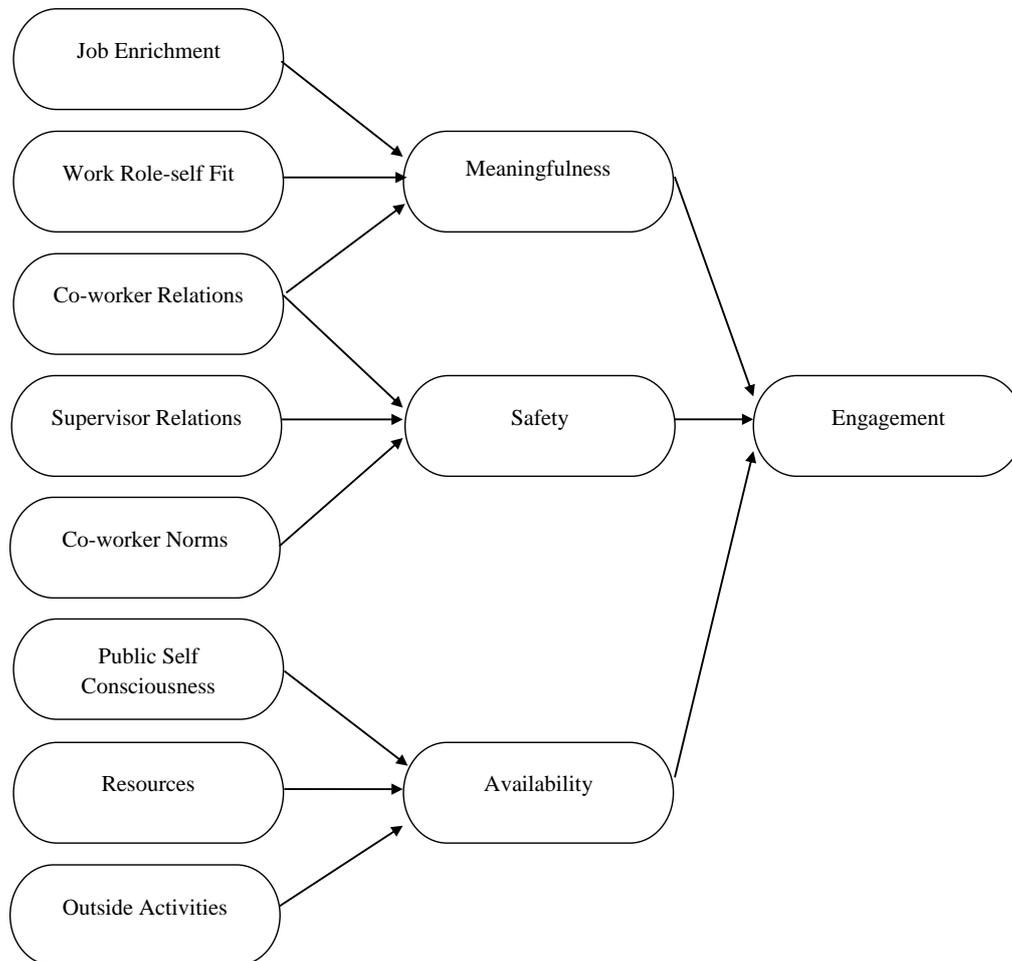
Figure 2.1. Graphical portrayal of the initial proposed conceptual structural model of employee personal engagement. Adapted from "The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work.", by May, D.R., Gilson, R.L., & Harter, L.M. (2004), Journal of Occupational and Organisational Psychology, p. 25.

2.3.6 The Results obtained for the May, Gilson, and Harter (2004) Engagement Structural Model

The fitted model and the obtained standardised estimates for the freed structural model parameters is shown in Figure 2.2.
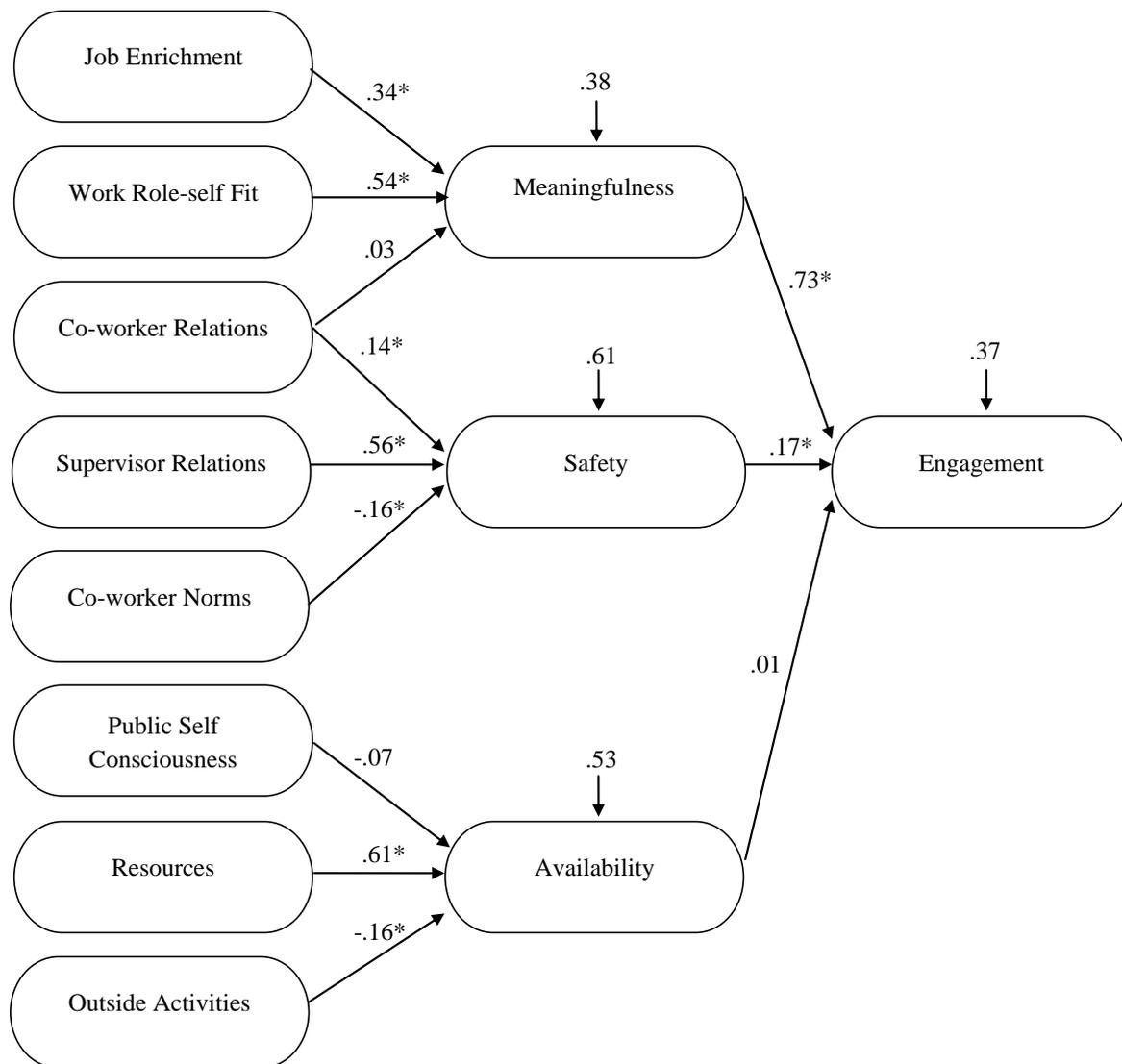
Figure 2.2. Graphical portrayal of the fitted initial proposed structural model of behavioural employee engagement. Reprinted from "The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work.", by May, D.R., Gilson, R.L., & Harter, L.M. (2004), Journal of Occupational and Organisational Psychology, 77, p.25.

Note. Path coefficients are standardised. *p<.05

The model obtained reasonably good fit. The exact fit null hypothesis (H_o: RMSEA=0) was rejected. The close fit null hypothesis (H_o: RMSEA≤.05) was not directly tested[14]. May et al. (2004) concluded acceptable fit for their model. However when evaluating the path-specific substantive hypotheses in the originally proposed model May et al. (2004) found that their results only provided partial support for hypothesis 1a-1c (the effect of *co-worker relations* on *psychological meaningfulness* was not statistically significant (p>.05)) when controlling for the effect of *job enrichment* and *work role-self fit*,

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[14] May et al. (2004) didn't provide/report RMSEA values in their study.

3a-3c (the effect of *public self-consciousness* on *psychological availability* was not statistically significant (p>.05) when controlling for *resources* and outside *activities*), and 4a-4c (the effect of *psychological availability* on *personal engagement* was not statistically significant (p>.05) when controlling for *meaningfulness* and *psychological safety*). Furthermore, results suggested that mediation by the three psychological conditions (hypotheses 5a-c) as originally theorised in Kahn's (1990) framework was also only partially supported by the data. This was evident because when testing mediation affects (hypotheses 5a-5c) May et al. (2004), in order to meet the conditions of mediation[15] specified by Baron & Kenny (1986), analysed three different models using the LISREL 8.51 program, namely; the direct effects model, the indirect effects model and the saturated model. In terms of May et al.'s (2004) study the 'direct effects' model estimated direct paths from each exogenous variable to its hypothesised mediator and to engagement. The 'indirect effects' model estimates paths from each exogenous variable to its hypothesised mediator and from each mediator to engagement (which is equivalent to their initial hypothesised model). Finally, what May et al. (2004) refer to as the 'saturated' model estimated paths from each exogenous variable to its proposed mediator and engagement and from each mediator to engagement. The results of the three models are given in Table 2.1.

Table 2.1

Fit indices and standardised path coefficients of the initial proposed structural model of behavioural employee engagement.

Measures	Direct Model	Indirect (Initial) Model	Saturated Model
Fit Indices			
Chi-squared	99.79*	107.59*	59.66*
df	21	26	18
GFI	.92	.92	.95
NNFI	.65	.71	.76
SRMR	.07	.07	.07
Direct Effects on Engagement			
Job Enrichment	.31*	—	.09
Work Role-self Fit	.47*	—	.14
Co-worker Relations	.00	—	-.01

[15] According to Baron and Kenny (1986) the first condition holds that the exogenous variable must significantly covary with the presumed mediator. In terms of May et al.'s (2004) study this condition is met when the path coefficient between an exogenous variable and its mediator is significant in their direct effects model. The second condition holds that the mediator must significantly covary with the endogenous variable. With regards to May et al.'s study this condition is met when the path coefficient between the mediator and the endogenous variable is significant in their indirect (initial effects) model. Lastly, Baron and Kenny's third condition holds that then the relationships between the mediator and the exogenous variable and endogenous variable are controlled, the relationship between the exogenous variable and endogenous variable become insignificant for fully mediated relations. If the relation is still significant but smaller in size, partial mediation is indicated (Baron & Kenny, 1986). In terms May et al.'s study the path coefficients in their direct effects and saturated models are compared to determine the form of mediation.

Table 2.1

Fit indices and standardised path coefficients of the initial proposed structural model of behavioural employee engagement (continued).

Supervisor Relations	.15	—	.14
Co-worker Norms	-.17*	—	-.15*
Resources	-.05	—	-.23*
Public Self Consciousness	.18*	—	.23*
Outside Activities	-.10	—	-.10
Meaningfulness	—	.73*	.56*
Safety	—	.17*	.06
Availability	—	.01	.22*
Direct Effects on Meaningfulness			
Job Enrichment	.35*	.34*	.34*
Work Role-self Fit	.53*	.54*	.53*
Co-worker Relations	.04	.03	.04
Direct Effects on Safety			
Co-worker Relations	.14*	.14*	.14*
Supervisor Relations	.56*	.56*	.56*
Co-worker Norms	-.16*	-.16*	-.16*
Direct Effects on Availability			
Resources	.61*	.61*	.61*
Public Self Consciousness	-.07	-.07	-.07
Outside Activities	-.16*	-.16*	-.16*

Note: Reprinted from "The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work.", by May, D.R., Gilson, R.L., & Harter, L.M. (2004), Journal of Occupational and Organisational Psychology, 77, p. 26.

*p<.05

The indirect effects model and the direct effects model were both nested within the saturated model. Hence May et al. (2004) could calculate the statistical significance of the difference in fit between these two models and the saturated model via a chi-square difference test (Diamantopoulos & Siguaw, 2000). The analyses indicated that "the partial mediation model (i.e. saturated model[16]) had better overall fit to the data than either the hypothesised full mediation model (i.e. indirect effects model) (X^2 difference=47.93, df =8, p<.05) and the direct effects model (X^2 difference=40.13, df =3, p<.05).

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[16] It should be acknowledged that what May et al. (2004) refer to as a saturated model is not what is commonly regarded as a saturated model. Usually a saturated model is a model with zero degrees of freedom in which as many parameters are estimated as there are unique elements in the observed variance-covariance matrix, also known as a just identified model. However, when interpreting and understanding the results of May et al.'s originally proposed model their definition needs to be adopted.

This suggests that mediation, as conceived in the original theoretical framework does not explain the covariation in the data as well as a model allowing partial mediation (i.e. the saturated model)" (May et al., 2004, p. 26)[17]. Since, what May et al. (2004) refer to as the saturated model, fitted their data better than the originally theorised model, they decided to investigate whether a revised model, still based on the original framework, would show improved explanatory power and overall fit with the data. Their primary concerns were with the theoretical issue of mediation and therefore were interested in a revised model that could provide a clearer understanding of mediation by the three psychological conditions. May et al.'s model revision process is discussed below.

First, they removed the paths between *co-worker relations* and *psychological meaningfulness* and between *public self-consciousness* and *psychological availability* as neither path coefficient was statistically significant ($p > .05$) and deletion of these path coefficients did not significantly impact the model's degree of overall fit (X^2 difference$=.40$, df$=1$, $p > .05$ for deletion of *co-worker relations* and X^2 difference$=.56$, df$=1$, $p > .05$ for deletion of *public self-consciousness*). May et al. (2004) then went on to add new paths[18] which they did one at a time in order to assess each added path's individual impact on other path coefficients and on fit statistics. "Significant X^2 difference tests after each addition indicated that each added path significantly added to the model's degree of overall fit" (May et al., 2004, p. 27). They first added a path from *public self-consciousness* to *psychological safety* (X^2 difference$=11.9$, df $=1$, $p < .05$), as they theorised that individuals who are insecure about their work roles may also feel unsafe at work, particularly those who experience high public self-consciousness (Fenigstein et al., 1975). And finally, paths were added from *public self-consciousness* to *personal engagement* (X^2 difference$=17.27$, df $=1$, $p > .05$) and from *resources* to *personal engagement* (X^2 differenc*e*$=9.77$, df$=1$, $p > .05$) because they theorised that there may be direct effects between the determinants of *psychological availability* and *personal engagement* itself (May et al., 2004). The fitted revised model and the obtained estimates for the freed structural model parameters is shown below in Figure 2.3.

The revised model obtained reasonably good fit. The exact fit null hypothesis (H_o: RMSEA$=0$) was rejected. The close fit null hypothesis (H_o: RMSEA$\leq.05$) was not tested[19]. In order to assess the fit for the overall revised model and each individual portion of the revised model May et al. (2004) followed

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[17] The current study would have preferred a different, more direct, targeted approach to the testing of the mediation hypotheses. The current study would have rather calculated the hypothesised indirect effects and testing the statistical significance of these indirect effects. This would have been possible by utilising the AP and CO commands available in the LISREL (rather than SIMPLIS) command language. It is, however, acknowledged that even if the hypothesised mediation effects would have been supported in this manner the question whether a partially mediated model provides a better account of the covariance matrix remains an important and valid question.

[18] May et al. (2004) failed to mention in their study how these paths were identified for inclusion. One possibility could have been by analysing modification index values.

[19] May et al. (2004) didn't provide/report RMSEA values in their study.

procedures recommended by Kline (1998). May et al. (2004) considered several goodness-of-fit indices to assess overall model fit. According to Kline (1998) LISREL goodness-of-fit index (GFI) values ≥ .9 and standardised root mean squared residual (SRMR) values < .10 are generally considered desirable. May et al. obtained a GIF = .95 and SRMR = .06 for their revised model. Their Non-Normed Fit Index (NNFI) of .82 suggested less than optimal fit for the revised model as NNFI values ≥ .9 are considered desirable. However, the chi-squared/degrees of freedom ratio was 2.78 indicating better model fit than the chi-squared test as the value of the ratio was <3.0 (May et al., 2004). From the foregoing May et al. (2004) concluded sufficiently acceptable model fit to warrant the interpretation of the structural model parameter estimates.
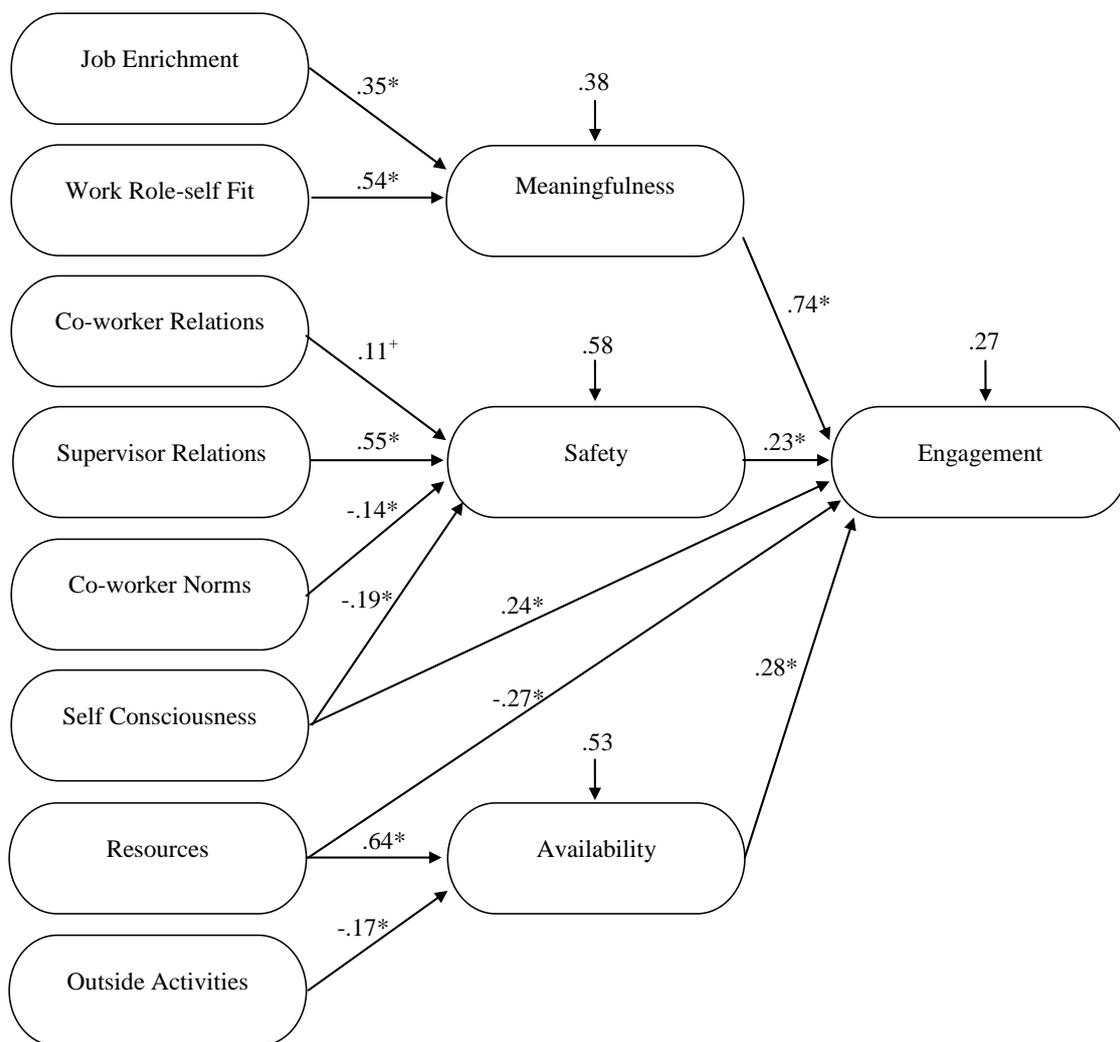
Figure 2.3. Graphical portrayal of the fitted revised (final) proposed structural model of behavioural employee engagement. Reprinted from "The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work.", by May, D.R., Gilson, R.L., & Harter, L.M. (2004), Journal of Occupational and Organisational Psychology, 77, p. 28.

Note. Path coefficients are standardised *p<.05; +p<.10.

Through the chi-squared difference test they assessed whether their revised model fitted statistically significantly better than the just-identified model – the model with zero degrees of freedom and having paths from each exogenous variable to each hypothesised mediator and to engagement, as well as paths from each hypothesised mediator to engagement. "Significant values of the chi-squared statistic indicated that our over-identified model (the revised model) was significantly different from the just-identified model (X^2 =69.61, df =25, N=199, p<.05)" (May et al., 2004, p. 29)

To assess fit of the individual sections of the model, May et al. (2004) utilised the rather unusual procedure suggested by Kline (1998) of comparing the observed correlations[20] with the correlations reproduced by LISREL-8.51. This enabled them to determine the degree to which the different sections of the revised model accounted for the original correlations (Kline, 1998). They further reported that the pattern of correlation residuals for the section of the model predicting *psychological meaningfulness*, *psychological safety* and *psychological availability* indicated relatively good fit, and the correlation residuals for the section of the model predicting *engagement* indicated fair fit (May et al., 2004). "Taken together, the model fit indices and the correlation residuals suggest that the relationships posited in the revised model account for a substantial amount of the covariation in the data. In addition, the revised model accounts for a large proportion of the variance in the three mediators and in *engagement*, lending more empirical support for the revised model's adequacy." (May et al., 2004, p. 29)

Results from the revised model indicate that all three psychological conditions are important in determining one's engagement at work. More specifically, the results suggested that both *job enrichment* and *work role-self fit* had significant positive relations with *psychological meaningfulness*. *Supervisor relations* and *co-worker relations* had significant positive relations with feelings of *psychological safety*, while (as predicted) adherence to *co-worker norms* and *public self-consciousness* were negatively related. *Psychological availability* was statistically significantly (p>.05) and positively related to *resources* and statistically significantly (p<.05) and negatively related to *outside activities*. With regards to mediation, analyses revealed that the effects of both *job enrichment* and *work role-self fit* on *engagement* respectively were fully mediated by *psychological meaningfulness* and, *psychological safety* only partially mediated the effects of *co-worker norms* on *engagement*. Finally, *resources* were also found to have a direct influence on *engagement* at work. An important finding in May et al.'s (2004) revised model depicted in Figure 2.3 is that by adding a direct path between *resources* and *engagement* the relationship between *psychological availability* and *engagement*, which was not significant (β= .01, p>.05) in the initial model depicted in Figure 2.2, became statistically significant (β= .28, p<.05) in the revised model. This is because *psychological availability* significantly explains variance in *engagement* that is not explained by *resources*. When the variance in *engagement*

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[20] It is not clear, nor was it indicated, why May et al. (2004) chose to analyse the correlation matrix rather than the covariance matrix.

that is explained by *resources* is not controlled, *psychological availability* does not statistically significantly (p>.05) explain variance in *engagement.*

2.4   THE PROPOSED EXPANDED EMPLOYEE ENGAGMENT STRUCTURAL MODEL

As previously argued, cumulative structural equation modelling research studies on employee engagement, where researchers attempt to expand and elaborate on an already existing employee engagement model, are more likely to ensure that meaningful progress will be made toward a more penetrating understanding of the psychological dynamics underlying employee engagement. The following section will first explore possible modifications, if necessary, to the revised May et al. (2004) employee engagement structural model and then go on to expand the model further into a comprehensive state engagement structural model.

2.4.1   Modifications to the Revised May et al. (2004) Employee Engagement Structural Model

Given the research objective of expanding on the revised May et al. (2004) employee personal engagement structural model, the existing model must first be examined to determine if it requires any structural modifications. This entails making an informed decision as to whether the revised May et al. model as is, should form the basis of the proposed expanded model or whether (a) specific causal paths in the model should be deleted, and/or (b) whether additional paths should be added between the existing latent variables. Deciding whether to include or remove paths was based on May et al.'s research results, on the significance of the path coefficient estimates they attained, and the conjectural soundness of the arguments suggested to back up the existing structural model hypotheses.

Due to the persuasiveness of the theoretical arguments which led to the revised models' hypothesised paths (presented in Section 2.3) and the statistical significance (p<.05) of the standardised path coefficients (as presented in Figure 2.3), all the causal paths hypothesised in the May et al. (2004) revised structural model were retained in the hypothesised expanded employee engagement structural model. Considering the question whether additional paths should be included between the existing latent variable, one modification is proposed by hypothesising that *psychological safet*y moderates the effect of *psychological meaningfulness* on *personal engagement*[21].

A moderator variable has been defined as a qualitative or quantitative variable which systematically affects the form, direction and/or strength of the relationship between an independent (predictor) variable and a dependent (criterion) variable (Baron & Kenny, 1989; Sharma, Durand & Gur-Arie,

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[21] For the remainder of this study work engagement at conceptualised by Kahn (1990) and incorporated in May et al.'s structural model will be referred to as personal engagement. This is to avoid any confusion with the construct state engagement (Bakker & Shaufeli, 2008; Demerouti & Bakker, 2006) which is included in the proposed expanded employee engagement structural model in Section 2.5.2.

1981). *Psychological safety* would be defined as a moderator of the relationship between *psychological meaningfulness* and *personal engagement* if the nature of the relationship is contingent upon the values or levels of *psychological safety*. *Psychological meaningfulnes*s refers to a sense or expectation of positive return on investments of self-in-role performances. To invest the self means that the self has to be revealed which makes the person vulnerable. Jobs rich in the job characteristics (Hackman & Oldham, 1980) and that offer the potential of high fit between the self and the role that the job requires, offers an opportunity to a valued benefit[22] of *psychological meaning*. Whether it is worthwhile grasping the opportunity depends on the perceived *psychological safety* to the self of doing so. If the person feels unable to show and employ their self-due to fear of negative consequences to the self-image, status or career, they are less likely to invest the self-in-role performances and experience the positive return of *meaningfulness*. Therefore, it is possible that if *psychological safety* is low the effect of *psychological meaningfulness* on *personal engagement* will be weakened and an individual will be less likely to *personally engage* their self in their work role. As such, and for the purpose of the current study, it is hypothesised that *psychological safety* moderates the effect of *psychological meaningfulness* on *personal engagement*.

The preceding theorising lead to eighteen path-specific substantive hypotheses.

Hypothesis 2[23]: In the proposed employee engagement structural model it is hypothesised that *job enrichment* positively influences *psychological meaningfulness[24]*.

Hypothesis 3: In the proposed employee engagement structural model it is hypothesised that *work role-self fit* positively influences *psychological meaningfulness*.

Hypothesis 4: In the proposed employee engagement structural model it is hypothesised that rewarding *co-worker relations* positively influences *psychological safety*.

Hypothesis 5: In the proposed employee engagement structural model it is hypothesised that supportive *supervisor relations* positively influences *psychological safety*.

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[22] The extent to which the psychological meaning earned by investing the self in enriched jobs in a manner that authentically expresses the self is valued probably varies across employees. The strength of the need to grow (Hackman & Oldham, 1980) could play a role to determine the valence of psychological meaningfulness. This line of reasoning suggests that the strength of the growth need moderates the effect of enrichment and work role-self fit on psychological meaningfulness.

[23] The overarching substantive hypothesis will be depicted as Hypothesis 1. The overarching hypothesis will be presented once the theorising has adequately answered the research initiating question and the structural model had formally emerged from the theorised at the end of Chapter 2. The overarching substantive hypothesis will make the claim that the proposed structural model provides a valid description of the psychological mechanism that regulates differences in the level of employee state engagement.

[24] The phrase in the proposed employee engagement structural model was used on purpose to acknowledge the fact that the each hypothesis posits that a specific exogenous (ξ_j) or endogenous (η_i) latent variable explains unique variance in a specific endogenous latent variable (η_k) when controlling for all other latent variables that are linked to η_k in the structural model.

Hypothesis 6: In the proposed employee engagement structural model it is hypothesised that adherence to *co-worker norms* negatively affects *psychological safety*.

Hypothesis 7: In the proposed employee engagement structural model it is hypothesised that *public self-consciousness* negatively affects *psychological safety*.

Hypothesis 8: In the proposed employee engagement structural model it is hypothesised that *resources* positively influences *psychological availability*.

Hypothesis 9: In the proposed employee engagement structural model it is hypothesised that *outside activities* negatively affects *psychological availability*.

Hypothesis 10: In the proposed employee engagement structural model it is hypothesised that *psychological meaningfulness* positively influences *personal engagement* at work.

Hypothesis 11: In the proposed employee engagement structural model it is hypothesised that *psychological safety* positively influences *Personal engagement* at work.

Hypothesis 12: In the proposed employee engagement structural model it is hypothesised that *Psychological availability* positively influences *personal engagement* at work.

Hypothesis 13: In the proposed employee engagement structural model it is hypothesised that *public self-consciousness* negatively affects *personal engagement* at work.

Hypothesis 14: In the proposed employee engagement structural model it is hypothesised that *resources* positively influences *personal engagement* at work.

Hypothesis 15: In the proposed employee engagement structural model it is hypothesised that experienced *psychological meaningfulness* mediates the effect of *job enrichment* and *work role-self fit* on *personal engagement* at work.

Hypothesis 16: In the proposed employee engagement structural model it is hypothesised that experienced *psychological safety* mediates the effect of *supervisor relations*, *co-worker relations*, *co-worker norms*, and *public self-consciousness* on *personal engagement* at work.

Hypothesis 17: In the proposed employee engagement structural model it is hypothesised that experienced *psychological availability* mediates the effect of *resources* and *outside activities* on *personal engagement* at work.

Hypothesis 18: In the proposed employee engagement structural model it is hypothesised that *psychological safety* moderates the effect of *psychological meaningfulness* on *personal engagement* at work.

2.4.2   Elaboration of the Revised May et al. (2004) Employee Engagement Structural Model

Elaboration of the revised May et al. (2004) employee engagement structural model will involve making a decision as to which additional latent variables should be added and how they should be structurally embedded in the revised model. The latent variables to be added will be discussed below and their hypothesised paths in the overall proposed expanded employee engagement structural model will be given.

2.4.2.1 State Engagement

According to Kahn (1990, p. 694) *personal engagement* is a changeable phenomenon resulting from "calibrations of self-in-role" that occur at physical, cognitive and emotional levels. These calibrations of self-in-role (which he termed *personal engagement* and *personal disengagement*) refer to "the behaviours by which people bring in or leave out their personal selves during work role performances". He defined *personal engagement* as "harnessing of organisational members' selves to their work roles". The act of harnessing is a changeable in that individuals can assign variable levels of their physical, cognitive and emotional energies to their work. That is, they can choose whether to employ and express (engage) or withdraw and defend (disengage) themselves during role performances. Kahn further suggested that such harnessing varied according to people's perceptions of the three sets of psychological conditions; *psychological meaningfulness*, *psychological safety* and *psychological availability*. In other words, an individual's decision to actively engage or disengage varies according to and it is influenced by their perceptions of these psychological conditions. Thus, *personal engagement*, as conceptualised by Kahn, is an action executable by individuals given the appropriate conditions. It refers to a psychological act of committing, rendering, giving or investing the self, and he identifies three dimensions of *personal engagement*; a physical, emotional and cognitive dimension. In his study Rich (2006) provides definitions for Kahn's (1990) three dimensions of personal engagement. According to Rich (2006) physical engagement involves the channelling of one's physical energies toward the completion of a certain task and can range from lethargy to vigorous involvement. Individuals who are cognitively engaged are thoroughly absorbed by their work and are able to ignore competing distracters and intensely focus on the task at hand (Rothbard, 2001), and finally, emotional engagement involves a strong connection between individuals' emotions, thoughts and feelings and their job (Kahn, 1990) which promotes feelings of enthusiasm and pride (Rich, 2006).

Kahn's conceptualisation of *personal engagement* where he focused on moments of personal engagement and the temporary conditions under which people are fully psychologically present at work, stands in contrast to the stance of Shaufeli, Salanova, Gonzàlez-Romà and Bakker (2002), Bakker and Schaufeli (2008) and Demerouti and Bakker (2006) who believe *state engagement* refers to a psychological state characterised by *energy*, *dedication* and *absorption*. They proposed that (state) engagement, rather than a psychological act of committing, rendering, giving or investing the self, refers

to "a more persistent and pervasive affective-cognitive state that is not focused on any particular object, event, individual or behaviour" (p. 74). Shaufeli et al. (2002) define *state engagement* as a "positive, fulfilling, work related state of mind that is characterised by *vigour*, *dedication* and *absorption*" (p. 74). It seems unlikely that the state of *state engagement* characterised in terms of these three dimensions would exist in specific employees as a function of specific employee characteristics but independent of variables characterising the job and the larger organisational context. The nature of the job should be such that it allows the psychological state of *state engagement* to develop. Literature acknowledges that the level of engagement that employees experience tends to be positively correlated with the extent to which the job is characterised by the Hackman and Oldham (1980) job characteristics (Maslach, Schaufeli & Leiter, 2001; May et al., 2004; Saks, 2006; Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008). This finding, however, begs the question which process produces the correlation. A direct structural linkage seems unlikely. A job high on the job characteristics offers the opportunity for *state engagement*. The opportunity, however, still needs to be psychologically embraced. It is only if the employee frequently and regularly commits, renders, gives themselves to the job that the psychological state of *state engagement* can emerge. It is therefore hypothesised in the proposed expanded employee engagement structural model that actively personally engaging in work role performances will lead to a positive, fulfilling work related state of mind.

Hypothesis 19: In the proposed employee engagement structural model it is hypothesised that *personal engagement* positively influences *state engagement*.

The dimensions characterising the psychological act of committing, rendering, giving or investing the self in a job and the dimensions characterising the psychological state that emerges from frequent and regular *personal engagement* seem to correspond. *Vigour*, which is characterised by "high levels of energy and mental resilience while working" (p. 74) relates to Kahn's physical dimension of *personal engagement*. Vigorous individuals are willing to invest considerable effort in their work and strongly persist in the face of difficulties. *Dedication*, which refers to being strongly involved in one's work and is characterised by a sense of significance, enthusiasm, inspiration, pride and challenge (Shaufeli et al., 2002), corresponds to Kahn's (1990) emotional dimension of *personal engagement*. Finally, *absorption* which involves "being fully concentrated and deeply engrossed in one's work, whereby time passes quickly, and one has difficulties detaching oneself from work" (Shaufeli et al., 2002, p. 75) relates to Kahn's (1990) cognitive dimension of *personal engagement*.

2.4.2.2 Engagement Outcome Variables

As previously stated in section 1.1, the objective of this study is to expand and elaborate the May et al. (2004) behavioural employee engagement structural model into a comprehensive state engagement structural model by identifying latent variable not currently included in the model that might influence *employee personal engagement* and state engagement. Although outcome variables do not directly

influence either *employee personal engagement* or state engagement it is reasonable to expect that downstream latent variables will eventually influence upstream variables. It does not seem unreasonable to argue that individuals do not remain unchanged by the effect of their behaviour on their environment. *Employee engagement* should be considered complex in that feedback loops exist that link latent *employee state engagement* outcome variables to the employee personal engagement potential latent variables and through them, the *personal engagement* and *employee state engagement* latent variables that originally (directly/indirectly) determined the outcome latent variables so as to create a dynamic system (Cilliers, 1998). As such outcome variables will be explored so as to gain a more penetrating understanding of the psychological dynamics underlying employee engagement.

Numerous researchers have argued that *state engagement* predicts positive employee outcomes, organisational success and financial performance (e.g. total shareholder return) (Bates, 2004; Baumruk, 2004; Harter, Schmidt & Hayes, 2002; Richman 2006; Xanthopoulou, Bakker, Demerouti & Schaufeli, 2009). These positive consequences for organisations are the driving force behind the popularity of *state engagement* (Ram & Prabhakar, 2011; Saks, 2006). According to Harter et al. (2004) there is a general belief that *state engagement* is connected to organisational/business results. However, engagement is an individual-level construct and if it does lead to organisational success, it must first impact individual-level outcomes. As such there is a logical reason to expect *state engagement* to be related to individuals' attitudes, intentions and behaviours (Ram & Prabhakar, 2011; Saks, 2006). Even though Kahn (1990) and May et al. (2004) didn't include outcomes in their studies, Kahn (1992) proposed that engagement leads to both individual-level outcomes (i.e. quality of people's work and their own experiences of doing that work), as well as organisational-level outcomes (i.e. the growth and productivity of organisations).

Saks (2006) suggests that *engagement* can be understood in terms of social exchange theory (SET). According to SET obligations are generated through a series of interactions between parties who are in a state of reciprocal interdependence (Saks, 2006). The theory proposes that relationships evolve over time into trusting, loyal and mutual commitments as long as the parties abide by certain "rules" of exchange (Cropanzano & Mitchell, 2005). Rules of exchange generally entail reciprocity or repayment rules – i.e. one party's actions lead to a response or actions by the other party. For example, when employees receive economic and socio-emotional resources from their organisation, they feel obligated to respond in kind and repay the organisation (Cropanzano & Mitchell, 2005). This is similar to Robinson, Perryman and Hayday's (2004) description of engagement as a two-way relationship between the employer and employee. One way for employees to repay their organisation is through their level of *personal engagement*. More specifically, employees could choose to engage themselves to varying degrees in response to the resources they receive from their organisation. The act of committing, rendering and giving of oneself, more fully, into one's work roles and investing greater amounts of physical, cognitive and emotional resources is a very profound way for employees to

respond to an organisation's action. Varying their levels of job performance serves as much more of a challenge for employees since performance is often evaluated and used as the basis for compensation and other administrative decisions. Employees are therefore more likely to exchange their *personal engagement* for resources and benefits provided by their organisation (Saks, 2006). The forgoing argument thus serves the logic that SET provides a strong theoretical foundation to explain why employees choose to become more or less engaged in their work through differing levels of *personal engagement*. The psychological conditions of *personal engagement* in May et al.'s (2004) engagement model can be considered economic and socio-emotional exchange resources within SET. When employees receive these resources from their organisation, they (in terms of Kahn's (1990; 1992) definition of *personal engagement*) feel obliged to invest themselves more fully into their role performances as repayment for the resources they received. Alternatively, failures of the organisation to provide these resources will likely results in employees withdrawing and personally disengaging from their work roles. Given this understanding of engagement in terms of SET, there is further reason to expect that engagement is related to individuals' attitudes, intentions and behaviours. As mentioned earlier, when both parties abide by the exchange rules, the result will be a more trusting and loyal relationship and mutual commitments (Cropanzano & Mitchell, 2005), and employees who continue to personally engage themselves do so because of the continuation of favourable reciprocal exchanges. Therefore, it logically follows that employees who are more engaged (viewed from the perspective of are likely to be in more trusting and high-quality relationships with their employers and will, as a result, be more likely to exhibit more positive attitudes, intentions and behaviours toward the organisation (Saks, 2006). The engagement outcomes to be explored and included in this study are *job satisfaction*, *organisational commitment*, *intention to quit*, and *organisational citizenship behaviour*.

2.4.2.2.1   Job satisfaction

Job satisfaction refers to a pleasurable or positive emotional state that arises from an employee's appraisal of their job or job experience (Locke, 1976). Locke's definition of *job satisfaction* stresses the importance of both affect or feeling, and cognition or thinking. Structured qualitative interviews with a group of Dutch employees from various occupations who scored high on the Utrecht Work Engagement Scale (Schaufeli et al., 2002) indicated that engaged employees experience high levels of energy and self-efficacy (Schaufeli, Taris, Le Blanc, Peeters, Bakker & De Jonge, 2001), which enables them to exercise influence over events that affect their lives. As such, because of their positive attitude and activity level, engaged employees create their own positive feedback or appraisals, in terms of appreciation, recognitions and success (Bakker & Demerouti, 2008).

Further reasons to expect *state engagement* to be related to the positive emotional state, characteristic/indicative of *job satisfaction*, are evident in the fact that the experience of engagement has been described as a fulfilling, positive work-related experience and state of mind (Demerouti &

Bakker, 2006; Schaufeli & Bakker, 2004; Schaufeli et al., 2002; Sonnentag, 2003) and has been found to be related to good health and positive work affect (Sonnentag, 2003). Engaged employees frequently experience positive emotions (e.g. happiness, joy, and enthusiasm) as evident in a recent study by Schaufeli and Van Rhenen, 2006). They experience better health in terms of less reported psychosomatic health complaints (Demerouti, Bakker, Jonge, Janssen & Shaufeli, 2001; Schaufeli, Taris & Van Rhenen, 2008) and fewer self-reported headaches, cardiovascular problems and stomach problems (Shaufeli & Bakker, 2004). Evidence also suggests that engaged employees are better able to create and mobilise their own job and personal resources that, in turn, fuel future engagement and so forth (Fredrickson, 2001; Xanthopoulou, Bakker, Demerouti & Schaufeli, 2007).

Employee state engagement and *job satisfaction* can be seen as two unique and distinct constructs in that, engagement implies activation, as opposed to satisfaction which is more similar to satiation (Erickson, 2005; Macey & Schneider, 2008). Additionally, *job satisfaction* is a descriptive evaluation of job characteristics or conditions (e.g. "I like my pay") whereas *state engagement* refers to a description of an individual's experiences resulting from the work (e.g. "I feel vigorous when working") (Christian, Garza & Slaughter, 2011). Storm and Rothmann argue that (2003, p. 63) "job satisfaction is the extent to which work is a source of need fulfilment and contentment, or a means of freeing employees from hassles or things causing dissatisfaction; it does not encompass the person's relationship with the work itself". However, arguing that *job satisfaction* does not encompass the person's relationship with the work itself seems somewhat of a controversial stance. The Herzberg two factor theory of satisfaction and motivation (Herzberg, Mausner, & Snyderman, 1959; Herzberg, 1966) would argue that satisfaction arises from the work itself whereas dissatisfaction arises from contextual factors. It could therefore be argued that the work itself will only give rise to *satisfaction* if it is high on the job characteristics and people are willing (due to psychological safety) to *personally engage* with the work which leads to *state engagement* that leads to *satisfaction*.

Therefore, based on the arguments presented above, it can be hypothesised that employee *state engagement* positively influences *job satisfaction*.

Hypothesis 20: In the proposed employee engagement structural model it is hypothesised that *state engagement* positively influences *job satisfaction*.

2.4.2.2.2 Organisational Commitment

Allen and Meyer (1990) identified a three-factor *organisational commitment* model. They recognised the three factors as affective, continuance and normative commitment. According to Meyer and Allen (1997) affective commitment involves the emotional connection to, identification with, and participation in an organisation. Continuance commitment stems from necessity and normative commitment from obligation.

The majority of research and literature on organisational commitment focuses on attitudinal, affective aspects (Allen & Meyer, 1990; Allen & Meyer, 1996; Meyer & Allen, 1991; Meyer & Allen, 1997). To this end, and for the purposes of this study, *organisational commitment* is defined at the extent to which an individual is emotionally connected to, identifies with and participates in the organisation (Meyer & Allen, 1991; Levy, 2003). Employees with a strong (affective) *organisational commitment* choose to stay at the organisation because they desire to (Meyer & Allen, 1991).

As previously mentioned, according to SET when both parties abide by the exchange rules, the result will be a more trusting and loyal relationship in which mutual commitments are made (Cropanzano & Mitchell, 2005). Employees who continue to personally engage themselves do so because of the continuation of favourable reciprocal exchanges. Therefore, it logically follows that employees who are more engaged are likely to be in more trusting and high-quality relationships with their employers and will, as a result, be more likely to exhibit more positive attitudes, intentions and behaviours toward the organisation. As such it is reasonable to assume that engaged employees, due to their more positive attitudes and emotions towards the organisation, are likely to be more loyal and exhibit stronger commitment to the organisation. Whitener (2001, p. 518) notes that, "employees' commitment to the organisation would be related to their perceptions of the employer's commitment to them as they reciprocate their perceptions of the organisation's actions in their own attitude and behaviour".

In terms of empirical research supporting the relationship between *state engagement* and *organisational commitment* Hakanen, Bakker and Shaufeli (2006) in a study, theoretically based on the Job Demands-Resources Model (Demerouti et al., 2001), found that *state engagement* was positively correlated with *organisational commitment*. Schaufeli et al.'s (2001) qualitative findings found that engaged employees are more committed to and satisfied with their jobs, as well as with Demerouti et al. (2001), who reported moderate positive correlations between *state engagement* and *organisational commitment*.

Employee engagement and *organisational commitment* can be seen as two unique and conceptually distinct constructs for two reasons. Firstly, *organisational commitment* refers to an employee's emotional attachment to the organisation as a whole, while *state engagement* represents perceptions based on the work itself (Maslach et al., 2001). This is in line with the views of Storm and Rothman (2003) who argue that "*organisational commitme*nt refers to an employee's allegiance to the organisation that provides employment. The focus is on the organisation, where engagement focuses on the work itself." (p. 63). Secondly*, state engagement* requires "a holistic investment of the entire self in terms of cognitive, emotional and physical energies" (Christian et al., 2011, p. 97), whereas *organisational commitment* refers to an emotional state of attachment.

It is therefore hypothesised in the expanded engagement model that *employee engagement* positively influences *organisational commitment*.

Hypothesis 21: In the proposed employee engagement structural model it is hypothesised that *state engagement* positively influences *organisational commitment*.

2.4.2.2.3   Intention to Quit

Intention to quit can be defined as "a conscious and deliberate wilfulness to leave the organisation" (Tett & Meyer, 1993, p. 2). The literature shows that an employee's intention to leave an organisation is one of the best predictors of actual turnover, and *job satisfaction*, *organisational commitment*, and *intention to quit* are among the most frequently cited as very important predictors of turnover (Arnold & Feldman, 1982; Tett & Meyer, 1993). A vast number of researchers have reported that *job satisfaction* and *organisational commitment* are negatively related to turnover and *intention to quit* (e.g. Blau & Boal, 1989; Cohen, 1993; Cohen & Hudecek, 1993; Hackett & Lapierre, 2001; Irvine & Evans, 1995; Irving & Meyer, 1994; Kaldenberg, Becker, & Zvonkovic, 1995; Lee, Carswell, & Allen, 2000; Masum, Azad, Hoque, Beh, Wanke, & Arslan, 2016; McEvoy & Cascio, 1987; Meyer, Stanley, Herscovitch, & Topolnytsky, 2002; Mobley, 1977; Porter, Steers, Mowday, & Boulian, 1974; Riordan & Griffeth, 1995; Steers, 1977; Tarigan & Ariani, 2015; Tett & Meyer, 1993; Yücel, 2012).

Tett and Meyer (1993) acknowledge that there are important differences amongst scholars regarding the relative roles of *job satisfaction* and *organisational commitment* in the leaving process. The first approach argues that *organisation commitment* stems from *job satisfaction* and as such, *organisational commitment* serves as a mediator of the effect of *job satisfaction* on turnover behaviour (Mathieu & Zajak, 1990; Tett & Meyer, 1993). The possible logic behind this relation could lie in the fact that employees who enjoy (have a positive affective response to) their jobs are more likely to commit to the organisation so as to remain in the organisation to continue performing the job they enjoy. Research on the determinants of *commitment* has consistently found *that job satisfaction* has a significant and positive influence on *organisational commitment* (Brown & Peterson, 1993; Decottis & Summers, 1987; Michaels, 1994; Williams & Anderson, 1991; Williams & Hazer, 1986). This seems a logical relation as it would imply that employees due to the pleasurable or positive emotional state gained from the appraisal of one's job or job experience would develop a more positive emotional attachment to the organisation. Colquitt, LePine, and Wesson (2010) demonstrated that, *job satisfaction* has a strong positive effect on *organisational commitment*. Support for the satisfaction-to-commitment mediation model can be found in Porter et al.'s (1974) argument, which received considerable empirical support (Williams & Hazer, 1986), that commitment takes more time to cultivate and is more stable and enduring than satisfaction (Tett & Meyer, 1993). Therefore, this model implies that *job satisfaction* can only have an indirect influence, through *organisational commitment*, on the employee's intention to stay/quit.

The second approach argues the reverse relation where *job satisfaction* stems from *organisational commitment* (Vandenberg & Lance, 1992; Salancik & Pfeffer, 1978). This reverse (commitment-to-

satisfaction) mediation model argues that an employee's commitment to the organisation promotes a positive attitude towards/appraisal of the job, and that the employee stays due to their feelings about their job (Tett & Meyer 1993; Salancik & Pfeffer, 1978). Therefore, this model implies that *organisational commitment* has an indirect influence, via *job satisfaction*, on the employee's turnover behaviour. Curry et al. (as cited in Tett and Meyer, 1993) have shown support for this commitment-to-satisfaction mediation model.

The third and final approach argues that both *job satisfaction* and *organisational commitment* contribute independently to the withdrawal process (Angle & Perry, 1981; Porter et al., 1974; Strumpf & Hartman, 1984; Tett & Meyer, 1993). However, Vandenberg and Lance (1992) claim that both previously revealed approaches are empirically defensibly. *Organisational commitment* is an affective response to the entire organisation, whereas *job satisfaction* is an affective response to specific aspects of the job (Williams & Hazer, 1986). In light of the high costs associated with turnover, *organisational commitment*, which has been defined as "a psychological link between the employee and his/her organisation that makes it less likely that the employee will voluntarily leave the organisation" (Allen & Meyer, 1996, p. 252), is an important variable to consider. Schaufeli and Bakker (2004) note that engaged employees are likely to have a greater attachment to their organisation (i.e. *organisational commitment*) and a lower tendency to leave the organisation (i.e. *intention to quit*). Similarly, Schaufeli and Salanova (2008) suggest that engaged employees demonstrate helpful behaviours towards the organisation like a low intention to quit and a commitment to organisational goals. On the other hand, Chiu, Lin, Tsai and Hsiao (2005) show that *job satisfaction* directly impacts *intention to quit*. Moreover, they demonstrate that *job satisfaction* indirectly impacts *intention to quit* through *organisational commitment*. Masum et al. (2016) also reveal that turnover intention is significantly negatively influenced by *job satisfaction*.

Therefore, based on the arguments presented above, and for the purposes of expanded engagement model in this study the following hypotheses can be made;

Hypothesis 22: In the proposed employee engagement structural model it is hypothesised that *job satisfaction* positively influences *organisational commitment*.

Hypothesis 23: In the proposed employee engagement structural model it is hypothesised that *job satisfaction* negatively affects *intention to quit*.

Hypothesis 24: In the proposed employee engagement structural model it is hypothesised that *organisational commitment* negatively affects *intention to quit*.

Hypothesis 25: In the proposed employee engagement structural model it is hypothesised that *organisational commitment* mediates the relationship between *job satisfaction* and i*ntention to quit*.

2.4.2.2.4　　　　Organisational Citizenship Behaviour

Organisational citizenship behaviour (OCB) is a positive organisational behaviour construct that was introduced in the 1980's and has been defined as individual discretionary behaviour, beyond formal obligations in that it is not directly acknowledged by the official reward system, and that, on average, stimulates the effective and efficient operation of the organisation (Organ, 1988). In addition, organisational citizenship behaviours (OCBs) have been recognised to contribute indirectly to the organisation through the preservation of the organisation's social system that supports task performance, that is by fostering a social environment conducive to the accomplishment of work (Organ, 1997). As stated by Podsakoff and MacKenzie (1997, p. 135) OCBs "lubricate the social machinery of the organisation, reducing friction and/or increasing efficiency". Even though OCB, since its introduction in the 1980's, has been the subject of over 100 empirical studies (LePine, Erez & Johnson, 2002), the taxonomy of OCB over the years has not been completely consistent. Various constructs such as prosocial organisational behaviour (Brief & Motowidlo, 1986), contextual performance (Motowidlo, 2002), organisational spontaneity (George & Brief, 1992), and extra-role behaviour (Van Dyne, Cummings & McLean Parks, 1995) have overlapped with OCB. Furthermore, researchers have been inconsistent in the behavioural dimensions that constitute OCB (Babcock-Roberson & Strickland, 2010).

Organ (1988) proposed a five-dimensional taxonomy of OCB containing altruism, conscientiousness, sportsmanship, courtesy and civic virtue which numerous researches have operationalised (Podsakoff, MacKenzie, Paine & Bachrach, 2000) to serve as the basis for OCB measurement. Despite the diverse literature on OCB, Organ's (1988) taxonomy has the greatest amount of empirical research (LePine et al., 2002) and as such will be used for the purpose of this study. Altruism refers to voluntary behaviour directly intended to help another person with work related problems (e.g. volunteering to help orientate a new employee, assisting a co-worker with a heavy workload). Conscientiousness refers to impersonal actions or behaviours such as compliance with norms defining a good worker (e.g. being punctual, conserving resources). Sportsmanship involves a willingness of the employee to tolerate the inevitable inconveniences and impositions of work without "complaining...railing against real or imagined slights and making federal cases out of small potatoes" (Organ, 1988, p. 11). Courtesy refers to all those forethoughtful actions that help someone else prevent a work-related problem (e.g. touching base with others before taking action that could affect them). Finally, civic virtue involves behaviours that show that the employee responsibly participates in and is concerned about matters that affect the organisation (e.g. attending meetings that are not compulsory but that help the organisation).

Despite the fact that *state engagement* and OCBs are closely related to each other, they are recognised as different concepts (Schaufeli & Bakker, 2010). *State engagement* is a motivational construct (Hakanen, Bakker & Schaufeli, 2006) not directed towards any specific individual, object or event

(Schaufeli & Bakker, 2004). OCBs on the other hand, are behaviours that are directed towards an individual or the organisation (Williams & Anderson, 1991).

According to Erickson (2005) *personal engagement* can be thought of as an indicator of an employee's willingness to expend discretionary effort to facilitate the organisation (Christian et al., 2011). To the extent to which engaged employees give of/invest themselves more fully during work role performances then less engaged employees, it is logical to expect that they should be more willing to step beyond that boundaries of their formally defined work roles and engage in acts that constitute OCB (Rich, Lepine & Crawford, 2010). [25]

Broaden and Build theory (Fredrickson, 2001) together with related research on positive affect (Fay & Sonnentag 2012) proposes that *state engagement* is linked with increased enactment of OCBs (Shantz, Afles, Truss & Soane, 2013). Broaden and Build theory suggests that employees in a positive state such as *state engagement* experience broadened cognition, which is related to higher levels of creativity, broader scope of attention and openness to information (Fredrickson, 2001).

In terms of empirical evidence supporting the relationship between *state engagement* and OCBs, numerous researchers have found that *state engagement* leads to higher levels of OCB (Babcock-Roberson & Strickland, 2010; Christian et al., 2011; Rich et al., 2010; Saks, 2006; Shantz et al., 2013). Furthermore, Sonnentag (2003) found that *state engagement* promotes proactive behaviour, taking initiative and the pursuit of learning goals.

In light of the above theoretical and empirical research it can be hypothesised that *state engagement* is positively related to OCB.

Hypothesis 26: In the proposed employee engagement structural model it is hypothesised that *state engagement* positively influences *organisational citizenship behaviour*.

The proposed model extensions are illustrated below in Figure 2.4.

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[25] This line of reasoning points to the need to consider psychological ownership (Pierce, Kostova & Dirks, 2001) as an additional latent variable that should in future be considered for inclusion in the psychological mechanism that regulates employee engagement. Investing the self into a job should lead, along the other two routes to psychological ownership, to psychological ownership (Pierce et al., 2001). Once an employee has psychologically taken ownership of a job they should tend to act in its best interest even if this calls for going beyond the call of duty.
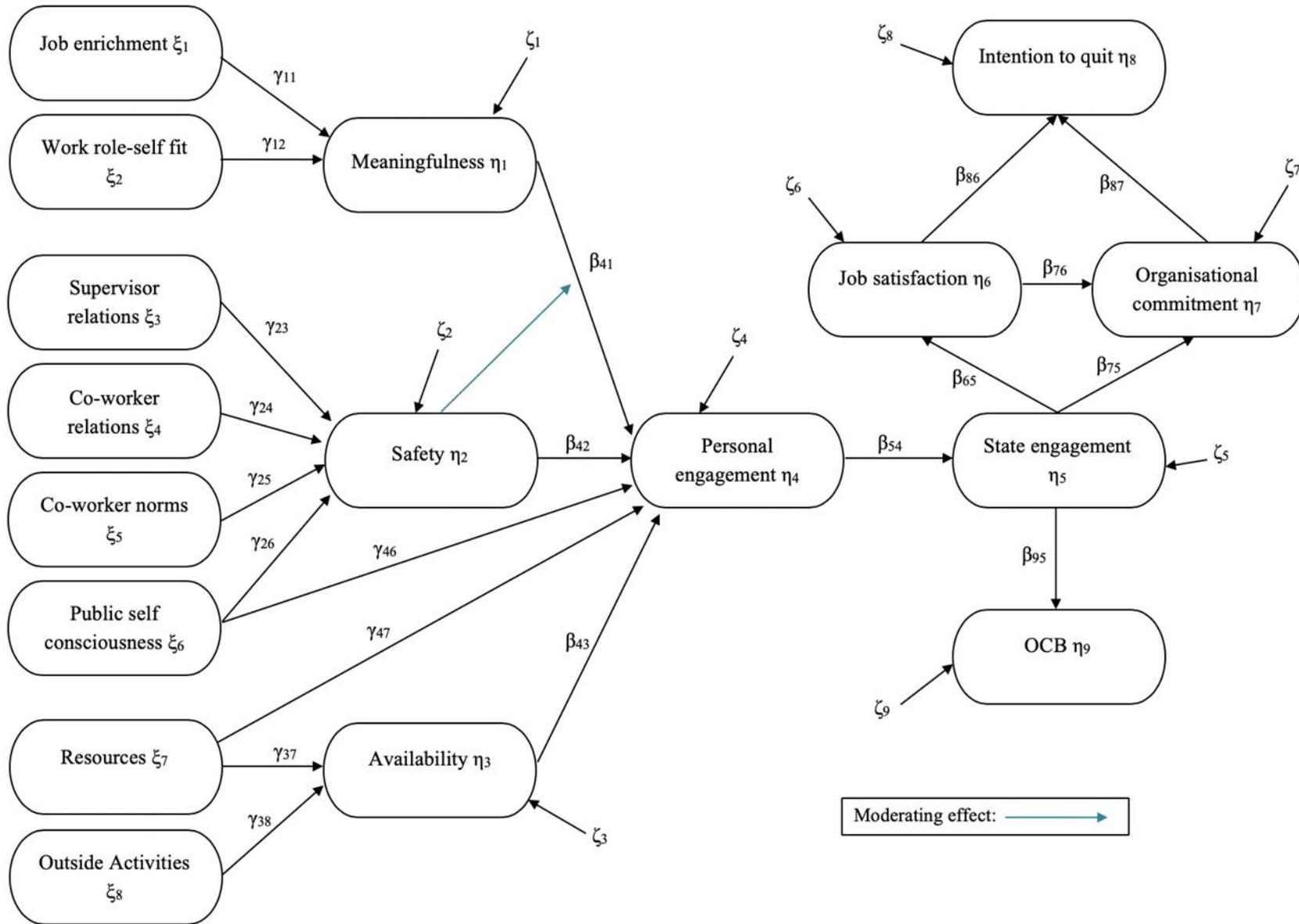
Figure 2.4. Graphical portrayal of the hypothesised expanded employee engagement structural model.

CHAPTER 3
RESEARCH METHODOLOGY

3.1   INTRODUCTION

In order for HRM to successfully cultivate a psychologically engaged workforce it needs to understand why differences in the state of *employee engagement* exist and why some individuals engage their selves in their work, whereas others disengage from their work. The level of employees' engagement does not occur at random. Rather, it is the result of the systematic working of an intricate nomological network of latent variables characterising employees' and their various perceptions of the work setting. Through systematic theorising in response to the research initiating question, the literature study derived an overarching substantive research hypothesis on the psychological mechanism that underpins *state engagement*. The probability of reaching a valid and credible verdict on the validity of the hypothesis why individuals engage their selves in their work and why they experience the psychological state of *employee engagement* depends on the research methodology used to arrive at the verdict.

Research methodology aids the epistemic epitome of science. Science is committed to an "epistemic imperative" (Babbie & Mouton, 2001, p. 8) to search for valid and credible explanations. An attempt to explain why individuals engage their selves in their work and why they experience the psychological state of *employee engagement* has been illustrated in the form of a structural model comprising an intricate nomological network of latent variables depicted in Figure 3.1 (also presented in Figure 2.4). Arguments can only be considered permissible (or valid) so far as the reasons closely fit the data that is available (Babbie & Mouton, 2001). Research methodology aids the epistemic epitome via two facets of the scientific method – objectivity and rationality. Objectivity relates to the scientific method's mindful, specific focus on error reduction. The scientific method of inquiry necessitates cautious reflection at several critical points in the process of testing the validity of the explanatory structural model where the epistemic epitome is threatened. It further requires that appropriate steps be taken at these points to maximise the probability of valid findings. Scientific objectivity resides in the knowledgeable researcher's understanding of the critical stages in the research process where the risk of the epistemic ideal's derailment is most acute, the nature of the risk and possible steps that can be considered to mitigate the risk. Scientific rationality refers to the scientific method's insistence that the research findings and subsequent credibility of the recommended contribution to the body of knowledge be critically evaluated by knowledgeable peers. That is, by assessing the methodological rigour of the process that was utilised to arrive at the inferences (Babbie & Mouton, 2001). The methodological choices made by the researcher at each of the critical stages in the research process where the risk of the epistemic ideal's derailment is most acute are therefore subjected to the critical evaluation of knowledgeable peers.

However, a crucial prerequisite to allow this process to operate is that an accurate and detailed description and a comprehensive motivation of the methodological selections made at the different critical points in the process where the epistemic ideal is potentially threatened be specified. This will permit knowledgeable peers to pinpoint weaknesses in the methodology together with their implications for the validity of the conclusions. Consequently, the following section will discuss in depth the methodology used in the study.
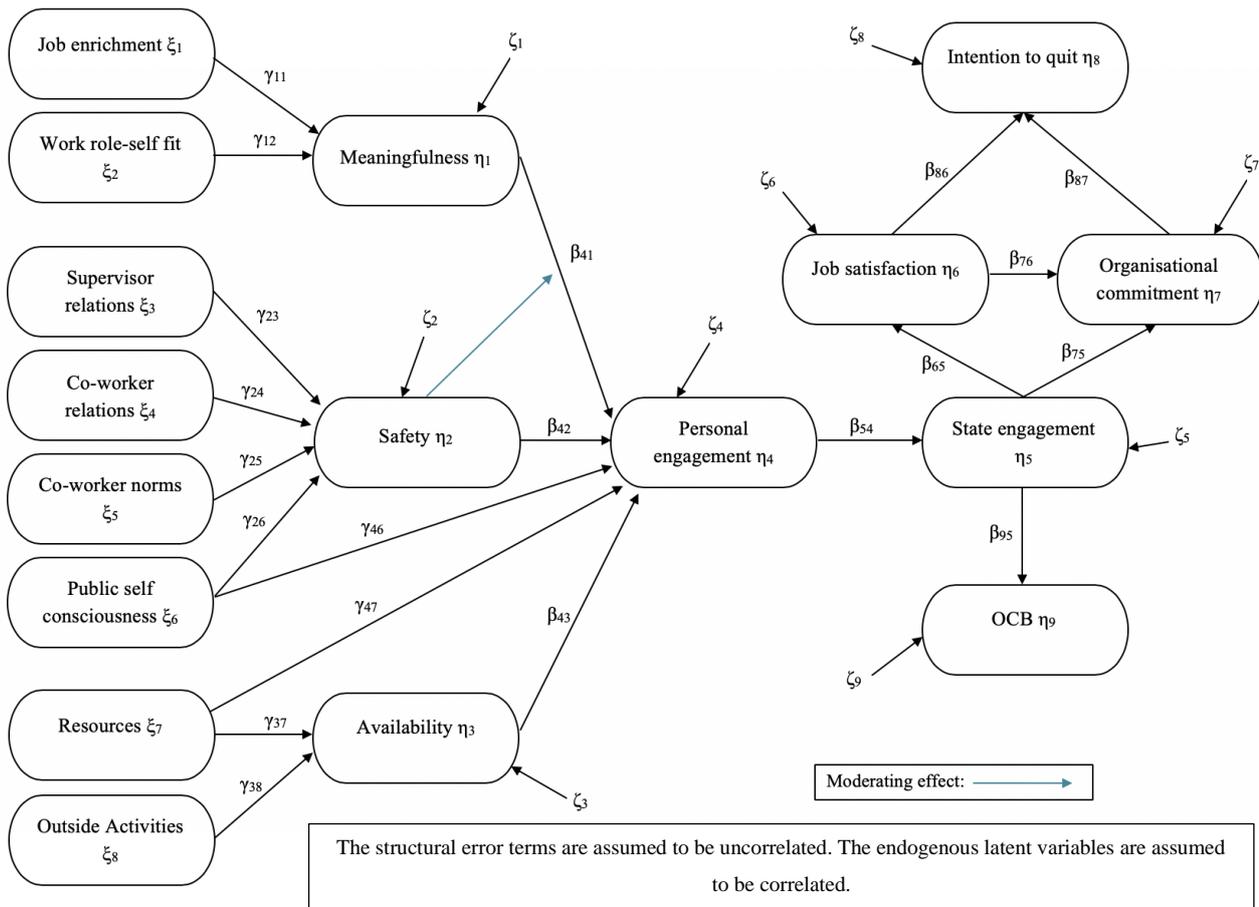
Figure 3.1. Graphical portrayal of the hypothesised expanded employee engagement structural model.

3.2   THE EXPANDED EMPLOYEE ENGAGEMENT STRUCTURAL MODEL

The proposed expanded structural model depicted in Figure 3.1 can also be expressed in terms of the following 9 structural equations:

$$\eta_1 = \gamma_{11} \xi_1 + \gamma_{12} \xi_2 + \zeta_1 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots[1]$$

$$\eta_2 = \gamma_{23} \xi_3 + \gamma_{24} \xi_4 + \gamma_{25} \xi_5 + \gamma_{26} \xi_6 + \zeta_2 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots[2]$$

$$\eta_3 = \gamma_{37} \xi_7 + \gamma_{38} \xi_8 + \zeta_3 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots[3]$$

$$\eta_4 = \beta_{41}\,\eta_1 + \beta_{42}\,\eta_2 + \beta_{43}\,\eta_3 + \gamma_{46}\,\xi_6 + \gamma_{47}\xi_7 + \gamma_{49}\xi_9{}^{26} + \zeta_4 \dots\dots\dots\dots\dots\dots\dots\dots[4]$$

$$\eta_5 = \beta_{54}\,\eta_4 + \zeta_5 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots[5]$$

$$\eta_6 = \beta_{65}\,\eta_5 + \zeta_6 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots[6]$$

$$\eta_7 = \beta_{75}\,\eta_5 + \beta_{76}\,\eta_6 + \zeta_7 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots[7]$$

$$\eta_8 = \beta_{86}\,\eta_6 + \beta_{87}\,\eta_7 + \zeta_8 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots[8]$$

$$\eta_9 = \beta_{95}\,\eta_5 + \zeta_9 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots[9]$$

The causal relationships hypothesised to exist between the various latent variables in the employee engagement structural model can further be expressed in matrix form. Equation 10 reduces the set of nine structural equations to a single matrix equation.

---

[26] $\xi_9 = \eta_1 * \eta_2$

$$
\begin{pmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \\ \eta_4 \\ \eta_5 \\ \eta_6 \\ \eta_7 \\ \eta_8 \\ \eta_9 \end{pmatrix} =
\begin{pmatrix}
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
\beta_{41} & \beta_{42} & \beta_{43} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & \beta_{54} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & \beta_{65} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & \beta_{75} & \beta_{76} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & \beta_{86} & \beta_{87} & 0 & 0 \\
0 & 0 & 0 & 0 & \beta_{95} & 0 & 0 & 0 & 0
\end{pmatrix}
\begin{pmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \\ \eta_4 \\ \eta_5 \\ \eta_6 \\ \eta_7 \\ \eta_8 \\ \eta_9 \end{pmatrix} +
\begin{pmatrix}
\gamma_{11} & \gamma_{12} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & \gamma_{23} & \gamma_{24} & \gamma_{25} & \gamma_{26} & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \gamma_{37} & \gamma_{38} \\
0 & 0 & 0 & 0 & 0 & \gamma_{46} & \gamma_{47} & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \gamma_{49} & 0
\end{pmatrix}
\begin{pmatrix} \xi_1 \\ \xi_2 \\ \xi_3 \\ \xi_4 \\ \xi_5 \\ \xi_6 \\ \xi_7 \\ \xi_8 \\ \xi_8 \end{pmatrix} +
\begin{pmatrix} \zeta_1 \\ \zeta_2 \\ \zeta_3 \\ \zeta_4 \\ \zeta_5 \\ \zeta_6 \\ \zeta_7 \\ \zeta_8 \\ \zeta_9 \end{pmatrix}
\quad .....(10)
$$

The matrix equation expressed as equation 10 can then be further reduced to the matrix equation expressed as equation 11.

$$\eta = B\eta + \Gamma\xi + \zeta \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots[11]$$

where:

- η is a 9 x 1 vector of endogenous latent variables;
- B is a 9 x 9 square matrix of (partial) regression coefficients describing the slope of the regression of η_j on η_i;
- Γ is a 9 x 9 matrix of (partial) regression coefficients describing the slope of the regression of η_j on ξ_i;
- ξ is a 9 x 1 vector of exogenous latent variables; and
- ζ is a 9 x 1 vector of structural error/disturbance terms.

Neither equations 2 – 9, nor equation 10, nor equation 11 fully specify the proposed structural model shown in Figure 3.1. The Ψ and Φ matrices also have to be defined to fully capture the explanation of employee engagement that has been developed in Chapter 2 through theorising in response to the research initiating question. The current study defined Ψ as a diagonal 9 x 9 structural error variance-covariance matrix. The overarching substantive research hypothesis thus posited that the structural error terms are uncorrelated. Φ was defined as a full symmetric 9 x 9 variance-covariance matrix representing the variance in as well as the covariance between the exogenous latent variables. The overarching substantive research hypothesis therefore posited that all the exogenous latent variables correlated. The latent interaction effect (ξ_9) was calculated from two endogenous latent variables (η_1 and η_2). hence no element of Φ needed to be fix to zero.

3.3   SUBSTANTIVE RESEARCH HYPOTHESES

The proposed research methodology should serve the objectives of this study. The objective of this study is to expand the employee personal engagement structural model proposed by May et al. (2004) into a comprehensive state engagement structural model. More specifically, the objective of this study is to identify additional latent variables not currently included in the May et al. (2004) employee engagement structural model and develop hypotheses on the way in which the additional latent variables are embedded in the current May et al. (2004) employee engagement structural model. The theoretical argument provided Chapter 2 (the literature study) led to the inclusion of a number of additional latent variables and modification of some of the causal paths. Five additional latent variables were included in the expanded model presented in Figure 3.1. All of the original paths were maintained, and one of them was modified; the hypothesised positive relationship of psychological meaningfulness and personal engagement was modified by hypothesising the moderating effect of psychological safety. The

modification will allow for a replacement of the hypothesis presented by May et al. (2004), with two hypotheses presented in this study. This is reflected in the expanded employee engagement structural model that is depicted in Figure 3.1 and expressed as equation 10.

The current study's overarching substantive hypothesis (**Hypothesis 1**) holds that the structural model presented in Figure 3.1 provides a valid account of the psychological process or mechanism that determines the level of *personal engagement* and *state engagement* among employees in an organisation. Hypothesis 1 can be divided into the following 21 more granular path-specific (direct effect) substantive research hypotheses[27][28].

Hypothesis 2: In the proposed employee engagement structural model it is hypothesised that *job enrichment* will positively influence *psychological meaningfulness*.

Hypothesis 3: In the proposed employee engagement structural model it is hypothesised that *work role-self fit* positively influences *psychological meaningfulness*.

Hypothesis 4: In the proposed employee engagement structural model it is hypothesised that rewarding *co-worker relations* positively influences p*sychological safety*.

Hypothesis 5: In the proposed employee engagement structural model it is hypothesised that supportive *supervisor relations* positively influences *psychological safety*.

Hypothesis 6: In the proposed employee engagement structural model it is hypothesised that adherence to *co-worker norms* negatively affects *psychological safety*.

Hypothesis 7: In the proposed employee engagement structural model it is hypothesised that *public self-consciousness* negatively affects *psychological safety*.

Hypothesis 8: In the proposed employee engagement structural model it is hypothesised that *resources* positively influences *psychological availability*.

Hypothesis 9: In the proposed employee engagement structural model it is hypothesised that *outside activities* negatively affects *psychological availability*.

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[27] All path-specific substantive research hypotheses should be interpreted to claim that ξ_j/η_j affects variance in η_i when controlling for the other effects hypothesised by the model to affect variance in η_i. This is implied by the inclusion of the phrase *in the proposed employee engagement structural model*.

[28] Indirect effect substantive hypotheses in which mediator variables mediate the effect of ξ_i on η_j or the effect of η_i on η_j are not formally stated here as path-specific hypotheses even when they were previously derived via theorising in Chapter 2. Neither were formal statistical hypotheses formulated for these effects. The significance of the indirect effects were nonetheless tested. This decision was taken because it was post-theorising thought that there is little justification in considering some indirect effects as more important than others.

Hypothesis 10: In the proposed employee engagement structural model it is hypothesised that *psychological meaningfulness* positively influences *personal engagement* at work.

Hypothesis 11: In the proposed employee engagement structural model it is hypothesised that *psychological safety* positively influences *personal engagement* at work.

Hypothesis 12: In the proposed employee engagement structural model it is hypothesised that *psychological availability* positively influences *personal engagement* at work.

Hypothesis 13: In the proposed employee engagement structural model it is hypothesised that *public self-consciousness* negatively affects *personal engagement* at work.

Hypothesis 14: In the proposed employee engagement structural model it is hypothesised that *resources* positively influences *personal engagement* at work.

Hypothesis 15: In the proposed employee engagement structural model it is hypothesised that *psychological safety* moderates the effect of *psychological meaningfulness* on *personal engagement* at work.

Hypothesis 16: In the proposed employee engagement structural model it is hypothesised that *personal engagement* positively influences *state engagement*.

Hypothesis 17: In the proposed employee engagement structural model it is hypothesised that *state engagement* positively influences *job satisfaction*.

Hypothesis 18: In the proposed employee engagement structural model it is hypothesised that *state engagement* positively influences *organisational commitment*.

Hypothesis 19: In the proposed employee engagement structural model it is hypothesised that *job satisfaction* positively influences *organisational commitment*.

Hypothesis 20: In the proposed employee engagement structural model it is hypothesised that *job satisfaction* negatively affects *intention to quit*.

Hypothesis 21: In the proposed employee engagement structural model it is hypothesised that *organisational commitment* negatively affects *intention to quit*.

Hypothesis 22: In the proposed employee engagement structural model it is hypothesised that *state engagement* positively influences *organisational citizenship behaviour*.

3.4   RESEARCH DESIGN

The overarching substantive research hypothesis holds precise claims in respect to the hypothesised employee engagement structural model. The employee engagement structural model (Figure 3.1) hypothesises that specific structural pathways exist between the various latent variables found in the expanded model. To empirically investigate the validity of the overarching substantive hypothesis, and the validity of the twenty-one path-specific substantive research hypotheses, a strategy is required that will guide the process of gathering unambiguous, empirical evidence with which to test the hypotheses.

The research design would constitute this strategy, blueprint or structure (Kerlinger & Lee, 2000). Babbie and Mouton (2001) describe the research design as the plan, guideline or blueprint of how the researcher intends to conduct the research process in order to achieve the research objective. The decision around which research design would be most suitable for the intended research depends mainly on the research problem, the hypotheses posed, and the type of evidence needed to test the research hypotheses. The research design is conceived so as to firstly, obtain answers to the research question and secondly, to control variance (Kerlinger, 1973). Therefore, this study relies on the extent to which the research design can augment systematic variance, reduce error variance and regulate extraneous variance (Kerlinger, 1973; Kerlinger & Lee, 2000). Doing so will ultimately determine the extent to which unambiguous empirical evidence will be obtained that can be interpreted as clearly in support (or in opposition) of the hypotheses being evaluated.

According to Kerlinger (1973) there are two broad types of research designs which can be distinguished, namely; experimental and *ex post facto* research designs. When using an *ex post facto* research design, the researcher has no direct control over independent variables because their manifestations have either already taken place or because they fundamentally cannot be manipulated (Kerlinger & Lee, 2000). On the other hand, in an experimental research design the researcher is able to manipulate and control one or more independent variables and observe the dependent variable/s for variation concomitant to the manipulation of the independent variable. Experimental manipulation and random assignment are not possible when using an *ex post facto* research design whereas in the experimental case, the researcher has manipulative control over at least one of the active variables (Kerlinger, 1973). The ambition behind the *ex post facto* research design is to determine what will happen to a particular variable when the other variables change. Inferences about the hypothesised relationship between the latent variables ξ and η are made from concomitant variation in independent and dependent variables (Kerlinger & Lee, 2000).

The relative strengths and weaknesses of the *ex post facto* and experimental designs have to be considered when evaluating the extent to which the choice of a research design in the current study will ensure unambiguous results. According to Kerlinger (1973) in addition to the limitation of *ex post facto* designs not being able to manipulate independent variables, they are also characterised by a lack of power to randomise and the risk of improper interpretation because of the reduced control that results

from the inability to randomise and to manipulate independent variables. The first limitation has already been discussed above. In terms of the second limitation, both experimental and *ex post facto* research allow for the possibility to select subjects at random. Nevertheless, in *ex post facto* research the researcher is unable to utilise the assignment of subjects to groups or the assignment of treatments to groups at random. As a result, the researcher using an *ex post facto* research design, needs be aware of the possible influence of self-selection bias – when subjects "select" themselves into groups on the basis of characteristics other than those in which the researcher is interested. Alternately, experimental research allows the researcher to exercise control by randomisation in that subjects can be assigned to groups or treatments at random. The third limitation, risk of improper interpretation, refers to the fact that the nature of the *ex post facto* research design prevents the drawing of causal inferences from significant path coefficients as correlations do not suggest causation. In addition, the inability to control for extraneous variables through random assignment reduces the internal validity of the *ex post facto* research design (Kerlinger & Lee, 2000). Consequently, in contrast to experimental designs, *ex post facto* research lacks control and flawed inferences could be drawn as a result of more than one possible explanation for the obtained difference or correlation (Kerlinger & Lee, 2000). This becomes particularly dicey when there's a lack of unambiguously framed hypotheses, which is, however, not the case in this study.

Despite the weaknesses associated with *ex post facto* research, it remains a valuable research design. This is because more often than not social science research does not lend itself to experimentation since the variables considered in these studies cannot always be manipulated. Therefore, since the variables considered in this study do not lend themselves to manipulation an *ex post facto* design was utilised. More specifically, an *ex post facto* correlation research design in which each latent variable in the structural model was operationalised in terms of at least two or more indicator variables (assuming in total p exogenous indicator variables and q endogenous indicator variables) was used to test the overarching and path-specific substantive research hypotheses. This resulted in the added advantage that it allowed for the testing of the structural model as a single, integrated explanation. The proposed design is schematically depicted below in Figure 3.2.

(X_{11})	..	(X_{1p})	Y_{11}	Y_{12}	..	Y_{1i}	..	Y_{1q}
(X_{21})	..	(X_{2p})	Y_{21}	Y_{22}	..	Y_{2i}	..	Y_{2q}
:	..	:	:	:	..	:	..	:
(X_{j1})	..	(X_{jp})	Y_{j1}	Y_{j2}	..	Y_{ji}	..	Y_{jq}
:	..	:	:	:	..	:	..	:
(X_{n1})	..	(X_{np})	Y_{n1}	Y_{n2}	..	Y_{ni}	..	Y_{nq}

Figure 3.2. Ex post facto correlation design[29]

According to Diamantopoulos and Siguaw (2000) at least two indicator variables per latent variable are required to safeguard that the comprehensive LISREL model is identified. In view of the logic underlying the *ex post* facto correlation design shown in Figure 3.2, as it applies to the current study, measures are obtained on the observed variables and the observed $(((p+q) \times (p+q+1))/2)$ covariance matrix is subsequently calculated, reflecting the variance in and covariance between the indicator variables. Diamantopoulos and Siguaw (2000) further explains that estimates for the freed parameters in the comprehensive LISREL model[30] are then attained in an iterative fashion with the aim of reproducing the observed covariance matrix as closely as possible. The comprehensive LISREL model essentially depicts a hypothesis on the nature of the process that produced the variances in and covariances between the indicator variables. If the fitted model is unable to closely reproduce the observed covariance matrix (Diamantopoulos & Siguaw, 2000; Kelloway, 1998) it follows that the structural model fails to provide a credible explanation for the observed covariance matrix. As such, the structural relations hypothesised by the model are unable to provide a valid account of the process underlying engagement. The opposite of this statement is, however, not true. If the reproduced covariance matrix drawn from the estimated structural and measurement model parameters closely fits the observed covariance matrix, it would not suggest, and it therefore cannot be assumed, that the psychological process postulated by the structural model necessarily is the one that produced the observed covariance matrix. It would therefore not warrant the conclusion that the psychological

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[29] The rows represent individual observations and the columns represent observed (or indicator) variables representing specific latent variables in the structural model. X represents measures of exogenous latent variables and Y represents measures of endogenous latent variables. The brackets indicate that the latent variables in question have been measured via the observed variables and not experimentally manipulated.

[30] The comprehensive LISREL model represents the structural model and the measurement model combined. The structural model depicts the structural relations that have been hypothesised to exist between the latent variables. the measurement model depicts the structural relations that have been hypothesised to exist between the latent variables and the observed(or indicator) variables.

process portrayed in the structural model did essentially produce the levels of the dependent latent variables comprising the phenomenon of interest.

Rather, a close fitting model (i.e. a high agreement between the observed and estimated covariance matrices) would only suggest that the structural model represents a plausible psychological mechanism that could have brought about the levels of the endogenous latent variables and that it is therefore acceptable to investigate the statistical significance and magnitude of the estimated path coefficients that allowed the close approximation of the observed covariance matrix. This follows because a close-fitting model implies that the psychological processes depicted in the structural model and the parameter estimates derived for the freed model parameters can be regarded as one plausible explanation for the observed covariance matrix. A close-fitting model in the current study therefore would only imply that the paths in the model along with their estimates provide a valid (i.e. permissible) account of the process determining *personal engagement* and *state engagement* (Babbie & Mouton, 2001). This conclusion can only really be justified if prior evidence exists that the measurement model fits closely.

3.5   STATISTICAL HYPOTHESES

The statistical hypotheses are formulated in a way that reflects and acknowledges how the recommended research design aims to test the validity of the proposed structural model, and the nature of the envisioned statistical analyses. Structural equation modelling was used to test the validity of the proposed structural model via the *ex post facto* correlation design. The employee engagement structural model consists of numerous exogenous and endogenous latent variables and the model further proposes causal relations between these endogenous latent variables. On an important note, structural equation modelling is the only analysis method that allows for the potential testing of the proposed structural model as a unified, complex hypothesis. This is an important advantage due to the fact that the explanation as to why individuals vary with regards to their level of engagement is not found in any precise point in the structural model; rather, it is embodied in the whole complex network of paths between the latent various variables. Therefore, if a series of multiple regression analyses were to be used to test the proposed paths it would require dissecting the model into as many sub-models as there are endogenous latent variables (nine separate regression models in the case of this study), subsequently resulting in a significant loss of meaning. The notational system used to formulate the subsequent statistical hypotheses follows the structural equation modelling convention associated with LISREL (Du Toit & Du Toit, 2001; Jöreskog & Sörbom, 1999; 1996a; 1996b).

Diamantopoulos and Siguaw (2000) confirms that to estimate the hypothesised model's fit, the extent to which the model is consistent with the obtained empirical data should be tested. In order to investigate the hypothesised model's fit, an exact fit null hypothesis and a close fit null hypothesis were tested.

The overarching substantive research hypothesis maintains that the employee engagement structural model depicted provides a valid account of the process determining the level of engagement of employees in an organisation. If the overarching substantive research hypothesis is understood to mean that the comprehensive LISREL model provides a perfect account of the psychological process underlying engagement, then the substantive research hypothesis can be translated into the following exact fit null hypothesis:

$$H_{01a}: RMSEA = 0^{31}$$

$$H_{a1a}: RMSEA > 0$$

Due to the fact that structural models are only estimations of reality, the probability of an exact fit is highly unlikely. In other words, structural models hardly ever fit the population precisely. The close fit null hypothesis is more realistic as it takes the error of approximation into account (Diamantopoulos & Siguaw, 2000). If the error of approximation is equal to or less than .05 it can be said that the model has close fit (Diamantopoulos & Siguaw, 2000). If the overarching substantive research hypothesis is understood to mean that the comprehensive LISREL model provides an approximate account of the psychological process underlying engagement, then the substantive research hypothesis can be translated into the following close fit null hypothesis:

$$H_{01b}: RMSEA \leq .05$$

$$H_{a1b}: RMSEA > .05$$

The overarching substantive research hypothesis was divided into the following twenty-one more granular path-specific substantive research hypotheses. These research hypotheses can be translated into path coefficient statistical hypotheses as summarised below and in Table 3.1.

Hypothesis 2: In the proposed employee engagement structural model it is hypothesised that *job enrichment* positively influences *psychological meaningfulness*.

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

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

Hypothesis 3: In the proposed employee engagement structural model it is hypothesised that *work role-self fit* positively influences *psychological meaningfulness*.

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[31] The statistical hypotheses are numbered as such to indicate that the exact and close fit null hypotheses will also be tested with respect to the measurement model. This allows for the evaluation of the success with which the latent variables in the structural model have been operationalised.

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

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

Hypothesis 4: In the proposed employee engagement structural model it is hypothesised that rewarding *co-worker relations* positively influences *psychological safety*.

$$H_{04}: \gamma_{23} = 0$$

$$H_{a4}: \gamma_{23} > 0$$

Hypothesis 5: In the proposed employee engagement structural model it is hypothesised that supportive *supervisor relations* positively influences *psychological safety*.

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

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

Hypothesis 6: In the proposed employee engagement structural model it is hypothesised that adherence to *co-worker norms* negatively affects *psychological safety*.

$$H_{06}: \gamma_{25} = 0$$

$$H_{a6}: \gamma_{25} < 0$$

Hypothesis 7: In the proposed employee engagement structural model it is hypothesised that *public self-consciousness* negatively affects *psychological safety*.

$$H_{07}: \gamma_{26} = 0$$

$$H_{a7}: \gamma_{26} < 0$$

Hypothesis 8: In the proposed employee engagement structural model it is hypothesised that *resources* positively influences *psychological availability*.

$$H_{08}: \gamma_{37} = 0$$

$$H_{a8}: \gamma_{37} > 0$$

Hypothesis 9: In the proposed employee engagement structural model it is hypothesised that *outside activities* negatively affects *psychological availability*.

$$H_{09}: \gamma_{38} = 0$$

$$H_{a9}: \gamma_{38} < 0$$

Hypothesis 10: In the proposed employee engagement structural model it is hypothesised that *psychological meaningfulness* positively influences *personal engagement* at work.

$$H_{010}: \beta_{41} = 0$$

$$H_{a10}: \beta_{41} > 0$$

Hypothesis 11: In the proposed employee engagement structural model it is hypothesised that *psychological safety* positively influences *personal engagement* at work.

$$H_{011}: \beta_{42} = 0$$

$$H_{a11}: \beta_{42} > 0$$

Hypothesis 12: In the proposed employee engagement structural model it is hypothesised that *psychological availability* positively influences *personal engagement* at work.

$$H_{012}: \beta_{43} = 0$$

$$H_{a12}: \beta_{43} > 0$$

Hypothesis 13: In the proposed employee engagement structural model it is hypothesised that *public self-consciousness* negatively affects *personal engagement* at work.

$$H_{013}: \gamma_{46} = 0$$

$$H_{a13}: \gamma_{46} < 0$$

Hypothesis 14: In the proposed employee engagement structural model it is hypothesised that *resources* positively influences *personal engagement* at work.

$$H_{014}: \gamma_{47} = 0$$

$$H_{a14}: \gamma_{47} > 0$$

Hypothesis 15: In the proposed employee engagement structural model it is hypothesised that *psychological safety* moderates the effect of *Psychological meaningfulness* on *Personal engagement* at work.

$$H_{015}: \gamma_{49} = 0^{32}$$

$$H_{a15}: \gamma_{49} > 0$$

Hypothesis 16: In the proposed employee engagement structural model it is hypothesised that *Personal engagement* positively influences state engagement.

$$H_{016}: \beta_{54} = 0$$

$$H_{a16}: \beta_{54} > 0$$

Hypothesis 17: In the proposed employee engagement structural model it is hypothesised that *state engagement* positively influences *job satisfaction*.

$$H_{017}: \beta_{65} = 0$$

$$H_{a17}: \beta_{65} > 0$$

Hypothesis 18: In the proposed employee engagement structural model it is hypothesised that *state engagement* positively influences *organisational commitment*.

$$H_{018}: \beta_{75} = 0$$

$$H_{a18}: \beta_{75} > 0$$

Hypothesis 19: In the proposed employee engagement structural model it is hypothesised that *job satisfaction* positively influences *organisational commitment*.

$$H_{019}: \beta_{76} = 0$$

$$H_{a19}: \beta_{76} > 0$$

Hypothesis 20: In the proposed employee engagement structural model it is hypothesised that *job satisfaction* negatively affects *intention to quit*.

$$H_{020}: \beta_{86} = 0$$

$$H_{a20}: \beta_{86} < 0$$

Hypothesis 21: In the proposed employee engagement structural model it is hypothesised that *organisational commitment* negatively affects *intention to quit*.

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[32] The psychological safety * the effect of psychological meaningfulness interaction effect is calculated as $\eta_1 * \eta_2$ and depicted as ξ_9.

$$H_{021}: \beta_{87} = 0$$

$$H_{a21}: \beta_{87} < 0$$

Hypothesis 22: In the proposed employee engagement structural model it is hypothesised that *state engagement* positively influences *organisational citizenship behaviour*.

$$H_{022}: \beta_{95} = 0$$

$$H_{022}: \beta_{95} > 0$$

The path-specific statistical hypotheses are summarised in Table 3.1.

Table 3.1

Path coefficient statistical hypotheses

Hypothesis 2: $H_{02}: \gamma_{11} = 0$ $H_{a2}: \gamma_{11} > 0$	Hypothesis 8: $H_{08}: \gamma_{37} = 0$ $H_{a8}: \gamma_{37} > 0$	Hypothesis 14: $H_{014}: \gamma_{47} = 0$ $H_{a14}: \gamma_{47} > 0$	Hypothesis 20: $H_{020}: \beta_{86} = 0$ $H_{a20}: \beta_{86} < 0$
Hypothesis 3: $H_{03}: \gamma_{12} = 0$ $H_{a3}: \gamma_{12} > 0$	Hypothesis 9: $H_{09}: \gamma_{38} = 0$ $H_{a9}: \gamma_{38} < 0$	Hypothesis 15: $H_{015}: \gamma_{49} = 0$ $H_{a15}: \gamma_{49} > 0$	Hypothesis 21: $H_{021}: \beta_{87} = 0$ $H_{a21}: \beta_{87} < 0$
Hypothesis 4: $H_{04}: \gamma_{23} = 0$ $H_{a4}: \gamma_{23} > 0$	Hypothesis 10: $H_{010}: \beta_{41} = 0$ $H_{a10}: \beta_{41} > 0$	Hypothesis 16: $H_{016}: \beta_{54} = 0$ $H_{a16}: \beta_{54} > 0$	Hypothesis 22: $H_{022}: \beta_{95} = 0$ $H_{a22}: \beta_{95} > 0$
Hypothesis 5: $H_{05}: \gamma_{24} = 0$ $H_{a5}: \gamma_{24} > 0$	Hypothesis 11: $H_{011}: \beta_{42} = 0$ $H_{a11}: \beta_{42} > 0$	Hypothesis 17: $H_{017}: \beta_{65} = 0$ $H_{a17}: \beta_{65} > 0$	
Hypothesis 6: $H_{06}: \gamma_{25} = 0$ $H_{a6}: \gamma_{25} < 0$	Hypothesis 12: $H_{012}: \beta_{43} = 0$ $H_{a12}: \beta_{43} > 0$	Hypothesis 18: $H_{018}: \beta_{75} = 0$ $H_{a18}: \beta_{75} > 0$	
Hypothesis 7: $H_{07}: \gamma_{26} = 0$ $H_{a7}: \gamma_{26} < 0$	Hypothesis 13: $H_{013}: \gamma_{46} = 0$ $H_{a13}: \gamma_{46} < 0$	Hypothesis 19: $H_{019}: \beta_{76} = 0$ $H_{a19}: \beta_{76} > 0$	

3.6   SAMPLING

The purpose of this study was to constructively contribute to the effectiveness of HR interventions aimed at improving the engagement of organisational employees in South Africa. As such, the target population for this study encompasses all full-time, permanent employees employed by South African private and public sector organisations. Due to the fact that it's very seldom possible to obtain measurements for each and every subject in a target population, sampling is in most cases a necessary procedure to allow the empirical testing of the research hypotheses. This problem is clearly relevant to this study as it would be practically impossible to obtain measures of the latent variables in the hypothesised employee engagement structural model for all employees in South Africa. The logic

behind sampling is to choose a subgroup of individuals from the sampling population that are representative of the target population in the study. This entails operationalising the target population as a sampling population. According to Babbie and Mouton (2001), the sampling population is made of up of the final sampling entities in the target population that have a positive, non-zero probability of being selected in the sample. A sample is considered representative so far as it provides a true rendering of the characteristics of the sampling population. A match between the sampling and target population would be the methodological ideal, however, this is rarely the case in practice and as such the researcher should aim to minimise the discrepancy or sampling gap between the target and sampling population. For the purpose of the current study the sampling population was defined as permanent, full-time teachers employed by the Western Cape Department of Education. A clearly noticeable and large sampling gap is thereby acknowledged.

3.6.1 Sampling technique

The degree to which observations can be generalised to the target population is dependent on the number of individuals in the selected sample, the size of the sampling gap (i.e. the lack of overlap between the target and sampling populations) and the representativeness of the sample of the sampling population. The power of inferential statistics tests likewise depends on sample size (De Goede & Theron, 2010). Extracting a representative sample from the sampling population clearly represents unfathomable logistical challenges in the current study. No easily available sampling framework exits. Multi-cluster sampling, for example, would entail a logistical capacity that far exceeds the resources available for this study. The suggested sampling procedure constitutes a non-probability sampling technique since the sampling population is not completely known and the individual probabilities are not known. This sampling method is based on factors such as common sense and ease, while still attempting to maintain representativeness and avoid bias.

Therefore, a non-probability sampling technique – i.e. convenience sampling was used in this study, which in involved taking available samples at hand. As a result, it cannot be claimed that the sample is representative of the target population or even the sampling population. Stated differently, it cannot be claimed that teachers who chose to actively participate in the study are representative of all employees employed by South African organisations. The researcher was not able to force organisations to participate in the study. Moreover, should organisations agree to take part in the research, all full-time teachers invited to participate in the study couldn't be forced to complete the survey. This acknowledged as a methodological weakness in the current study.

3.6.2   Sample size

In light of the nature of the current study, the subject of sample size was tackled from the viewpoint of structural equation modelling. According to Kelloway (1998), SEM is a large sample technique. Additionally, Tabachnick and Fidell (2007) state that in SEM, the size of the sample significantly influences the parameter estimates and chi-square test of fit. Even though Kelloway (1998) implies that a sample of 200 observations or more seem to be satisfactory for most SEM analyses, Kline (2010) cautions that both model complexity and statistical power are elements that impact sample size requirements. Therefore, when making a decision around a suitable sample size for a study intending to use SEM there are three factors that should be considered; the 1) ratio of sample size to the number of estimated parameters, 2) statistical power, and 3) practical and logistical considerations.

In terms of the ratio of the sample size to the number of parameters to be estimated, the following should be noted: At bare minimum, a situation would be deemed unacceptable or undesirable if there are more freed model parameters then there are observations in the sample. Complex measurement and structural models require larger sample sizes as they encompass more variables, and as such have more freed parameters that have to be estimated to warrant the drawing of reasonably stable conclusions (Kline, 2010). According to Jackson (cited in Kline, 2010, p. 12) a rule-of-thumb of the N:q[33] should be used to establish the relation between model complexity and sample size, where the estimation technique in use is maximum likelihood (ML). Kline (2010), when citing Jackson, advises that a sample size-to-estimated parameters ratio of 20:1 would be best. Alternately, Bentler and Chou (cited in Kelloway, 1998) advocate that the sample size-to-estimated parameters ratio should range between 5:1 and 10:1. Therefore, based on the counsel of Bentler and Chou (cited in Kelloway, 1998) a sample of 685 – 1370 employees would be appropriate to provide a persuasive test of the structural model depicted in Figure 3.1 (137 freed parameters[34]).

The second consideration that needs to be addressed when considering the appropriate sample size is the issue of statistical power. Statistical power refers to the conditional probability of rejecting the null hypothesis given it is false (Theron, 2012). Therefore, statistical power in relation to SEM is associated with the test of the close-fit hypothesis (H_0: RMSEA $\leq$ .05) against the alternative mediocre fit hypothesis (H_a: RMSEA $>$ .05). More specifically, it refers to the probability of rejecting the null hypothesis of close fit (H_0: RMSEA $\leq$ .05) given that it is false and should be rejected (i.e., the model fit is essentially mediocre, (H_a: RMSEA $>$ .05). If the statistical power is exceptionally high, even a

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[33] N here refers to sample size whereas q refers to the number of model parameters requiring statistical estimates.

[34] The comprehensive LISREL model contained 21 freed γ/β path coefficients, 9 freed structural error variances ψ_{ip}, 20 freed exogenous factor loadings λ_{ij}^X, 9 freed endogenous factor loadings λ_{ij}^Y, 36 freed inter exogenous latent variable correlations ϕ_{jp}, 20 freed exogenous measurement error variances $\theta_{\delta ii}$, 4 freed exogenous measurement error covariances $\theta_{\delta ik}$, and 18 freed endogenous measurement error variances $\theta_{\varepsilon ii}$.

small deviation from close fit would end in rejecting the close fit null hypothesis, implying that any endeavour to gather formal empirical evidence for the validity of the model would be futile. Conversely, if statistical power is exceptionally low it would imply that even if the model fails to obtain close fit, the close fit null hypothesis would still not be rejected. Not rejecting the close fit under conditions of low power will not present very persuasive proof on the validity of the model. The computer software created in R by Preacher and Coffman (2006) was utilised to calculate the required sample size for the test of close fit given the effect sizes assumed above, a significance level (α) of .05, a power level of .80 and degrees of freedom (ν) of:

Df   =   (½(p+q)(p+q+1)) - t

       =   741[35] - 137

       =   604

The Preacher and Coffman (2006) R software suggested that a sample size of 44 (43.75) observations would be required in order to ensure .80 statistical power in evaluating the exact fit null hypothesis of the proposed employee engagement structural model. This is clearly not a sample size that could be realistically considered given the N:q rules-of-thumb referred to above. It does, however, indicate that the sample sizes indicated by the N:q rules-of-thumb will ensure adequate power. In Figure 3.3 the statistical power of the test of close fit is shown as a function of sample size. In Figure 3.3 the model under H_a is assumed to be reasonable (RMSEA=.066).
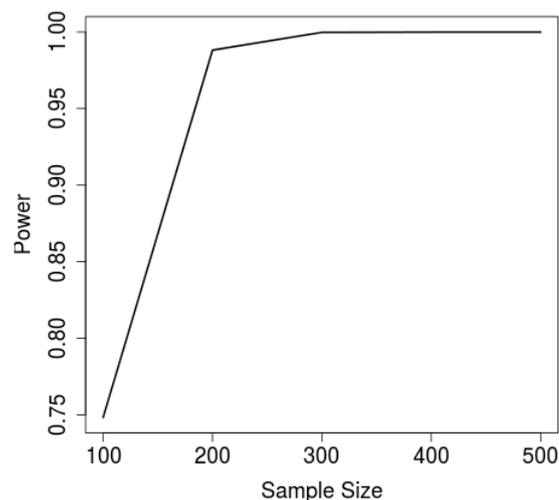
Figure 3.3. Statistical power of the test of close fit as a function of sample size assuming RMSEA =.066 under H_a.

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[35] Given the manner in which the 18 latent variables were operationalised to fit the comprehensive LISREL model (see paragraph 3.7) there were 38 observed/indicator variables from which the observed variance-covariance matrix was calculated.

The third and final consideration, when deciding on a suitable sample size, involves any practical and logistical considerations. For example; cost, access to suitable participants and the willingness of organisations/employers to commit large numbers of employees to this study. When taking these three considerations into account it was proposed that a sample of 200 – 400 research participants should be selected for the purpose of testing the proposed employee engagement structural model.

3.6.3   Procedure for inviting research participants

The principals of numerous schools in the Western Cape were contacted by the researcher to obtain informed institutional permission and subsequently organise the sampling and data collection process. Prior to this formal informed institutional permission for the study was obtained from the Western Cape Department of Education (WCDOE). Strict ethical rules were adhered to so as to ensure every step of the process complied with the ethical guidelines (discussed in detail in section 3.10). Informed consent from participants and the data was captured via an online survey that was distributed via email (**APPENDIX A**). The school principals, upon agreement to partake in the study, provided access to either the head of HR or administration who then assisted in distributing the surveys to employees. This process helped ensured that employee privacy remained protected.

Regrettable, only a limited number of targeted schools agreed to participate in the study and the desired sample size was not met. Permission was subsequently sought from the Research Ethics Committee (Humanities) of Stellenbosch University and granted to recruit additional research participants via a snowball sampling method, with the intention of gathering the largest sample size possible. This method involved distributing the survey (via email) more broadly to full time, permanently employed teachers beyond the scope of the Western Cape Education Department. Participant teachers were requested to then forward the email to other potential participants of the same job description[36].

3.7   MEASURING INSTRUMENTS/OPERATIONALISATION

The ability to test the fit of the employee engagement structural model and the structural relationships portrayed in the model is dependent on the availability of measuring instruments that would allow for the valid and reliable measurement of the latent variables included in the model. So as to gather empirical evidence that the relations portrayed in the structural model provide a valid explanation for the differences observed in employee engagement, measures of the different exogenous and endogenous latent variables presented in the model are required. Furthermore, the degree to which valid and credible conclusions can be made on the ability of the proposed employee engagement structural model to

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[36] A potential limitation of using the snowball sampling method is that it might have attracted participants who are not necessarily full time, permanently employed teachers in South Africa. Thus, it's possible that the sample might include individuals that fall outside of the target population and therefore who don't meet the sample criteria of the study.

explain the differences in engagement is dependent on the extent to which the manifest indicators are in fact valid, reliable and unbiased measures of the latent variables they've been assigned to reflect. As clarified by Diamantopoulos and Siguaw (2000, p. 89), "...unless we can trust the quality of our measures, then any assessment of the substantive relations of interest will be problematic".

The hypothesised structural relationships were evaluated by fitting the comprehensive LISREL model containing the structural model and the measurement model. Clear inferences on structural model fit can only be drawn from the fit of the comprehensive LISREL model if the measurement model shows close fit, and the measurement model parameters reveal that the indicator variables provide valid and reliable measures of the latent variables they were assigned to represent. To this end, the following sections will discuss part of the evidence needed to determine the psychometric soundness of the indicator variables, which are used to operationalise or measure the latent variables of the proposed employee engagement structural model. Empirical evidence found in the literature on the validity and reliability of the chosen measuring instruments is revised to defend the selection of specific measurement tools. In addition, the success with which the manifest indicators reflect the latent variables encompassing the employee engagement structural model were empirically evaluated via item analysis, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Item analysis was conducted on each of the selected measures to establish the extent to which the items all represent a common underlying latent variable, as well as all sensitively discriminate between different levels of the latent variable. Poor or problematic items were subsequently considered for deletion or revision. EFA was utilised to investigate the uni-dimensionality assumption, and finally CFA was utilised to determine the extent to which the design intention underlying the operationalisation of the latent variables contained in the employee engagement structural model succeeded. The proposed statistical techniques are discussed in more depth in Section 3.9.

3.7.1 May et al.'s (2004) Current Latent Variables

The measures for the latent variables from May et al.'s (2004) employee engagement structural model are first discussed, followed by the measures used for the latent variables which were added to the expanded employee engagement structural model. The same measuring instruments used by May et al. (2004) were used to gather data in the current study.

Following Edmondson (1999), May et al. (2004), in order to substantiate that their measures were distinct from one another, examined both the antecedent and outcome sections of their model. Consequently, they initially placed all of the exogenous and mediating variable items in a principal components factor analysis with oblique rotation using .40 as their cut-off point for cross-loadings. The results of the factor analysis of the independent variables identified 14 factors with eigenvalues >1.00. The largest factor, containing all of the *supervisor relations* items, explained 23.9% of the variance. Furthermore, May et al. (2004) concluded that all of the scale items loaded on their respective constructs

and did not cross-load on the other factors. The *job enrichment* scale items loaded on four factors instead of the five-factor model. However Fried and Ferris (1987) explain that these subscales should be averaged in any case as an indicator of overall *job enrichment*. Secondly, May et al. (2004) performed a principal components factor analysis using oblique rotation for the *personal engagement* outcome variable which provided four factors with the largest explaining only 28.1% of the variance. Since three reliable theorised dimensions of engagement were not present (as discussed in Section 3.7.1.12) and each item contributed positively to the Cronbach's alpha, May et al. (2004) averaged all items for the engagement scale. Taken as a whole, the results from the factor analyses provided support for the discriminant validity of their measures and did not imply that common method variance posed a problem in their data as per Harmon's one-factor test for common method bias (Podsakoff & Organ, 1986).

All of the sub-scale measures used by May et al. (2004) were employed to measure the respective latent variables in the expanded employee engagement structural model. All scale measures use a five-point agreement-disagreement Likert format, where responses varied between (1) "strongly disagree", and (5) "strongly agree", unless otherwise noted. All the items used in the scale measures are show in **APPENDIX A**[37].

3.7.1.1 Job Enrichment

Job enrichment was measured by using fifteen items from the Job Diagnostic Survey (Hackman & Oldham, 1980) to obtain an overall indicator of *job enrichment* (Fried & Ferris, 1987). The JDS utilises three items for each of the five job-related dimensions: skill variety, task identity, task significance, autonomy and feedback. May et al. (2004) reported that the fifteen items revealed a Cronbach alpha of .85.

Two item parcels were calculated by taking the mean of the even and uneven numbered items of the above-mentioned scale, to form two composite indicator variables of the *job enrichment* latent variable within the proposed expanded structural model.

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[37] Only a portion of the expanded employee engagement model was tested for the purpose of this study due to the small sample size that was obtained. In other words, even though all measuring instruments mentioned in section 3.7 were administered to respondents, the final data analysis (Chapter 4) was only performed on the final modified employee engagement structural model presented in Figure 4.1.

3.7.1.2 Work Role-self Fit

Work role-self fit was assessed by means of four items from May (2003) which directly measure individuals' perceived fit with their jobs and self-concept (Kristof, 1996). May et al. (2004) reported that the four items revealed a Cronbach alpha of .92.

Two item parcels were calculated by taking the mean of the even and uneven numbered items of this scale, to form two composite indicator variables of the *work role-self fit* latent variable within the proposed expanded structural model.

3.7.1.3 Co-worker Relations

Co-worker relations was measured by utilising ten items from May (2003). May et al. (2004) obtained good reliability statistics indicated by a Cronbach alpha of .93 for these ten items. These items measure for example whether co-workers valued an individual's input, valued who they were as individuals and trusted one another May et al. (2004).

Two item parcels were calculated by taking the mean of the even and uneven numbered items of the above-mentioned scale, to form two composite indicator variables of the *co-worker relations* latent variable within the proposed expanded structural model.

3.7.1.4 Supervisor Relations

Supportive *supervisor relations* was measured by using ten items of which the first six were drawn from Oldham and Cummings (1996) and the remaining four items were drawn from Butler (1991). May et al. (2004) obtained a Cronbach alpha of .95 for the scale.

Two item parcels were calculated by taking the mean of the even and uneven numbered items of this scale, to form two composite indicator variables of the *supervisor relations* latent variable within the proposed expanded structural model.

3.7.1.5 Co-worker Norms

Adherence to *co-worker norms* that is, the degree to which individuals follow co-worker norms and do what is expected of them by co-workers, was assessed by means of the three items May et al. (2004) developed for their study. They obtained a somewhat disappointing Cronbach alpha of .61 for the scale. Three additional items were written for this scale that would be brought into play if the scale had again returned such disappointing results.

Two item parcels were calculated by taking the mean of the even and uneven numbered items of the scale. This will result in the formulation of two composite indicator variables of the *co-worker norms* latent variable within the proposed expanded structural model.

3.7.1.6 Public Self Consciousness

May et al. (2004) argued that individuals who are insecure about their work roles may also feel unsafe at work, particularly those who experience *public self-consciousnes*s (Fenigstein et al., 1975). "Individuals who constantly worry about what others think of them are likely to experience less psychological safety at work. They will be inhibited when it comes to trying new ways of accomplishing their tasks" (May et al., 2004, p. 31). As such *public self-consciousness* was measured by using three items which pertain to public self-consciousness as opposed to private self-consciousness (Fenigstein et al., 1975). May et al. (2004) reported that the three items revealed a Cronbach alpha of .83. Three additional items were also written for this scale to protect against the possibility that the short scale might return a too low Cronbach alpha.

Two item parcels were calculated by taking the mean of the even and uneven numbered items of the above-mentioned scale, to form two composite indicator variables of the *public self-consciousness* latent variable within the proposed expanded structural model.

3.7.1.7 Resources

For the purposes of this study the *resources* latent variable, which involves the degree to which individuals possess the necessary resources to become available for engagement, will be assessed by means of eight items that were developed by May et al. (2004) for their study. May et al. (2004) obtained good reliability statistics indicated by a Cronbach alpha of .91 for the eight items in this scale.

Two item parcels were calculated by taking the mean of the even and uneven numbered items of the scale. This will result in the formulation of two composite indicator variables of the *resources* latent variable within the proposed expanded structural model.

3.7.1.8 Outside Activities

Outside activities which refers to the degree of involvement in outside organisations, was measured in the May et al. (2004) study using a single item: 'How many hours per week do you participate in organisations other than (the company's name) (i.e. other jobs, church, school, girl scouts, volunteering, etc.)?' which was developed by May et al. (2004) for their study. The choices include: (1) "1–5 hours", (2) "6–10 hours", (3) "11–15 hours", (4) "16–20 hours", and (5) "21+ hours".

Parcelling is not possible with a single item and internal consistency as a concept only makes sense when you have multiple indicators. As such, the current study developed six items to form a scale. Two item parcels were calculated by taking the mean of the even and uneven numbered items of the scale, resulting in the formulation of two composite indicator variables of the outside activities latent variable

within the proposed expanded structural model. This would make it possible to calculate Cronbach's alpha for this subscale.

3.7.1.9 Psychological Meaningfulness

In order to measure *psychological meaningfulness*, that is the degree of meaning that employees discover in their work-related activities, six items which May et al. (2004) drew from Spreitzer (1995) and May (2003) was used. May et al. (2004) reported that the six items of the *psychological meaningfulness* scale revealed a Cronbach alpha of .90.

Again, two item parcels were calculated by taking the mean of the even and uneven numbered items of this scale, to form two composite indicator variables of the *psychological meaningfulness* latent variable within the proposed expanded structural model.

3.7.1.10 Psychological Safety

Like in May et al.'s (2004) study, the *psychological safety* latent variable was assessed by utilising three items ($\alpha = .71$) based on Kahn's (1990) work. These three items, of which May et al. (2004) reported a Cronbach alpha of .71, assessed whether the employee felt comfortable and safe to be themselves and express their own opinions at work or whether on the contrary, there was a threatening environment at work. One additional item was written for this subscale.

Two item parcels were calculated by taking the mean of the even and uneven numbered items of this above-mentioned scale, to form two composite indicator variables of the *psychological safety* latent variable within the proposed expanded structural model.

3.7.1.11 Psychological Availability

Psychological availability, which involves the confidence individuals have in terms of their ability to be cognitively, physically and emotionally available for work, was measured by using five items May et al. (2004) developed based on Kahn's (1990) discussion. May et al. (2004) reported to have obtained a Cronbach Alpha of .85 for the five items in the p*sychological availability* scale.

Two item parcels were calculated by taking the mean of the even and uneven numbered items of the scale, to form two composite indicator variables of the *psychological safety* latent variable within the proposed expanded structural model.

3.7.1.12 Personal Engagement

Due to the fact that Kahn (1990; 1992) theorised that there may be three distinct components of engagement (physical, cognitive and emotional) May et al. (2004) initially conducted an exploratory principal components factor analysis of twenty-four items. However, since three separate and reliable

scales representing cognitive, emotional and physical engagement did not emerge from their data, they decided to apply an overall scale with thirteen items which demonstrated good reliability statistics and had some balance across the three forms of engagement (May et al., 2004). Therefore, for the purposes of this study, the *personal engagement* latent variable was measured by employing those thirteen items that May et al. (2004) developed for their study. The items reflect each of the three dimensions of Kahn's (1990) psychological engagement: cognitive engagement, emotional engagement and physical engagement. Furthermore, May et al. (2004) report a Cronbach alpha of .77 for those thirteen items in the scale.

Two item parcels were calculated by taking the mean of the even and uneven numbered items of the above-mentioned scale. This resulted in the formulation of two composite indicator variables of the *personal engagement* latent variable within the proposed expanded structural model.

3.7.2 Proposed Models' Additional Latent Variables

The measures to be used for the latent variables which were added to the expanded employee engagement structural model will now be discussed. All the items used in the scale measures discussed below are shown in **APPENDIX A**.

3.7.2.1 State Engagement

The Utrecht Work Engagement Scale (UWES), a self-report questionnaire developed by Schaufeli et al. (2002), consists of seventeen items (UWES-17), which measure the three core dimensions of work engagement, namely: vigour (six items), dedication (five items), and absorption (six items). Originally the UWES contained twenty-four items, however after psychometric testing seven poor items were deleted and seventeen items were retained (Seppälä, Mauno, Feldt, Hakanen, Kinnunen, Tolvanen, & Schaufeli, 2009).

The UWES has been validated in various countries including China (Fong & Ng, 2012; Yi-Wen & Yi-Qun, 2005), Finland (Hakanen, 2002; Seppälä et al., 2009), Greece (Xanthopoulou, Bakker, Demerouti, & Kantas, 2007; Xanthopoulou, Bakker, Kantas & Demerouti, 2012), Japan (Shimazu et al., 2008), South Africa (Coetzer & Rothmann, 2007; Storm & Rothmann, 2003), Spain (Salanova, Agut & Peiro, 2005; Schaufeli et al., 2002), Norway (Nerstad, Richardsen & Martinussen, 2010) and the Netherlands (Balducci et al., 2010; Mills, Culbertson & Fullagar, 2011; Schaufeli & Bakker, 2003; Schaufeli et al., 2002). All studies utilised confirmatory factor analyses and yielded support that a three-factor model for UWES was better than that of alternate factor models. Additionally, the internal consistencies of the three subscales showed to be sufficient in each investigation. However, this being said, it is important to note that some studies failed to reproduce the three-factor structure of work engagement (e.g. Rothmann, Jorgensen & Hill, 2011; Shimazu et al., 2008; Sonnentag, 2003). Bakker et al. (2008) point

out that this may be accredited partly to translation issues when it comes to items that contain metaphors (e.g. "Time flies when I am working"). Furthermore, researchers suggest that due to the high inter-correlations existing between the three factors (vigour, dedication and absorption) the overall score of work engagement may at times be more useful in empirical research than the scores on the three separate factors of the UWES (Balducci et al., 2010; Schaufeli et al., 2006). Recently, Schaufeli et al. (2006) developed a shorter nine-item version of the UWES (UWES-9) where vigour, dedication and absorption are assessed by three items per dimension. They provided evidence for its cross-national validity and confirmed that the three engagement dimensions are moderately strongly related.

For the purpose of this study the latent variable *state engagement* was measured using the UWES-17. All items were scored on a seven-point frequency rating scale varying from (0) "never", to (6) "every day". International and national studies report Cronbach alpha coefficients for the three subscales varying between .68 and .91 (Goliath-Yarde & Roodt, 2011; Schaufeli et al., 2002; Storm & Rothmann, 2003). De Bruin, Hill, Henn, and Muller (2013) in their study reported Cronbach alpha coefficients for the three subscales as follows: vigour, α=.88; dedication, α=.91; absorption, α=.85. Additionally, they reported correlations between the three subscales as: r =.86 between vigour and dedication; r =.79 between vigour and absorption; r =.79 between dedication and absorption.

Two item parcels were calculated by taking the mean of the even and uneven numbered items of the UWES-17 rather than calculating three dimensions scores. This resulted in the formulation of two composite indicator variables of the *state engagement* latent variable within the proposed expanded structural model.

3.7.2.2 Job satisfaction

The Minnesota Satisfaction Questionnaire (MSQ) is intended to measure an individual's satisfaction with their job by emphasising aspects of a job that an employee can find rewarding (Weiss, David, England, & Lofquist, 1967). As such, it helps to form a more individualised picture of satisfaction with work and the work environment. For the purposes of this study *job satisfaction* was measured by utilising the short form of the Minnesota Satisfaction Questionnaire (MSQ-SF). The MSQ-SF is made up of twenty items from the longer version that best represent each of the scales, and consists of three scales namely; intrinsic satisfaction (items 1, 2, 3, 4, 7, 8, 9, 10, 11, 15, 16, and 20), extrinsic satisfaction (items 5, 6, 12, 13, 14, and 19), and general satisfaction (all items). The respondents are required to indicate their response to each item on a five-point Likert type scale. Responses can vary between (1) "very dissatisfied", to (5) "very satisfied". Weiss et al. (as cited in Arvey, Bouchard, Segal & Abraham, 1989 and in Senter, Morgan, Serna-McDonald and Bewley, 2010) indicates that the internal consistency measures calculated for the three scales, on the basis of a wide variety of occupational groups, provide a median reliability coefficient of .86 for the intrinsic satisfaction scale, .80 for the extrinsic scale, and .90 for the general satisfaction scale.

Two item parcels were calculated by taking the mean of the even and uneven numbered items of the overall *job satisfaction* scale. This resulted in the formulation of two composite indicator variables of the *job satisfaction* latent variable within the proposed expanded structural model.

3.7.2.3 Organisational Commitment

The three component model (TCM) Employee Commitment Survey developed by Meyer and Allen (1991) which measures three forms of employee commitment to an organisation: desire-based (affective commitment), obligation-based (normative commitment) and cost-based (continuance commitment) was utilised to measure the one component of employee commitment that this study focuses on; namely, desired-based (affective commitment). The survey consists of three adequately validated scales (even though use was made of one scale only): The Affective Commitment Scale (ACS), the Normative Commitment Scale (NCS) and the Continuance Commitment Scale (CCS). Each of the scales is scored separately and can be used to develop a "commitment profile" of employees within an organisation (Meyer & Allen, 2004).

The ACS is made up of eight items, and responses occur on a seven-point agree-disagree Likert type scale for each item. Responses include: (1) "strongly disagree"; (2) "disagree"; (3) "slightly disagree"; (4) "undecided"; (5) "slightly agree"; (6) "agree"; (7) "strongly agree". In addition, the ACS is comprised of both positively and negatively phrased items (Meyer & Allen, 1997). Studies conducted by Allen and Meyer (1990) and Allen and Meyer (1996) report reliability coefficients of .87 and .85 respectively for the ACS. Factor analysis with Varimax rotation (Allen & Meyer, 1990) confirmed the multidimensionality of the construct and showed that the ACS accounted for 58.8% of the variance.

In this study two item parcels were calculated by taking the mean of the even and uneven numbered items of the ACS to form two composite indicator variables for the *organisational commitment* latent variable in the proposed expanded structural model.

3.7.2.4 Intention to Quit

In order to measure *intention to quit* a modified version of Arnold and Feldman's Intention to Quit Scale, developed by Oehley (2007), was utilised. The scale comprised four items, where respondents were required to indicate their response to each of the items on a five-point frequency scale. Responses ranged between (1) "never", to (5) "always". The items included in the scale were: 1) Wanting to leave the organisation, 2) Searching for another position, 3) Planning to leave the organisation and 4) Actually leaving the organisation within the next year (Oehley, 2007). Cronbach alpha reliability coefficients of .848 and .880 were reported by Oehley (2007) and Smuts (2011) respectively for the Intention to quit scale. In addition, results from principal axis factoring with oblique rotation, performed by Smuts

(2011) on the Intention to Quit Scale, confirmed the uni-dimensionality of the scale and factor loadings ranged from between .960 and .718.

Two item parcels were calculated by taking the mean of the even and uneven numbered items of this above-mentioned scale, to form two composite indicator variables of the *intention to quit* latent variable within the proposed expanded structural model.

3.7.2.5 Organisational Citizenship Behaviour

The *OCB* latent variable was measured using the sixteen-item scale developed by Lee and Allen (2002). Eight items were used to assess *OCBI* (organisational citizenship behaviours directed at individuals), and eight items were used for *OCBO* (organisational citizenship behaviours directed at the organisation). Respondents were required to rate each item on a five-point frequency scale. Responses varied between (1) "never", to (5) "always". Lee and Allen (2002) performed a confirmatory factor analysis which clearly showed that the two-factor model is favoured over the one-factor model and thus confirmed an empirical distinction between *OCBI* and *OCBO*. Furthermore, they reported a Cronbach alpha coefficient of .83 for *OCBI* and .88 for *OCBO*.

Two item parcels were calculated by taking the mean of the items allocated to the *OCBI* and *OCBO* subscales, to form two composite indicator variables of the *OCB* latent variable within the proposed expanded structural model.

3.7.2.6 Operationalising the *psychological safety*psychological meaningfulness* latent interaction effect

The interaction between the *psychological safety* and the *psychological meaningfulness* latent variables would have been modelled as an additional latent variable in the model. The indicator variables for the latent interaction effect would be calculated using the residual centering or orthogonolising procedure suggested by Little, Bovaird and Widamen (2006). The residual centering techniques requires the calculation of all possible product terms from the indicators of the latent variables involved in the latent interaction effect. Each product term is then regressed on all the individual indicators of the latent variables involved in the interaction effect. The residuals are subsequently calculated for each regression model. The residuals are then used as the indicator variables for the latent interaction effect variables. Since the residuals contain that part of the dependent variable (i.e. the product terms) that is independent of the predictors it was regressed on, the residuals in this case only that part of the product term that represents the pure interaction effect.

3.8   MISSING VALUES

In social science research it is unlikely that a complete dataset will be collected. Therefore, the issue of missing values needs to be investigated and addressed before the composite indicator variables can be calculated and the fit of the structural model can be evaluated. If the composite indicator variables were to be calculated without appropriately addressing the issue of missing values it could result in seemingly satisfactory, albeit in reality defective, indicator variables.

Missing values fall into one of three categories (Switzer & Roth, 2002). The first category refers to values that are missing completely at random (MCAR). This involves missing values that do not depend on the variable of interest or on any other variables in the dataset. The second category refers to values which are missing at random (MAR). Values are considered MAR if the probability of missing values on any variable is not related to its particular value. Under MAR, however, the pattern of missing values is predictable from other variables in the database. The third and final category refers to values which are missing not at random (MNAR), which occurs when the missing value depends on the actual value of the variables that are missing. The various techniques used to treat the missing data problem either assume that a MAR or a MCAR mechanism brought about the missing values.

Raghunathan (2004) recommends that the decision as to which missing data technique (MDT) to utilise, in addressing the issue of missing values, ought to be based on the potential of the technique to improve the inferential validity of the results. According to Switzer and Roth (2002) the decision as to which MDT to utilise is dependent on the number of missing values, the mechanism that produced the missing values, as well as the nature of the data (i.e. whether the data follows a multivariate normal distribution). Five missing data techniques (MDTs) which can be utilised in addressing the issue of missing values will be discussed. These techniques include:

- List-wise deletion
- Pair-wise deletion
- Imputation by matching
- Multiple imputations
- Full information maximum likelihood imputation

List-wise deletion is generally employed as the default option in addressing missing values in most statistical analyses (Switzer & Roth, 2002). It is an *ad hoc* technique for addressing the matter of missing values as it attends to the issue prior to any substantive analysis being done (Carter, 2006). This MDT requires the deletion of entire cases where there are missing values for any of the variables; ensuring only cases with complete datasets remain (Mels, 2003). A disadvantage of this technique is that, depending on the sample size and the number of latent variables being investigated, a dramatic reduction

in the sample size available for data analysis could transpire (Carter, 2006; Mels, 2003, Ragunathan, 2004).

Pair-wise deletion, also an *ad hoc* technique for addressing the issue of missing values in a dataset, aims to retain the traditional approach of deleting while minimising data loss (Switzer & Roth, 2002). This MDT focuses on deleting cases only for analysis on variables where values are missing. It involves calculating the covariance estimates for each pair of observed variables for only the cases where complete observations for both variables are available (Wothke, as cited in Carter, 2006), and cases can only be deleted when they have any missing values on the variables involved in the calculation of covariance estimates (Kline, as cited in Carter, 2006). Even though pair-wise deletion is commonly regarded as an improvement on list-wise deletion since more of the original data is retained (Switzer & Roth, 2002), it also runs the risk of resulting in a sizable reduction of the sample available for data analysis. In addition, Pigott (2001) points out that pair-wise deletion could engender invalid estimates due to the varying sample sizes used to estimate parameters. In other words, it could result in analyses in the same study that are based on very different (sub)samples (Switzer & Roth, 2002). Therefore, the most prominent disadvantage associated with deletion techniques is that they customarily reduce the size of a sample which can potentially negatively affect the study power (Switzer & Roth, 2002) if there is a considerable amount of loss. Considerable data loss could affect parameter estimates by introducing bias.

Imputation by matching is a technique which involves replacing missing values with substitute real values. The substitute values are derived from one or more other cases with similar observed values on a set of matching variables. A minimisation criterion is applied on a set of matching variables and imputation does not take place for a case unless the minimisation criterion is satisfied or if no observation exists that has complete data on the set of matching variables (Jöreskog & Sörbom, 1996a). Ideally, researchers should use matching variables that will not be utilised in the confirmatory factor analysis. However, this is quite often not possible. Therefore, the items least beleaguered by missing values are generally utilised as matching variables. The fact that this MDT makes less stringent assumptions than the multiple imputation procedures is an advantage of this method. Alternately, the fact that cases which are unsuccessfully imputed are removed from the imputed data set serves as a disadvantage of this method.

The *multiple imputation* (MI) technique uses existing values from the observed variables to predict missing values. Estimate values for each missing value in the dataset are generated so as to create multiple complete datasets (Pigott, 2001; Switzer & Roth, 2002). The parameter of interest is then calculated on each one of these data sets. This MDT addresses missing values by restoring the innate variability in the missing values and taking into account ambiguity caused in estimating the missing value (Wayman, 2003). The MI technique assumes that data is MAR and that the observed data follows

a multivariate normal distribution (Du Toit & Du Toit, 2001). However, these assumptions are generally not met. Mels (2003) argues that the use of MI would be acceptable if observed variables are measured on a scale consisting of five or more scale values, given that the observed variables are not excessively skewed (even though the null hypothesis of multivariate normality had been rejected) and given that less than 30% of the data constitutes missing values. MI does return an imputed data set and it does so for all cases.

The *full information maximum likelihood* (FIML) *estimation* technique uses the expectation-maximisation (EM) algorithm to calculate a case-wise likelihood function using only the variables that are observed for particular cases. Estimates of missing values are acquired based on the incomplete observed data to maximise the observed data likelihood (Enders & Bandalos as cited in Dunbar-Isaacson, 2006). This method, instead of generating values for individual missing variables, provides estimates for the means, variance, and covariance matrix of the variables of interest, which are consequently used to obtain model parameters (Pigott, 2001). The FIML technique is probably more efficient than the available MI techniques. However, that being said, it does have the disadvantage that no separate imputed data set is created which prevents item and dimensionality analyses as well as the calculation of item parcels, which is a requirement of this study. As with the MI technique, this technique assumes the data values are MAR and that the observed data is continuous and follows a multivariate normal distribution (Du Toit & Du Toit, 2001).

It is clear from the forgoing discussion that the FIML and MI MDTs hold clear advantages over the two deletion techniques; list-wise and pair-wise case as well as over imputation by matching. In addition, according to Pigott (2001), two of the complications related to the FIML estimation technique can be overcome by using MI of missing values. Firstly, standard errors of estimates can be simply obtained with MI and secondly, MI generates superior flexibility in that it provides a completed dataset after imputation which can be used for further analysis. For the purposes of this study the multiple imputation method was utilised

3.9   DATA ANALYSIS

The objective of the data analysis was to test the proposed employee engagement structural model depicted in Figure 3.1. As previously discussed in section 3.7, various instruments were used to obtain the data to realise this objective. The data obtained from the instruments was analysed using item analysis, exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and structural equation modelling (SEM).

3.9.1   Item Analysis

The various instruments utilised to measure the latent variables comprising the proposed structural model were developed to measure a specific construct/latent variable, or a dimension of a construct/latent variable, carrying a specific constitutive definition. Items have been specifically developed to reflect a respondent's standing on these specific latent variables. Moreover, the items have been developed to serve as stimuli to which the individual responds with specific observable behaviour that is a reasonably uncontaminated expression of the specific underlying unidimensional latent variable (De Goede, 2007; Smuts, 2011). The success of these design intentions should reflect in a number of item statistics.

If the behavioural responses to the items of a subscale developed to reflect a unidimensional latent variable or a unidimensional latent dimension of a multivariate latent variable successfully do so the item responses of test-takers should be reasonably internally consistent. Item analysis was conducted to determine the internal consistency of the responses of individuals to items of the measuring instruments used to test the proposed employee engagement structural model. The main objective behind conducting item analysis is that it allows for the identification of items that do not successfully contribute to the internal consistency of the subscale. A poor item would be one that fails to discriminate between different levels of the latent variable they are meant to reflect and/or items that, in comparison to their subscale colleagues, fail reflect a common underlying latent variable. These poor items were subsequently identified and considered for elimination. When considering elimination, poor items are generally either transformed or completely deleted from the respective scales contributing to a considerable improvement in the Cronbach alpha of the scale, and ultimately an enhancement of the overall reliability of the scale. To this end, item analysis was performed on a subscale level.

Decisions regarding elimination of any items for any specific scale were based on a basket of empirical evidence obtainable in the item statistics presented by the item analysis. This available basket of evidence includes, amongst others, the following classical measurement theory item statistics: the item-total correlations, the squared multiple correlation, the change in subscale reliability when the item is deleted, the change in subscale variance if the item is deleted, the inter-item correlations, the item means and the item standard deviations (Murphy & Davidshofer, 2005).

Item analysis was conducted after the treatment of missing values using the Reliability procedure of SPSS version 25.

3.9.2   Exploratory Factor Analysis

It would've been a bit impulsive to base decisions around eliminating any of the items used in this study solely on evidence derived from the item analysis. A more vigilant approach would be to obtain further

evidence to justify the elimination of any items from a scale which fail to reflect the intended latent variable. Each of the scales (or subscales in the case of multidimensional latent variables) used to measure the latent variables comprising the proposed structural model were designed to reflect participants' standing on an uni-dimensional construct. Each of the (sub)scales should therefore be essentially one-dimensional sets of items. These items were designed to operate as stimulus sets to which individuals respond with observable behaviour, that is in essence an expression of a specific uni-dimensional underlying latent variable. Nevertheless, as pointed out by Guion (1998) the behavioural response to each item is never only dependent on the latent variable of interest, but also influenced by various other non-relevant latent variables and random error influences which are not relevant to the measurement objective. It is assumed that only the relatable latent variable is a common source of systematic variance across all the items comprising a subscale. As such, the assumption is that if the specific latent variable of interest would be statistically controlled that the partial correlation between items would move towards zero, confirming the presence of a single underlying common factor (Hulin, Drasgow & Parson, 1983). Accordingly, the intention is to obtain reasonably uncontaminated, pure measures of the specific underlying latent variable via the items comprising the scale.

Dimensionality analysis, through exploratory factory analysis (EFA), was performed to a) confirm the uni-dimensionality of the (sub)scales used to measure the latent variables and dimensions of those latent variables comprising the proposed structural model, b) eliminate items characterised by weak factor loadings, and/or if necessary, c) divide heterogeneous scales into two or more homogenous sets (De Goede, 2007). Therefore, through EFA, the uni-dimensionality assumption as well as the assumption that the target latent variable explains a significant proportion of the variance observed in each item, were examined for each of the (sub)scales.

The following would constitute support for uni-dimensionality; if the eigenvalue-greater-than-unity rule (supported by the scree plot) results in the extraction of a single factor; the size of the factor loadings is relatively high (>.50); and only a small percentage of the residual correlations are larger than .05. Consequently, EFA complements item analysis as it endeavours to obtain further evidence to justify the decision to remove any of the items from a specific scale that fail to reflect the intended latent variable[38].

Principal axis factoring (PAF) was utilised as the default extraction technique (Tabachnick & Fidell, 2007). This extraction technique is preferred over principal component factor analysis (PCA) for two

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[38] However, neither the item analyses nor the EFA of the various scales can offer sufficient evidence to permit an irrefutable conclusion on the success with which the specific latent variable, as constitutively defined, is measured. If the specific latent variable was not successfully measured it would reflect in poor item statistics and inappropriate factor structures with low factor loadings. Successful item and dimensionality analysis in contrast only means that the position that the scale/subscale measures the latent variable of interest has survived opportunities to be falsified. Therefore in order to acquire more convincing evidence on the construct validity of the various scales the measurement models mapping the items on the latent variables will need to be integrated into fully fledged structural models that also map the latent variables onto outcome latent variables in accordance with the directives of the constitutive definitions of the latent variables.

reasons. Firstly, it is the most widely used and understood extraction technique and secondly, it only analyses common variance shared between items within a scale while PCA analyses all the variance (common, random/error and unique variance) (Field, 2005; Tabachnick & Fidell, 2007). In the occurrence of factor fission, the extracted solution will be subjected to rotation. There are two types of factor rotation which can be performed; namely orthogonal rotation and oblique rotation (Field, 2005; Tabachnick & Fidell, 2007). Orthogonal rotation considers all factors to be independent (i.e. uncorrelated) whereas oblique rotation allows factors to correlate (Field, 2005; Tabachnick & Fidell, 2007). Therefore, even though its slightly more difficult to interpret than orthogonal rotation, oblique rotation was utilised in this study as it provides more realistic results by making better provision for the possibility that the extracted factors could be correlated. The factor loading will be considered satisfactory if $\lambda_{ij} > .50$. According to Hair, Black, Babin, Anderson and Tatham (2006), factor loadings should be considered acceptable if $\lambda_{ij} > .71$. The latter criterion was considered to be more appropriately applied to the evaluation of the loadings of composite indicator variables (i.e. item parcels).

The Dimension reduction procedure of SPSS version 25 was used to investigate the dimensionality of the (sub)scales used to measure the latent variables included in the proposed employee engagement structural model.

3.9.3 Structural Equation Modelling

3.9.3.1 Variable Type

The decision as to which is the appropriate moment matrix to analyse and the appropriate estimation technique to use to estimate freed model parameters is dependent on the measurement level on which the indicator variables are measured. Structural equation modelling (SEM) can be conducted on the proposed structural model one of two ways, either by using the individual scale items or by creating and using two or more linear composites of individual scale items known as item parcelling. Bandalos (2002) describes item parcelling in SEM analysis as the substitution of item scores with parcelling scores which are derived by averaging or summing item scores from two or more items.

Section 3.7 stipulated that two linear composites of individual items will be formed (i.e. item parcels) to represent each of the latent variables when testing the fit of the structural model. The decision to use item parcels as opposed to individual items to measure latent variables was made due to the various advantages associated with item parcelling. One advantage of item parcelling is that it can be utilised as a substitute for data transformations or other alternate estimation techniques when working with non-normally distributed and roughly categorised data (Coffman & MacCallum, 2005). Item parcelling as such is used as a means to mitigate these effects by making distributions more continuous and normally distributed (Bandalos, 2002). Furthermore, apart from the fact that parcelling simplifies the task of fitting the structural model by decreasing the number of parameters to be estimated and thereby reducing

the required sample size, the creation of two or more linear composite indicator variables for each latent variable also has the added advantage of creating more reliable indicator variables (Kishton & Widaman, as cited in Coffman & MacCallum, 2005; Nunnally, 1978). However, that being said, Marsh, Hau, Balla and Grayson (1998) warn that solutions in confirmatory factor analysis tend to improve when the number of indicator variables per latent variable increases. If individual items were to be used as indicator variables the result would be an extremely complex comprehensive LISREL model which requires an extremely large sample to ensure credible parameter estimates[39]. Therefore, it was decided to use item parcelling which allows the assumption that the indicator variables are continuous variables, measured on an interval level (Jöreskog & Sörbom, 1996a; 1996b; Mels, 2003). To this end, the covariance matrix was analysed with maximum likelihood estimation provided the multivariate normality assumption was met (Du Toit & Du Toit, 2001; Mels, 2003).

3.9.3.2 Multivariate Normality

The maximum likelihood estimation technique, that LISREL uses by default to estimate the freed parameters in a model fitted to continuous data, assumes that the indicator variable distribution follows a multivariate normal distribution. The validity and credibility of the model fit statistics and the statistical significance of the path coefficient estimates are compromised when ML estimation is used under conditions where this assumption is not satisfied (Du Toit & Du Toit, 2001; Mels, 2003). Consequently, the null hypothesis that this assumption is met was formally tested in PRELIS. In the event that the null hypothesis was rejected (i.e. the data does not follow a multivariate normal distribution), then normalisation was attempted (Jöreskog & Sörbom 1996a). If normalisation was unsuccessful, then robust maximum likelihood estimation was used (Mels, 2003).

3.9.3.3 Confirmatory Factor Analysis

A number of the latent variables included in the structural model were conceptualised as multidimensional constructs (e.g. *personal engagement, state engagement*, *job satisfaction*, OCB). Dimensionality analysis was conducted on the subscales of the instruments chosen to measure these multidimensional latent variables. In addition, the complete multi-factor measurement models were fitted for each instrument. The individual items were used to represent the latent dimensions in these measurement models. Since responses to all items were recorded on 5-point or longer Likert scale, the data was treated as continuous (Muthén & Kaplan, 1985). The covariance matrix was analysed with

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[39] By increasing the number of indicator variables the number of factor loading and error variance parameters that have to be estimated increases.

maximum likelihood estimation provided the multivariate normality assumption was met (Du Toit & Du Toit, 2001; Mels, 2003).

The comprehensive LISREL model[40] fit indices can only be interpreted unambiguously for or against the fitted structural model if evidence is provided that the indicator variables used to measure the latent variables when fitting the structural model successfully reflected the latent variables they were intended to represent (Diamantopoulos & Siguaw, 2000). Schreiber, Stage, King, Nora and Barlow (2006) similarly state that a key aspect of confirmatory factory analysis (CFA) is evaluating the reliability of indicator variables. Therefore, as previously argued in section 3.7, the fit of the employee engagement measurement model used to operationalise the employee engagement structural model needed to be evaluated before fitting the employee engagement structural model.

By conducting CFA, the measurement model was fitted by analysing the covariance matrix. If the multivariate normality assumption was met maximum likelihood estimation was used (before or after normalisation). Alternately, if normalisation failed to achieve multivariate normality in the observed data robust maximum likelihood estimation was used. LISREL 8.8 was used to perform the CFA. The employee engagement measurement model was fitted by allowing the measurement error terms of those indicators of the latent interaction effect (i.e. the residuals) that share the same indicators of the latent variables involved in the interaction effect in the dependent variable to be correlated.

According to Hair et al. (2006) the substantive measurement hypothesis under evaluation is that the measurement model provides a valid account of the process that produced the observed covariance matrix. The ideal would be if the measurement model provides a perfect or exact description of the process that produced the observed covariance matrix, in which case the measurement hypothesis translates into the following exact fit null hypothesis:

$$H_{023a}: \text{RMSEA} = 0$$

$$H_{a23a}: \text{RMSEA} > 0$$

If the measurement model only provides an approximate account of the manner in which the latent variables manifest themselves in the indicator variables, then the measurement hypothesis translates into the following close fit null hypothesis:

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[40] The comprehensive LISREL model contained both the measurement model depicting the structural relations between the latent variables and the indicator variables, as well as the structural model depicting the structural relations between the latent variables.

$$H_{023b}: RMSEA \leq .05$$

$$H_{a23b}: RMSEA > .05$$

If the exact or close measurement fit would be found (i.e. H_{023a} or H_{023b} would not be rejected) the following 38 null hypotheses on the significance of the factor loading of the jth item parcel on the kth latent variable will be tested:

H_{0i}: λ_{jk}=0; i=24, 25,…, 61 j=1, 2, …, 38; k=1, 2, …, 18

H_{ai}: λ_{jk}>0; i=24, 25,…, 61 ; j=1, 2, …, 38; k=1, 2, …, 18

If the exact or close measurement fit would be found (i.e. H_{023a} or H_{023b} would not be rejected), the following 38 null hypotheses would be tested with regards to the freed variance elements in the variance-covariance matrix $\mathbf{\Theta_\delta}$:

H_{0i}: $\Theta_{\delta jj}$ =0; i =62, 63,..., 99 ; j=1, 2.....38

H_{ai}: $\Theta_{\delta jj}$ > 0; i =62, 63,..., 99 ; j=1, 2.....38

If the exact or close measurement fit would be found (i.e. H_{023a} or H_{023b} would not be rejected), the following 4 null hypotheses would be tested with regards to the freed covariance elements in the variance-covariance matrix $\mathbf{\Theta_\delta}$:

H_{0i}: $\Theta_{\delta jj}$ =0; i =100, 101,..., 103 ; j=35 , 36 .... 38; k=35, 36.... 38; j≠k

H_{ai}: $\Theta_{\delta jj}$ > 0; i =100, 101,..., 103 ; j=35 , 36 ..... 38; k=35, 36.... 38; j≠k

If the exact or close measurement fit would be found (i.e. H_{023a} or H_{023b} would not be rejected), the following 153 null hypotheses would be tested with regards to the freed covariance elements in the variance-covariance matrix $\mathbf{\Phi}$:

H_{0i}: ϕ_{jk} =0; i=104, 105,…, 256 ; j=1, 2, …, 18; k=1, 2, …, 18; j≠k

H_{ai}: ϕ_{jk} ≠0; i=104, 105,…, 256 ; j=1, 2, …, 18; k=1, 2, …, 18; j≠k

3.9.3.4 Interpretation of Measurement Model Fit and Parameter Estimates

The above exact and close measurement model fit hypotheses were investigated by conducting an overall fit assessment of the measurement model. Measurement model fit essentially reflects the ability of the fitted model to reproduce the observed covariance matrix. Conducting an overall fit assessment of the measurement model involves focusing specifically on the relationship between latent variables and the observed variables used to measure the latent variables, together with the measurement model

parameter estimates (Diamantopoulos & Siguaw, 2000). In this study measurement model fit was interpreted by examining the full range of fit indices provided by LISREL 8.8 (Diamantopoulos & Siguaw, 2000).

Overall model fit in covariance structural models can be assessed by interpreting the Satorra-Bentler chi square statistic (x^2) (assuming that the data failed to satisfy the multivariate normality assumption) which tests the null hypothesis that the model fits the population data perfectly (i.e. the exact fit null hypothesis, H_{023a}: RMSEA= 0). In the case of a statistically significant X^2 (p<.05), the exact null hypothesis will be rejected. Large X^2 values indicate bad fit while small X^2 values reflect good fit. The size of X^2 can be determined by the X^2: degrees of freedom (df) ratio. A X^2-df ratio ranging between 2 and 5 would indicate good fit. Since it is highly unlikely that the model fits the population perfectly, the rejection of the exact fit null hypothesis was expected. This statistic should be interpreted with caution as it is known for being sensitive to variations in sample size, and as such numerous other fit indices have been suggested and evaluated.

The Root Mean Square Error of Approximation (RMSEA) according to Hair et al. (2006) reflects the ability of the model, with unknown but ideally chosen parameter values, to reproduce the population covariance matrix were it available. LISREL measures the significance of the obtained RMSEA value by testing H_{023b}: RMSEA $\leq$ .05 against H_{a25}: RMSEA > .05. Sample estimate values for RMSEA below .05 indicate good fit, values ranging between .05 and .08 indicate reasonable fit, values ranging between .08 and .10 indicate mediocre fit, and values above .10 indicate poor fit (Diamantopoulos & Siguaw, 2000).

The magnitude and distribution of the standardised residuals were also considered. Standardised residuals, which are interpreted as z-score, should be evenly distributed around zero and are considered large if they exceed $\pm$ 2.58. Negative residuals suggest overestimation implying that explanatory paths need to be remove whereas, positive residuals suggest underestimation implying that paths need to be added. In addition, the magnitude and the statistical significance of model modification indices calculated for lambda-X ($\mathbf{\Lambda_x}$) and theta-delta ($\mathbf{\Theta_\delta}$) were investigated. Large, statistically significant, modification index values indicate the extent to which the fit of the model would improve if model parameters are set free. Therefore, a small percentage of large and significant (p<.05) modification index values comment favourably on the fit of the model as it suggests that very few possibilities exist to improve the fit of the proposed model.

The validity of the indicator variables was investigated by examining each of their squared multiple correlations (R^2). The R^2 estimate indicates the proportion of variance in the indicator variable that is explained by the latent variable it is intended to measure. Therefore, high R^2 estimates ($R^2 \geq$ .50) are sought after as they imply that the indicator variables were successfully operationalised and are valid

and reliable. According to Diamantopoulos and Siguaw (2000) variance that is not explained by the R^2 can be accredited to measurement error. Both the proportion average variance extracted (ρ_v) and the composite reliability (ρ_c) was calculated for each latent variable. The former refers to the proportion of variance in the indicator variables representing a specific latent variable that is explained by the latent variable as opposed to measurement error. The latter measure describes the reliability with which the indicator variables of a latent variable measure the particular latent variable. A ρ_v value of at least .50 and a ρ_c value of at least .60 are considered acceptable (Diamantopoulos & Siguaw, 2000).

In the event that the measurement model showed close fit (i.e. H_{023b} failed to be rejected), or if it showed at least reasonable fit, the magnitude and the statistical significance of the factor loading estimates (λ) were also investigated. Hair et al. (2006) advise that the magnitude of the factor loading estimates will be considered satisfactory if the completely standardised factor loading estimates are $\geq .71$. This would imply that approximately 50.41% of the variance in the indicator variable is explained by the latent variable they are intended to represent. In addition, should the measurement model show close fit (i.e. H_{025} failed to be rejected), or if it showed at least reasonable fit, the magnitude and the statistical significance of the measurement error variance estimates ($\Theta_{\delta i}$) were investigated, well as the magnitude and the statistical significance of the measurement error covariance estimates ($\Theta_{\delta k}$). The statistical significance of the inter-latent variable correlations (ϕ_{ij}) would also be tested. Lastly, the discriminant validity of the measurement model was evaluated by determining whether any ϕ_{ij} exceeded .90 and whether any of the 95% confidence intervals calculated for ϕ_{ij} contained unity.

In summary, the operationalisation of the latent variables comprising the employee engagement structural model were considered successful if:

- The measurement model fits the data at least closely;
- The unstandardised factor loading estimates are all statistically significant (p<.05);
- The completely standardised factor loading estimates are all larger than .71;
- The unstandardised measurement error variances are all statistically significant (p<.05);
- The completely standardised measurement error variances are all smaller than .50;
- All ϕ_{ij} are smaller than .90 and none of the 95% confidence intervals calculated for ϕ_{ij} contained unity.

3.9.3.5 Fitting the Structural Model

The structural model proposes specific structural hypotheses concerning the psychological dynamics underlying employee engagement. Therefore, the structural model attempts to describe why the indicator variables correlate in the manner that they do in the observed covariance matrix in terms of

the structural relations that exist between the latent variables. In SEM the fit of a structural model needs to be inferred from the fit of the measurement model and the fit of the comprehensive LISREL model. The comprehensive LISREL model fits the observed data to the extent that the reproduced covariance matrix provides an acceptable explanation for the empirical covariance matrix (Schermelleh-Engel, Moosbrugger & Muller, 2003). Essentially, the objective behind the evaluation of structural model fit (done through the evaluation of the goodness-of-fit statistics obtained for the measurement model and for the comprehensive LISREL model) is to determine the degree to which the empirical data supports the theoretical relationships contained in the model (Diamantopoulos & Siguaw, 2000).

In the event that the close fit measurement model null hypothesis (H_{023b}: RMSEA $\leq$ .05) is not rejected (p > .05) or if at least reasonable measurement model fit is obtained (.05 < RMSEA <.08), the if the full range of fit indices produced by LISREL provide corroborating evidence of close fit and if the remaining criteria that have been set for the conclusion of satisfactory operationalisation have been adequately met, the structural model fit was examined by testing H_{01} to H_{022} (refer to section 3.5). The employee engagement structural model was fitted by analysing the covariance matrix. Maximum likelihood estimation would be used if the multivariate normality assumption is satisfied, whereas robust maximum likelihood estimation would be used if they multivariate normality assumption couldn't be satisfied. LISREL 8.8 was utilised to fit the structural model.

3.9.3.6 Interpretation of Structural Model Fit and Parameter Estimates

Structural model fit was reported and interpreted by once again considering the full range of LISREL fit indices. Consideration was also given to the standardised residuals and model modification indices calculated for $\mathbf{\Gamma}$, $\mathbf{B}$ and $\mathbf{\Psi}$. Large modification index values indicate the extent to which the fit of the proposed model would improve if structural model parameters currently fixed to zero are set free. Therefore, a small percentage of large and significant modification index values comment favourably on the fit of the model as it suggests that very few possibilities exist to improve the fit of the proposed model. The model modification indices for the above-mentioned matrices were examined with the primary intention of commenting on the model fit. However, examination of the model modifications calculated for the $\mathbf{\Gamma}$ and $\mathbf{B}$ matrices were also utilised to explore possible modifications to the current structural model if such modifications make substantive theoretical sense. The modification indices calculated for phi ($\mathbf{\Psi}$) were utilised solely to comment on the fit of the structural model and not to suggest modifications.

Should the evaluation of structural model fit indicate close fit the subsequent interpretation would focus on the hypothesised causal relationships in the model, as well as whether these causal relationships are supported by the obtained empirical data (Diamantopoulos & Siguaw, 2000). Therefore, if H_{01b} fails to be rejected (i.e. the proposed model achieves close fit) then the remaining substantive hypotheses were tested. The unstandardised path coefficients were interpreted in terms of the statistical significance of

the (direct effect) path coefficients and the completely standardised path coefficient estimates were interpreted in terms of their magnitude, provided they are found to be significant (p<.05). Furthermore, the magnitude and the statistical significance of the indirect and total effects were calculated for each hypothesised influence[41] in the proposed model[42]. The proportion of variance explained in each of the endogenous latent variables in the model were also examined.

Finally, the psychological explanation for employee engagement during evaluation as it is expressed in the proposed model, would be deemed satisfactory if 1) the measurement model fitted the data well and the remaining criteria that have been set for the conclusion of satisfactory operationalisation have been adequately met, 2) the comprehensive model fitted the data well, 3) the path coefficients for the hypothesised structural relations were statistically significant (p<.05), 4) the standardised path coefficients for the hypothesised structural relations were moderate to large, and 5) the proposed model was found to explain a substantial segment of the variance in each of the endogenous latent variables.

3.9.3.7 Considering Possible Structural Model Modifications

The modification indices of the Γ and $\mathbf{B}$ matrices for the currently fixed parameters of the structural model were used to determine if adding one or more paths would significantly (p <.05) improve the fit of the model. Modification indices with values greater than 6.64 indicate currently fixed parameters that, if set free, would significantly improve the fit of the model (Diamantopoulos & Siguaw, 2000). In addition, the completely standardised expected change estimates for the Γ and $\mathbf{B}$ matrices were utilised to investigate potential modifications to the structural model. Diamantopoulos and Siguaw (2000) advocate that caution must be exercised when considering model modifications and that any modifications to the model based on these statistics should only be considered if sound theoretical arguments justify the inclusion of additional paths. Consequently, correlated structural error items, and correlated measurement error items were not considered.

Van Deventer (2015) raises an important reservation about the manner in which model modification indices have been used in the past. Typically, structural model modification has been performed and reported on in a manner that suggests that model modification forms an integral part of the statistical analysis aimed at testing the proposed model (e.g. Van Heerden & Theron, 2014). The value of data-driven suggestions on modifications to the structural model is thereby not questioned or criticised. Rather Van Deventer (2015) expressed a concern is that insufficient effort is made to clearly separate the empirical testing of the overarching and path-specific substantive hypotheses that have been

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[41] The term influence, in this case, refers to the indirect and total effects of ξ_j on η_i as well as the indirect and total effects of η_j on η_i.

[42] Strictly speaking, formal statistical hypotheses ought to have been explicitly stated for the indirect and well as total effects in the proposed model.

developed through theorising in response to the research initiating question and subsequent attempts to modify the original comprehensive hypothesis based on findings derived from the study.

The current study strived to conform to Van Deventer's (2015) suggestion and to use the modification indices calculated for Γ and **B**, along with the completely standardised expected change estimates, to derive data-driven suggestions for future research.

3.10   EVALUATION OF RESEARCH ETHICS

In order to protect the dignity, rights, safety and wellbeing of the research participants involved in this study it is essential to reflect on potential ethical risks associated with the proposed research as outlined in this proposal. Empirical behavioural research involves either the active or passive involvement of individuals which could result in the dignity, rights, safety and wellbeing of the individuals being compromised to some degree. The critical question arises as to whether this compromise can be justified in terms of the purpose of the research. As agued in the introduction of this proposal the desired research in this study has a benevolent purpose. As such, the critical question is whether the costs that research participants have to incur outweigh the benefits that accrue to society.

It is the right of the research participant to voluntary decide whether they wish to participate in research. The participant, in order to make an informed decision as to whether they wish to participate in the research, needs to be informed of the following;

- The objective and purpose of the research.
- What participation in the research will entail.
- How the research results will be distributed and used.
- Who the researchers are and what their affiliation is.
- Where they can make further inquiries about the research if they wish to do so.
- What their rights as research participants are as well as, where they can obtain more information on their research rights.

The information provided to potential research participants needs to be presented in a dialect that is accessible to the age and educational level of the participants.

According to Annexure 12 of the Ethical Rules of Conduct for Practitioners Registered under the Health Professions Act (Act no. 56 of 1974) (Republic of South Africa, 2006) a psychologist performing research is duty-bound to enter into an agreement with participants on the nature of the research as well as the responsibilities of both the participants and of the researcher. The agreement by which the research participant provides informed consent should meet the following requirements according to Annexure 12 (Republic of South Africa, 2006, p. 42):

89. (1) A psychologist shall use language that is reasonably understandable to the research participant concerned in obtaining his or her informed consent.

(2) Informed consent referred to in sub rule (1) shall be appropriately documented, and in obtaining such consent the psychologist shall –

(a) inform the participant of the nature of the research;

(b) inform the participant that he or she is free to participate or decline to participate in or to withdraw from the research;

(c) explain the foreseeable consequences of declining or withdrawing;

(d) inform the participant of significant factors that may be expected to influence his or her willingness to participate (such as risks, discomfort, adverse effects or exceptions to the requirement of confidentiality);

(e) explain any other matters about which the participant enquires;

(f) when conducting research with a research participant such as a student or subordinate, take special care to protect such participant from the adverse consequences of declining or withdrawing from participation;

(g) when research participation is a course requirement or opportunity for extra credit, give a participant the choice of equitable alternative activities; and

(h) in the case of a person who is legally incapable of giving informed consent, nevertheless –

(i) provide an appropriate explanation;

    (ii) obtain the participants assent; and

    (iii) obtain appropriate permission from a person legally authorized to give such permission.

For the purposes of this study the researcher obtained informed consent for all participating school teachers. The informed consent formulation has been integrated as a preamble in the survey questionnaire shown in **APPENDIX A**.

Moreover, a psychologist performing research, according to Annexure 12 of the Ethical Rules of Conduct for Practitioners Registered under the Health Professions Act (Act no. 56 of 1974) (Republic of South Africa, 2006, p. 41) is duty-bound to attain institutional permission from the organisation from which research participants will be solicited:

A psychologist shall –

(a) obtain written approval from the host institution or organisation concerned prior to conducting research;

(b) provide the host institution or organisation with accurate information about his or her research proposals; and

(c) conduct the research in accordance with the research protocol approved by the institution or organisation concerned.

Informed institutional permission for the research was obtained from the Western Cape Department of Education (DOE) (see **APPENDIX C**) as well as from the principals of the schools involved. The applications for institutional permission were accompanied by a copy of the research proposal.

All information collected via the survey questionnaire was anonymous information and the data collected was treated as confidential. The focus of this study is not to describe the level of participants on the various latent variables but rather to illustrate the relationships hypothesised between the various latent variables.

According to Annexure 12 of the Ethical Rules of Conduct for Practitioners Registered under the Health Professions Act (Act no. 56 of 1974) (Republic of South Africa, 2006, p. 41) psychological researchers are duty-bound to disclose confidential information under the following circumstances:

> A psychologist may disclose confidential information –
>
> (a) only with the permission of the client concerned;
>
> (b) when permitted by law to do so for a legitimate purpose, such as providing a client
> with the professional services required;
>
> (c) to appropriate professionals and then for strictly professional purposes only;
>
> (d) to protect a client or other persons from harm; or
>
> (e) to obtain payment for a psychological service, in which instance disclosure is
> limited to the minimum necessary to achieve that purpose.

The informed consent formulation notifies participants of points (a) and (b). No *prima facie* arguments to suspect the necessity for (d) exist and to this end, no reference of it is made in the informed consent formulations. All of the instruments used to collect data from research participants are available in the public domain and none can be regarded as psychological tests as defined by the Health Professions Act (Republic of South Africa, 2006).

In the event that a researcher would like to offer a possible incentive or reward for participating in the research, the following stipulation in the Ethical Rules of Conduct for Practitioners Registered under the Health Professions Act (Act no. 56 of 1974, p. 43) should be adhered to:

> In offering professional psychological services as an inducement to gain the
> participation of a person in research, a psychologist shall –
>
> a) explain the nature of such services, as well as the risks, obligations and limitations
> involved; and
>
> b) not offer excessive or inappropriate financial or other inducements to obtain the
> person's participation, particularly when such inducement might tend to exert undue
> influence on that person to participate.

In the current study all participants were provided with the opportunity to enter into a lucky draw for a chance to win a mobile tablet device. It should be noted that this was not provided as payment for participation but rather as a carrot to lure or encourage individuals to take part in the study.

An application for ethical clearance of the proposed research study has been submitted to the Research Ethics Committee Human Research (Humanities) of Stellenbosch University (see **APPENDIX B**).

CHAPTER 4

RESEARCH RESULTS

4.1   INTRODUCTION

The objective of this study was to modify and expand the May et al. (2004) employee engagement structural model. The objective of this chapter is to present and discuss the results of the empirical analyses that were performed to test this expanded model.

4.2   SAMPLE DEMOGRAPHIC CHARACTERISTICS

The sample for this study consisted of teachers employed in the public and private sectors in South Africa. The final sample size, once the online survey was closed, consisted of 107 complete responses. Table 4.1 depicts the demographic information that was gathered from the final sample.

The sample was fairly evenly spread in terms of age, with 54.8% of the respondents falling between 18 – 39. The majority of the respondents were female (64.5%). Table 4.1 also shows that most of the respondents were White (74.8%) and speak English (66.4%). Lastly, 37.7% of the sample indicated that they had been working in their current position for longer than 5 years.

Table 4.1

Final sample demographic characteristics

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-29	28	26.2	26.9	26.9
	30-39	29	27.1	27.9	54.8
	40-49	22	20.6	21.2	76.0
	50-59	20	18.7	19.2	95.2
	60+	5	4.7	4.8	100.0
	Total	104	97.2	100.0	
Missing	System	3	2.8		
Total		107	100.0		
Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	36	33.6	34.3	34.3
	Female	69	64.5	65.7	100.0
	Total	105	98.1	100.0	
Missing	System	2	1.9		
Total		107	100.0		

Table 4.1

Final sample demographic characteristics (continued)

	Race				
		Frequency	Percent	Valid Percent	Cumulative Percent
	Coloured	19	17.8	18.4	18.4
	Indian	2	1.9	1.9	20.4
Valid	White	80	74.8	77.7	98.1
	Other	2	1.9	1.9	100.0
	Total	103	96.3	100.0	
Missing	System	4	3.7		
Total		107	100.0		
	Home language				
		Frequency	Percent	Valid Percent	Cumulative Percent
	English	71	66.4	67.6	67.6
Valid	Afrikaans	33	30.8	31.4	99.0
	French	1	0.9	1.0	100.0
	Total	105	98.1	100.0	
Missing	System	2	1.9		
Total		107	100.0		
	Time spent working in your current position				
		Frequency	Percent	Valid Percent	Cumulative Percent
	6 months - 1 year and 11 months	16	15.0	15.1	15.1
	2 years - 3 years and 11 months	29	27.1	27.4	42.5
Valid	4 - 5 years and 11 months	21	19.6	19.8	62.3
	> 5 years	40	37.4	37.7	100.0
	Total	106	99.1	100.0	
Missing	System	1	0.9		
Total		107	100.0		

Based on the desired ratio of observations to freed model parameters, the desired level of statistical power and logistical considerations a sample size target of 200 – 400 research participants was set in Chapter 3. This should have permitted the testing the proposed employee engagement structural model as shown in Figure 3.1. Regrettably this target could not be achieved. The realised sample size of 107 fell well short of even the lower boundary of the target sample size interval. In fact, the number of observations (107) were less than the number of freed parameters in the comprehensive LISREL model implied by Figure 3.1 and the indicator variable strategy described in paragraph 3.7 (137) exceeded.

4.3 THE REDUCED EMPLOYEE ENGAGEMENT STRUCTURAL MODEL

Empirically testing the full expanded employee engagement structural model depicted in Figure 2.4 was therefore unfortunately not possible in the current study. A structural model of that magnitude and complexity required a much larger sample size than this study was able to obtain. The dilemma faced by the researcher is that participants can only be asked to partake in the study but participation is still

voluntary. The time required to complete the full battery of instruments required a major time and energy investment from participants. The incentive that was offered (a tablet) was seemingly not enough to persuade large numbers of teachers to complete the online composite research questionnaire.

In light of this, it was decided to empirically test only a subset of the current expanded employee engagement structural model. This reduced structural model is presented in Figure 4.1[43].
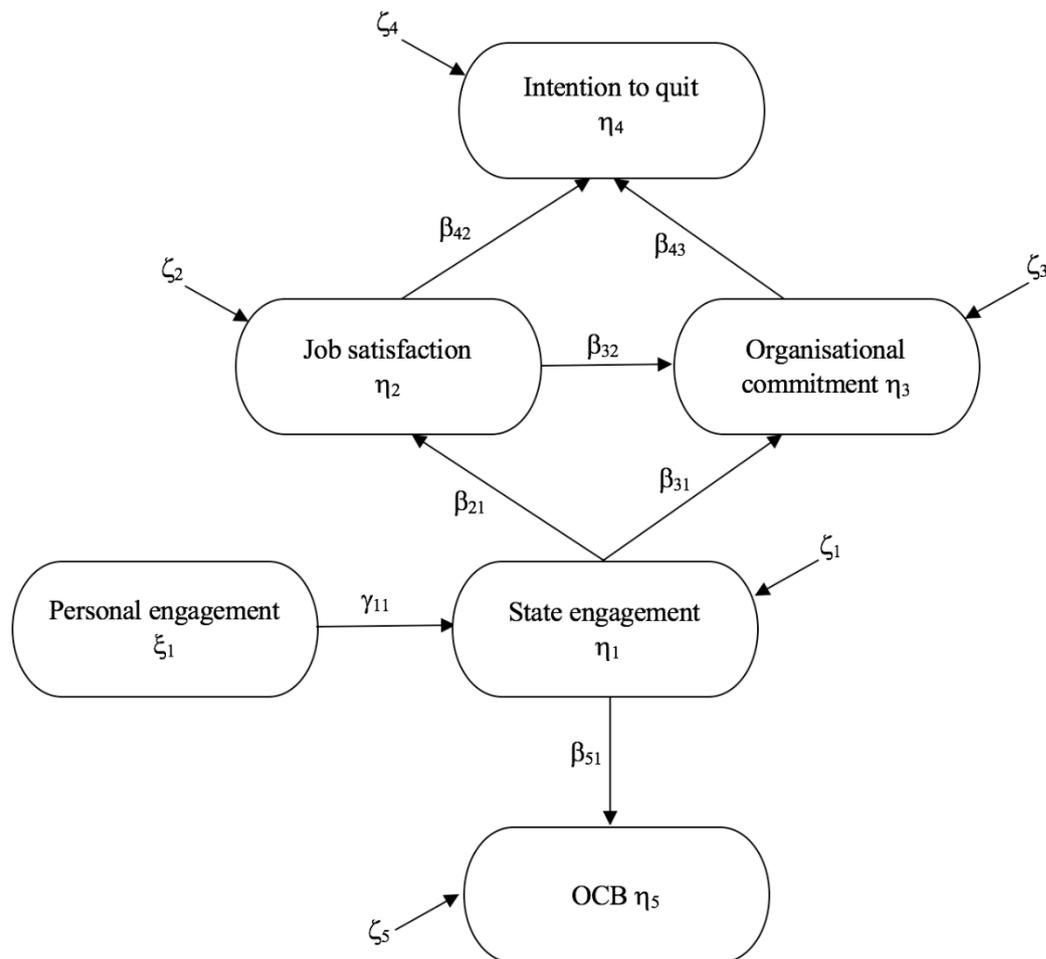
Figure 4.1. Hypothesised reduced employee engagement structural model.

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[43] The reduced employee engagement structural model includes the variables that were added to the May et al. (2004) employee engagement structural model in Section 2.4.2. The hypothesised structural relationships between these three latent variables haven't been empirically tested and thus serve to help further uncover the nomological network underlying employee engagement.

The reduced comprehensive LISREL model now contained 31 freed model parameters[44]. This still meant a somewhat questionable ratio of observations to freed parameters of 3.452: 1 that is less than the minimum N:q ratio requirement suggested by Bentler and Chou (1987) of 5: 1.

The reduction of the proposed engagement structural model necessitated the reformulation of the substantive research hypotheses and the statistical hypotheses. The overarching substantive research hypothesis for this study now maintains that the reduced employee engagement structural model depicted in Figure 4.1 provides a valid account of the process determining the level of employee engagement in an organisation. The substantive research hypothesis translates into the following exact fit and close fit null hypotheses:

$$H_{01a}: RMSEA = 0$$

$$H_{a1a}: RMSEA > 0$$

$$H_{01b}: RMSEA \leq .05$$

$$H_{a1b}: RMSEA > .05$$

In addition to the overarching substantive research hypothesis, seven path-specific statistical hypotheses were formulated to test the validity of the proposed path-specific substantive hypotheses in Figure 4.1. More specifically:

Hypothesis 2: In the proposed employee engagement structural model it is hypothesised that *personal engagement* positively influences employee *state engagement*.

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

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

Hypothesis 3: In the proposed employee engagement structural model it is hypothesised that *state engagement* positively influences *job satisfaction*.

$$H_{03}: \beta_{21} = 0$$

$$H_{a3}: \beta_{21} > 0$$

---

[44] The reduced comprehensive LISREL model contained 7 freed γ/β path coefficients, 5 freed structural error variances ψ_{ip}, 2 freed exogenous factor loadings λ_{ij}^{X}, 5 freed endogenous factor loadings λ_{ij}^{Y}, 0 freed inter exogenous latent variable correlations ϕ_{jp}, 2 freed exogenous measurement error variances $\theta_{\delta ii}$, and 10 freed endogenous measurement error variances $\theta_{\varepsilon ii}$.

Hypothesis 4: In the proposed employee engagement structural model it is hypothesised that *state engagement* positively influences *organisational commitment*.

$$H_{04}: \beta_{31} = 0$$

$$H_{a4}: \beta_{31} > 0$$

Hypothesis 5: In the proposed employee engagement structural model it is hypothesised that *job satisfaction* positively influences *organisational commitment*.

$$H_{05}: \beta_{32} = 0$$

$$H_{a5}: \beta_{32} > 0$$

Hypothesis 6: In the proposed employee engagement structural model it is hypothesised that *job satisfaction* negatively affects *intention to quit*.

$$H_{06}: \beta_{42} = 0$$

$$H_{a6}: \beta_{42} > 0$$

Hypothesis 7: In the proposed employee engagement structural model it is hypothesised that *organisational commitment* negatively affects *intention to quit*.

$$H_{07}: \beta_{43} = 0$$

$$H_{a7}: \beta_{43} < 0$$

Hypothesis 8: In the proposed employee engagement structural model it is hypothesised that *state engagement* positively influences *organisational citizenship behaviour*.

$$H_{08}: \beta_{51} = 0$$

$$H_{a8}: \beta_{51} > 0$$

In addition to the 7 path-specific statistical hypotheses, 5 structural error variance hypotheses were formulated as well.

$$H_{0i}: \psi_{pp} = 0; \ i = 9, 10, \ldots, 13; \ p = 1, 2, \ldots, 5$$

$$H_{ai}: \psi_{pk} > 0; \ i = 9, 10, \ldots, 13; \ p = 1, 2, \ldots, 5$$

No hypotheses for Φ were required since the reduced structural model only contained a single exogenous latent variable.

As previously mentioned, prior to testing the above structural model hypotheses, it is necessary test the various hypotheses related to the fit of the employee engagement measurement model.

The substantive measurement hypothesis (that the measurement model provides a valid account of the process that produced the observed covariance matrix) translates into the following exact fit and close fit null hypotheses:

$$H_{014a}: RMSEA = 0$$

$$H_{a14a}: RMSEA > 0$$

$$H_{014b}: RMSEA \leq .05$$

$$H_{014b}: RMSEA > .05$$

In the event that the measurement model obtained exact or close fit (i.e. H_{014a} and/or H_{01b} was not rejected), the following 12 factor loading, 12 measurement error variance, and 15 latent variable covariance null hypotheses were tested:

$$H_{0i}: \lambda_{jk} = 0; i=15, 16, ..., 26; j=1, 2, ..., 12; k=1, 2, ..., 6$$
$$H_{ai}: \lambda_{jk} \neq 0; i=15, 16, ..., 26; j=1, 2, ..., 12; k=1, 2, ..., 6$$

$$H_{0i}: \Theta_{\delta jj} = 0; j =27, 28, ..., 38;$$
$$H_{ai}: \Theta_{\delta jj} > 0; j =27, 28, ..., 38;$$

$$H_{0i}: \phi_{pk} = 0; i =39, 40..., 53; p=1, 2...,6; k=1, 2...,6; j\neq k$$
$$H_{ai}: \phi_{pk} > 0; i =39, 40..., 53; p=1, 2...,6; k=1, 2...,6; j\neq k$$

44.4   MISSING VALUES

The current study made use of *multiple imputation* (MI) to address the issue of missing values. As mentioned in section 3.8, the technique uses existing values from the observed variables to predict missing values. The advantage of this method being that it retains the complete dataset.

MI was performed on the final sample of 107 completed responses using PRELIS. The number of missing values per item are shown in Table 4.2.

There were total of 8346 data points (107*78), of which 61 were missing. Thus, only .731 percent (i.e. less than 1%) of the total dataset constituted missing values. Given that MI was used, none of the cases with missing values on one or more variables were deleted and the imputed data set comprising 107 observations without any missing values was used for item analysis and EFA. Both the item analysis and the EFA were performed in SPSS 25 (SPSS, 2018).

Table 4.2

Number of missing values per item

PE1	PE2	PE3	PE4	PE5	PE6	PE7
2	2	2	2	2	2	2
PE8	PE9	PE10	PE11	PE12	PE13	SE1
2	2	2	2	2	2	2
SE2	SE3	SE4	SE5	SE6	SE7	SE8
2	2	2	2	2	2	2
SE9	SE10	SE11	SE12	SE13	SE14	SE15
2	2	2	2	2	2	2
SE16	SE17	JS1	JS2	JS3	JS4	JS5
2	2	1	0	0	0	0
JS6	JS7	JS8	JS9	JS10	JS11	JS12
0	0	0	0	0	0	0
JS13	JS14	JS15	JS16	JS17	JS18	JS19
0	0	0	0	0	0	0
JS20	OC1	OC2	OC3	OC4	OC5	OC6
0	0	0	0	0	0	0
OC7	OC8	IQ1	IQ2	IQ3	IQ4	OCBI1
0	0	0	0	0	0	0
OCBI2	OCBI3	OCBI4	OCBI5	OCBI6	OCBI7	OCBI8
0	0	0	0	0	0	0
OCBO1	OCBO2	OCBO3	OCBO4	OCBO5	OCBO6	OCBO7
0	0	0	0	0	0	0
OCBO8						
0						

4.5   ITEM ANALYSIS

Item analysis was conducted to determine the internal consistency of individuals' responses to items of the measuring instruments used to test the latent variables embedded in the proposed employee engagement structural model. The main objective behind conducting the item analysis was to attempt to identify and, if necessary, remove poor items that did not successfully contribute to the internal consistency of their respective scales or subscales. The SPSS Reliability Procedure was utilised to conduct the item analyses.

The items used in the employee engagement survey were designed with the intention that they validly and sensitively reflect an individual's standing on the specific latent variables that make up the proposed model. In the event that this design intention succeeded, "the classical measurement theory item statistics will exhibit a high coefficient of internal consistency, the absence of items with extreme means (and consequently no truncated item distributions), no items with small (outlier) item standard deviations, no items that consistently correlate below the mean inter-item correlation with the remaining items, no items with small (outlier) corrected item-total correlations, no items with small (outlier) squared multiple correlations and no items that, when deleted, increase the scale/subscale Cronbach's alpha." (Albertyn, 2018).

The extent to which the design intention failed for specific items will be clearly reflected in the item statistics, indicating that the items fail reflect an individual's standing on the specific latent variable. However, the converse of this statement is not true. That is, the presence of favourable item statistics does not mean that the items accurately reflect an individual's standing on a specific latent variable. That the construct of interest has been validly and sensitively measured rather merely becomes a permissible and plausible position to hold.

4.5.1 Item Analysis for the Personal Engagement Scale

The *personal engagement* scale used for this study comprised thirteen items. These items reflect the three dimensions of *personal engagement* that Kahn (1990) originally theorised; namely, cognitive, emotional and physical engagement. May et al. (2004) found that three separate and reliable scales representing these dimensions did not emerge from their data, and thus applied an overall scale. The current study nevertheless performed item analysis on the subscale level to determine if similar results present in the data. The reliability of the composite *personal engagement* score was calculated via a formula proposed by Nunnally (1978).

4.5.1.1 Item Analysis of the Cognitive Engagement Subscale of the Personal Engagement Scale

The item analysis results for the *cognitive engagement* subscale of the *personal engagement* scale are shown in Table 4.3.

Table 4.3

Item statistics for the cognitive engagement subscale of the personal engagement scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.724	.732	4

Item Statistics			
	Mean	Std. Deviation	N
PE1_cog	4,91	1.457	107
PE2_cog_R	5.08	1.275	107
PE3_cog	4.76	1.510	107
PE4_cog	5.82	1.026	107

Inter-Item Correlation Matrix				
	PE1_cog	PE2_cog_R	PE3_cog	PE4_cog
PE1_cog	1.000	.355	.457	.594
PE2_cog_R	.355	1.000	.310	.257
PE3_cog	.457	.310	1.000	.465
PE4_cog	.594	.257	.465	1.000

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.143	4.757	5.822	1.065	1.224	.223	4
Item Variances	1.770	1.053	2.280	1.227	2.165	.307	4
Inter-Item Correlations	.406	.257	.594	.338	2.316	.014	4

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PE1_cog	15.66	8.263	.610	.423	.600
PE2_cog_R	15.49	10.686	.382	.154	.734
PE3_cog	15.81	8.569	.525	.287	.659
PE4_cog	14.75	10.549	.584	.401	.643

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
20.57	15.493	3.936	4

Table 4.3 shows that a less than satisfactory Cronbach's Alpha of .724 was obtained for the *cognitive engagement* subscale. This indicates that approximately 72% of the variance in the items was systematic or true score variance and 18% was random error variance.

The smallest standard deviation was for item PE4_cog followed by item PE2_cog_R but the items could not be tagged as outliers in the item standard deviation distribution. Both items also had higher means (item PE4_cog being the highest), neither sufficiently extreme enough though to significantly curtail the variance of the item distribution.

Only item PE2_cog_R consistently correlated lower than the mean inter-item correlation (.406) with the remaining items of the subscale. Item PE2_cog_R also showed itself somewhat of an outlier in the corrected item-total distribution and in the squared multiple correlation distribution. Furthermore, the results revealed that item PE2_cog_R would ever so slightly increase the current Cronbach's Alpha if deleted (from .724 to .734). This is a rather small increase, suggesting that the item doesn't seriously disturb the internal consistency of the subscale and as such won't be flagged as problematic.

In light of this marginal nature of evidence against item PE2_cog_R and the fact that there are very few items in the subscale, it was decided to retain all the items in the cognitive engagement subscale.

4.5.1.2 Item Analysis of the Emotional Engagement Subscale of the Personal Engagement Scale

The item statistics for the *emotional engagement* subscale of the *personal engagement* scale are presented in Table 4.4.

Table 4.4

Item statistics for the emotional engagement subscale of the personal engagement scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.360	.489	4

Item Statistics			
	Mean	Std. Deviation	N
PE5_emo	6.31	.692	107
PE6_emo	6.36	.603	107
PE7_emo_R	5.73	1.060	107
PE8_emo	5.48	1.390	107

Table 4.4

Item statistics for the emotional engagement subscale of the personal engagement scale (continued)

Inter-Item Correlation Matrix				
	PE5_emo	PE6_emo	PE7_emo_R	PE8_emo
PE5_emo	1.000	.481	.179	.297
PE6_emo	.481	1.000	.137	.123
PE7_emo_R	.179	.137	1.000	-.059
PE8_emo	.297	.123	-.059	1.000

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.967	5.477	6.355	.879	1.160	.188	4
Item Variances	.974	.363	1.931	1.568	5.316	.519	4
Inter-Item Correlations	.193	-.059	.481	.540	-8.186	.030	4

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PE5_emo	17.56	3.626	.469	.307	.086
PE6_emo	17.51	4.196	.317	.234	.236
PE7_emo_R	18.14	3.952	.063	.049	.447
PE8_emo	18.39	2.807	.130	.101	.449

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
23.87	5.341	2.311	4

The results in Table 4.4 reflect a very poor state of affairs for the *emotional engagement* subscale. An extremely poor Cronbach's alpha of .360 was obtained. The mean inter-item correlation is extremely low, with PE7_emo_R consistently correlating lower than it. The most problematic items appear to be PE7_emo_R and PE8_emo as they consistently present as outliers in the corrected item-total correlation and the squared multiple correlation distributions. Moreover, these two items have a low negative correlation with each other even though the negative PE7_emo item had been reversed. The item-total statistics section of Table 4.4 also indicates that the deletion of both items PE7_emo_R and PE8_emo will result in an increase in the internal consistency of the subscale. Overall the results indicate that the responses to the items in the *emotional engagement* scale were unambiguously determined by different sources of systematic variance. The deletion of item PE8_emo increased the Cronbach alpha to .449. Item PE7_emo_R now correlated consistently lower than the mean inter-item correlation (.266) with the remaining items of the subscale. The deletion of item PE7_emo_R increased the Cronbach alpha to

.645. Deleting both items PE7_emo_R and PE8_emo, however, results in a two-item *emotional engagement* subscale. These results may provide clarity around why in their study May et al. (2004) didn't find that three separate and reliable factors representing the three dimensions of personal engagement emerged from their data. The decision whether to delete these two items were postponed until after the EFA and CFA analyses.

4.5.1.3 Item Analysis of the Physical Engagement Subscale of the Personal Engagement Scale

The *physical engagement* subscale of the *personal engagement* scale comprised 5 items. The item analysis for this subscale is presented in Table 4.5.

Table 4.5

Item statistics for the physical engagement subscale of the personal engagement scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.613	.628	5

Item Statistics			
	Mean	Std. Deviation	N
PE9_phy	5.99	.830	107
PE10_phy	6.23	.907	107
PE11_phy_R	4.94	2.069	107
PE12_phy	5.75	1.367	107
PE13_phy_R	5.94	1.287	107

Inter-Item Correlation Matrix					
	PE9_phy	PE10_phy	PE11_phy_R	PE12_phy	PE13_phy_R
PE9_phy	1.000	.517	.071	.197	.088
PE10_phy	.517	1.000	.188	.094	.246
PE11_phy_R	.071	.188	1.000	.285	.675
PE12_phy	.197	.094	.285	1.000	.163
PE13_phy_R	.088	.246	.675	.163	1.000

Summary Item Statistics						
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.772	4.944	6.234	1.290	1.261	.244	5
Item Variances	1.864	.689	4.280	3.591	6.215	2.086	5
Inter-Item Correlations	0.252	.071	.675	.604	9.495	.037	5

Table 4.5

Item statistics for the physical engagement subscale of the personal engagement scale (continued)

	Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PE9_phy	22.87	15.926	.250	.295	.611
PE10_phy	22.63	15.161	.324	.310	.586
PE11_phy_R	23.92	7.832	.532	.489	.476
PE12_phy	23.11	13.534	.285	.118	.600
PE13_phy_R	22.92	11.682	.561	.472	.459

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
28.86	18.273	4.275	5

The item statistics in Table 4.5 reflect a very unsatisfactory situation for the reliability of the *physical engagement* subscale. A very poor Cronbach's alpha of .613 was obtained, indicating that approximately 39% of the variance in the items was random error variance.

The item PE9_phy showed itself as somewhat of an outlier in the corrected item-total correlation distribution and item PE12_phy showed itself as somewhat of an outlier in the squared multiple correlation distribution. Neither of these two items, however, consistently correlated below the mean (.252) inter-item correlation with the remaining items of the subscale. The inter-item correlation matrix suggests the possibility of factor fission. The item-total statistics reveal that the deletion of any of the items wouldn't even result in an increase in the current Cronbach's alpha of the *physical engagement* subscale. This evidence, coupled with the length of the subscale and the poor reliability results for the *emotional engagement* scale, led towards not deleting any items and rather calculating the reliability of the total score on the overall *personal engagement* scale in the section to follow.

4.5.1.4 Reliability of the Total Score on the Personal Engagement Scale

Calculating the reliability of the *personal engagem*ent scale in the same manner as its (questionable) three subscales would have underestimated the reliability of the scale as a function of the extent to which the subscales correlate lower with each other. The reliability of the total score was rather calculated as the unweighted sum of the three *personal engagement* subscale scores utilising the following formula proposed by Nunnally (1978, p. 248):

$$rtot = 1 - \left[\frac{(\Sigma_{i=1}^{53}S^2i - \Sigma_{i=1}^{53}rttiS^2i)}{S^2t}\right]$$

Where:

- r_{tot} refers to the reliability of the unweighted linear composite
- S^2_i refers to the variance of the ith subscale score
- r_{tti} refers to the internal consistency reliability of the ith subscale
- S^2_i refers to the variance of the unweighted total score.

The unweighted total score reliability of the complete *personal engagement* scale was calculated as:

$$rtot = 1 - \left[\frac{\left[\Sigma_{i=1}^{5}S^2i - \Sigma_{i=1}^{5}rttiS^2i\right]}{S^2t}\right]$$

$$rtot = 1 - \left[\frac{39.107 - 24.334}{65.646}\right]$$

$$rtot = 1 - 0.225$$

$$rtot = .775$$

The resultant value of .78 was considered less than satisfactory but nevertheless still acceptable[45].

4.5.2   Item Analysis for the State Engagement Scale

The UWES-17 (Schaufeli et al., 2002) was used to measure *state engagement*. The instrument comprised 17 items, measured on a seven-point frequency scale, which measure the three core dimensions of *state engagement*, namely vigour, dedication and absorption. Item analysis was performed on subscale level and the reliability of the composite *state engagement* score was calculated with Nunnally's (1978) formula.

4.5.2.1 Item Analysis of the Vigour Subscale of the State Engagement Scale

The item analysis results for the *vigour* subscale of the *state engagement* scale are shown in Table 4.6.

---

[45] The value of .78 contrasted with the value of .75 that would have been obtained if all the personal engagement items would have simply been combined in a single item analysis.

Table 4.6

Item statistics for the vigour subscale of the state engagement scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.751	.756	6

Item Statistics			
	Mean	Std. Deviation	N
SE1_vig	4.74	1.144	107
SE4_vig	5.01	1.042	107
SE8_vig	4.57	1.597	107
SE12_vig	5.79	.949	107
SE15_vig	5.07	1.226	107
SE17_vig	6.09	0.885	107

Inter-Item Correlation Matrix						
	SE1_vig	SE4_vig	SE8_vig	SE12_vig	SE15_vig	SE17_vig
SE1_vig	1.000	.564	.491	.245	.209	.136
SE4_vig	.564	1.000	.547	.451	.502	.245
SE8_vig	.491	.547	1.000	.246	.368	.262
SE12_vig	.245	.451	.246	1.000	.313	.293
SE15_vig	.209	.502	.368	.313	1.000	.228
SE17_vig	.136	.245	.262	.293	.228	1.000

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.213	4.570	6.093	1.523	1.333	.362	6
Item Variances	1.355	.784	2.549	1.766	3.253	.411	6
Inter-Item Correlations	.340	.136	.564	.428	4.144	.018	6

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SE1_vig	26.54	15.911	.497	.379	.714
SE4_vig	26.27	14.879	.720	.555	.658
SE8_vig	26.71	12.661	.576	.380	.699
SE12_vig	25.49	17.460	.427	.246	.732
SE15_vig	26.21	15.712	.466	.293	.723
SE17_vig	25.19	18.512	.322	.132	.754

Table 4.6

Item statistics for the vigour subscale of the state engagement scale (continued)

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
31.28	21.751	4.664	6

The reliability statistics in Table 4.6 indicated a somewhat less than satisfactory Cronbach's alpha of .751. Item SE17_vig presented itself as a slightly insensitive item that fell as an outlier towards the lower end of the item standard deviation distribution. Item SE17_vig also consistently correlated lower than the mean inter-item correlation (.393) with the remaining items of the subscale although only marginally so. Item SE17_vig also showed itself as somewhat of an outlier in the corrected item-total and squared multiple correlation distributions. The latter means that item SE17_vig was a bit of a closed book for its colleague items. This would suggest that the responses to this item weren't underpinned to the same degree by the systematic variance (not necessarily unidimensional though and not necessarily the intended latent variable) that underpinned the remaining items of the scale (Reitz, 2019). This is further evident by the fact that the deletion of this item would result in a marginal increase in the Cronbach's alpha (.751 to .754). Even though item SE17_vig presented itself as slightly problematic, the current coefficient alpha combined with the weak evidence against it swayed the decision to retain all items in the subscale.

4.5.2.2 Item Analysis of the Dedication Subscale of the State Engagement Scale

Table 4.7 presents the item statistics for the *dedication* subscale of the *state engagement* scale.

Table 4.7

Item statistics for the dedication subscale of the state engagement scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.855	.860	5

Item Statistics			
	Mean	Std. Deviation	N
SE2_ded	5.87	1.133	107
SE5_ded	5.75	.922	107
SE7_ded	5.74	1.176	107
SE10_ded	6.06	.845	107
SE13_ded	5.44	1.175	107

Table 4.7

Item statistics for the dedication subscale of the state engagement scale (continued)

Inter-Item Correlation Matrix					
	SE2_ded	SE5_ded	SE7_ded	SE10_ded	SE13_ded
SE2_ded	1.000	.591	.689	.559	.419
SE5_ded	.591	1.000	.712	.563	.469
SE7_ded	.689	.712	1.000	.594	.562
SE10_ded	.559	.563	.594	1.000	.365
SE13_ded	.419	.469	.562	.365	1.000

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.770	5.439	6.056	.617	1.113	.051	5
Item Variances	1.123	.714	1.384	.670	1.938	.101	5
Inter-Item Correlations	.552	.365	.712	.348	1.954	.011	5

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SE2_ded	22.98	11.226	.692	.520	.819
SE5_ded	23.10	12.244	.724	.552	.815
SE7_ded	23.11	10.270	.811	.669	.784
SE10_ded	22.79	13.203	.628	.422	.838
SE13_ded	23.41	11.980	.542	.326	.862

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
28.85	17.770	4.215	5

The Cronbach's alpha (.855) exceeded the critical cut-off value of .80, indicating satisfactory reliability for the *dedication* subscale. None of the items in the subscale presented with extreme (high or low) means. Item SE10_ded's standard deviation is slightly lower than that of the other items but not excessively so.

Item SE13_ded correlated (marginally) lower than the mean inter-item correlation (.552) with 3 of the 4 other items in the subscale. Deletion of this item would have resulted in only a marginal increase in the Cronbach's alpha. The item statistics for the *dedication* subscale didn't raise sufficient concerns to remove any of the items and consequently none were deleted.

4.5.2.3 Item Analysis of the Absorption Subscale of the State Engagement Scale

The *absorption* subscale of the *state engagement* scale comprised of 6 items measured on a 7-point scale. The item analysis results for the *absorption* subscale are shown in Table 4.8.

Table 4.8

Item statistics for the absorption subscale of the state engagement scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.779	.796	6

Item Statistics	Mean	Std. Deviation	N
SE3_abs	5.79	1.037	107
SE6_abs	5.07	1.305	107
SE9_abs	5.64	1.076	107
SE11_abs	5.70	.983	107
SE14_abs	5.14	1.153	107
SE16_abs	4.83	1.457	107

Inter-Item Correlation Matrix	SE3_abs	SE6_abs	SE9_abs	SE11_abs	SE14_abs	SE16_abs
SE3_abs	1.000	.519	.352	.547	.412	.344
SE6_abs	.519	1.000	.454	.523	.383	.204
SE9_abs	.352	.454	1.000	.467	.604	.177
SE11_abs	.547	.523	.467	1.000	.370	.301
SE14_abs	.412	.383	.604	.370	1.000	.244
SE16_abs	.344	.204	.177	.301	.244	1.000

Summary Item Statistics	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.360	4.832	5.785	.953	1.197	.157	6
Item Variances	1.393	.966	2.122	1.156	2.196	.194	6
Inter-Item Correlations	.393	.177	.604	.427	3.411	.016	6

Table 4.8

Item statistics for the absorption subscale of the state engagement scale (continued)

	Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SE3_abs	26.37	17.387	.616	.426	.727
SE6_abs	27.09	16.142	.567	.394	.735
SE9_abs	26.52	17.535	.566	.456	.737
SE11_abs	26.46	17.685	.622	.432	.728
SE14_abs	27.02	17.169	.554	.418	.738
SE16_abs	27.33	17.618	.332	.146	.808

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
32.16	23.795	4.878	6

The Cronbach's alpha for the *absorption* subscale was .779, indicating somewhat unsatisfactory reliability. None of the items presented as outliers in the item standard deviation distribution. Item SE16_abs consistently correlated lower than the mean inter-item correlation (.393) with the remaining items of the scale. This item also presented itself as an outlier in the corrected item-total correlation distribution and particularly in the squared multiple correlation distribution. This suggests that item SE16_abs didn't respond to the same source of systematic variance as the other items in the subscale, leading it to respond out of turn with the remaining items. The items inability to act in unison with the other items is further reflected in the fact that Cronbach's alpha would substantially increase to .808 were it deleted. Thus, it was decided to delete item SE16_abs from the *absorption* subscale of *state engagement*.[46]

Subsequently, item analysis was rerun on the subscale to determine the extent to which deletion of item SE16_abs resulted in any other items stepping forward as problematic in the subscale. The results are presented in Table 4.9

---

[46] When running item analysis on all 17 state engagement items, item SE16_abs similar presented itself as a problematic item, whereby deletion of this item would increase Cronbach's alpha.

Table 4.9

Item statistics for the absorption subscale of the state engagement scale after deleting item SE16_abs

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.808	.812	5

Item Statistics			
	Mean	Std. Deviation	N
SE3_abs	5.79	1.037	107
SE6_abs	5.07	1.305	107
SE9_abs	5.64	1.076	107
SE11_abs	5.70	.983	107
SE14_abs	5.14	1.153	107

Inter-Item Correlation Matrix				
	SE3_abs	SE6_abs	SE9_abs	SE11_abs	SE14_abs
SE3_abs	1.000	.519	.352	.547	.412
SE6_abs	.519	1.000	.454	.523	.383
SE9_abs	.352	.454	1.000	.467	.604
SE11_abs	.547	.523	.467	1.000	.370
SE14_abs	.412	.383	.604	.370	1.000

Summary Item Statistics						
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.465	5.065	5.785	.720	1.142	.113	5
Item Variances	1.247	.966	1.703	.737	1.763	.083	5
Inter-Item Correlations	.463	.352	.604	.253	1.718	.007	5

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SE3_abs	21.542	12.251	.591	.404	.772
SE6_abs	22.262	10.742	.605	.393	.771
SE9_abs	21.692	11.913	.612	.455	.765
SE11_abs	21.626	12.368	.620	.422	.766
SE14_abs	22.187	11.814	.565	.412	.780

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
27.327	17.618	4.197	5

Table 4.9 shows that no other items presented as problematic after removing item SE16_abs. Deleting any of the remaining items would have resulted in a decrease in the Cronbach alpha, and as such all were retained.

4.5.2.4 Reliability of the Total Score on the State Engagement

The reliability of the *state engagement* total score was calculated using Nunnally's (1978) formula as the unweighted sum of the three *state engagement* subscale scores.

The unweighted total score reliability for the overall *state engagement* scale was calculated as:

$$rtot = 1 - \left[\frac{\left[\Sigma_{i=1}^{5} S^2 i - \Sigma_{i=1}^{5} rttiS^2 i \right]}{S^2 t} \right]$$

$$rtot = 1 - \left[\frac{57.139 - 45.771}{133.553} \right]$$

$$rtot = 1 - 0.085$$

$$rtot = 0.915$$

The resultant value of .92 was considered highly satisfactory[47].

4.5.3 Item Analysis for the Job satisfaction Scale

The *job satisfaction* scale for this study was made up of twenty items. These items (MSQ-SF; Weiss et al., 1967) are said to reflect three scales, namely; intrinsic satisfaction (items 1, 2, 3, 4, 7, 8, 9, 10, 11, 15, 16, and 20), extrinsic satisfaction (items 5, 6, 12, 13, 14, and 19), and general satisfaction (all items[48]). Item analysis was performed on both the intrinsic and extrinsic satisfaction subscales. The reliability of the composite *personal engagement* score was calculated via a formula proposed by Nunnally (1978).

4.5.3.1 Item Analysis of the Intrinsic Satisfaction Subscale of the Job satisfaction Scale

The item analysis results for the *intrinsic satisfaction* subscale of the *job satisfaction* scale are shown in Table 4.10.

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[47] The value of .915 contrasted with the value of .901 that would have been obtained if all the state engagement items would have simply been combined in a single item analysis.

[48] Items 17 and 18 being the only unique items in the general satisfaction subscale.

Table 4.10

Item statistics for the intrinsic satisfaction subscale of the job satisfaction scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.803	.802	12

Item Statistics			
	Mean	Std. Deviation	N
JS1_int	4.16	.814	107
JS2_int	3.86	.782	107
JS3_int	3.73	.917	107
JS4_int	3.84	.848	107
JS7_int	4.07	.832	107
JS8_int	4.34	.629	107
JS9_int	4.58	.615	107
JS10_int	3.44	.767	107
JS11_int	4.12	.832	107
JS15_int	3.61	.939	107
JS16_int	3.79	.942	107
JS20_int	4.17	.874	107

Inter-Item Correlation Matrix												
	JS1_int	JS2_int	JS3_int	JS4_int	JS7_int	JS8_int	JS9_int	JS10_int	JS11_int	JS15_int	JS16_int	JS20_int
JS1_int	1.000	.109	-.030	.132	.261	.411	.417	.068	.222	-.152	-.115	.201
JS2_int	.109	1.000	.315	.194	.263	.020	.170	.229	.171	.322	.356	.366
JS3_int	-.030	.315	1.000	.441	.262	.176	.181	.318	.353	.390	.434	.399
JS4_int	.132	.194	.441	1.000	.244	.225	.341	.123	.415	.335	.405	.393
JS7_int	.261	.263	.262	.244	1.000	.294	.302	.229	.246	.147	.129	.424
JS8_int	.411	.020	.176	.225	.294	1.000	.296	.141	.282	-.030	.060	.308
JS9_int	.417	.170	.181	.341	.302	.296	1.000	.195	.525	.087	.022	.344
JS10_int	.068	.229	.318	.123	.229	.141	.195	1.000	.270	.045	.014	.311
JS11_int	.222	.171	.353	.415	.246	.282	.525	.270	1.000	.231	.226	.477
JS15_int	-.152	.322	.390	.335	.147	-.030	.087	.045	.231	1.000	.746	.472
JS16_int	-.115	.356	.434	.405	.129	.060	.022	.014	.226	.746	1.000	.503
JS20_int	.201	.366	.399	.393	.424	.308	.344	.311	.477	.472	.503	1.000

Table 4.10

Item statistics for the intrinsic satisfaction subscale of the job satisfaction scale (continued)

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.975	3.439	4.579	1.140	1.332	.104	12
Item Variances	.676	.378	.887	.509	2.347	.028	12
Inter-Item Correlations	.252	-.152	.746	.898	-4.907	.026	12

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
JS1_int	43.54	28.402	.200	.336	.811
JS2_int	43.84	26.814	.416	.255	.792
JS3_int	43.97	25.009	.539	.391	.780
JS4_int	43.86	25.499	.534	.358	.781
JS7_int	43.63	26.368	.437	.269	.790
JS8_int	43.36	28.177	.333	.287	.799
JS9_int	43.12	27.523	.449	.419	.791
JS10_int	44.26	27.780	.300	.229	.802
JS11_int	43.58	25.529	.544	.426	.780
JS15_int	44.09	25.652	.448	.597	.790
JS16_int	43.92	25.342	.482	.651	.786
JS20_int	43.53	23.987	.706	.539	.763

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
47.70	30.797	5.549	12

This subscale consisted of 12 items. Table 4.10 indicates that a satisfactory Cronbach's alpha of .803 was obtained, marginally exceeding the critical cut-off point. Items JS8_int and JS9_int showed themselves as slight outliers in the item standard deviation distribution, though not excessively so. None of the items consistently correlated lower than the mean inter-item correlation (.252). The inter-item correlation matrix in Table 4.10 suggests possible factor fission. Item JS1_int, if deleted, would have resulted in a marginal increase in the Cronbach alpha. However, none of this evidence was sufficiently severe enough to question any of these items and thus none were deleted.

4.5.3.2 Item Analysis of the Extrinsic Satisfaction Subscale of the Job satisfaction Scale

The *extrinsic satisfaction* subscale comprised of 6 items. The item analysis results for this subscale of the *job satisfaction* scale are shown in Table 4.11.

Table 4.11

Item statistics for the extrinsic satisfaction subscale of the job satisfaction scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.806	.810	6

Item Statistics			
	Mean	Std. Deviation	N
JS5_ext	3.67	.929	107
JS6_ext	3.67	1.044	107
JS12_ext	3.23	.853	107
JS13_ext	2.34	1.098	107
JS14_ext	2.73	1.005	107
JS19_ext	3.53	.935	107

Inter-Item Correlation Matrix						
	JS5_ext	JS6_ext	JS12_ext	JS13_ext	JS14_ext	JS19_ext
JS5_ext	1.000	.764	.561	.284	.298	.517
JS6_ext	.764	1.000	.457	.303	.274	.451
JS12_ext	.561	.457	1.000	.378	.437	.469
JS13_ext	.284	.303	.378	1.000	.647	.219
JS14_ext	.298	.274	.437	.647	1.000	.175
JS19_ext	.517	.451	.469	.219	.175	1.000

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.196	2.336	3.673	1.336	1.572	.305	6
Item Variances	.962	.728	1.206	.479	1.657	.030	6
Inter-Item Correlations	.416	.175	.764	.589	4.361	.026	6

Table 4.11

Item statistics for the extrinsic satisfaction subscale of the job satisfaction scale (continued)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
			Item-Total Statistics		
JS5_ext	15.50	12.290	.677	.656	.751
JS6_ext	15.50	12.026	.614	.595	.763
JS12_ext	15.94	12.921	.638	.439	.762
JS13_ext	16.84	12.493	.497	.442	.793
JS14_ext	16.45	12.910	.504	.467	.789
JS19_ext	15.64	13.382	.483	.326	.792

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
19.18	17.563	4.191	6

Table 4.11 shows that a satisfactory Cronbach's Alpha of .806 was obtained. This indicates that approximately 20% of the variance in the items was random error variance and 80% was systematic or true score variance. None of the items displayed sufficiently small standard deviations to flag them as outliers in the item standard deviation distribution. None of the items therefore presented themselves as normatively insensitive items. None of the items consistently correlated lower than the mean inter-item correlation (.416) with the remaining items of the subscale. None of the items showed themselves as outliers in either the corrected item-total correlation distribution or the squared multiple correlation distribution. Overall the findings seem to suggest that all the items were underpinned by the same source of systematic variance. In addition, the results revealed that none of the items would increase the current Cronbach's alpha if deleted. In light of the absence of poor items all were consequently retained in the subscale.

4.5.3.3 Reliability of the Total Score on the Job satisfaction Scale

The reliability of the *job satisfaction* total score, estimated as the unweighted sum of the two subscale scores, was calculated using the formula proposed by Nunnally (1978) as:

$$rtot = 1 - \left[\frac{\left[\Sigma_{i=1}^{52} S^2 i - \Sigma_{i=1}^{52} rttiS^2 i \right]}{S^2 t} \right]$$

$$rtot = 1 - \left[\frac{48.359 - 38.890}{95.401} \right]$$

$$rtot = 1 - .099$$

$$rtot = .901$$

The resultant value of .90 was considered highly satisfactory. It's necessary to point out that this total score failed to included items JS_17 and JS_18 which don't form part of either the intrinsic or the extrinsic subscales of the *job satisfaction* scale – i.e. they're the only two items that are unique to the general satisfaction subscale with the remaining items overlapping with either the intrinsic or extrinsic satisfaction scale. When all the *job satisfaction* items were combined in a single item analysis, the results indicated a satisfactory Cronbach's alpha of .881, and none of the items presented as problematic to the extent that deletion was required. Due to the multidimensional nature of the *job satisfaction* scale this would, however, not be an appropriate way to evaluate the psychometric integrity of the scale items.

4.5.4   Item Analysis for the Organisational Commitment Scale

The *organisational commitment* scale in this study comprised of eight items measured on a seven-point scale. These items assessed desired-based or affective commitment. The results for the item analysis of the *organisation commitment* scale are presented below in table 4.12.

Table 4.12

Item statistics for the organisational commitment scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
0.871	.876	8

Item Statistics			
	Mean	Std. Deviation	N
OC1	4.90	1.868	107
OC2	5.47	1.423	107
OC3	4.93	1.750	107
OC4_R	3.63	1.464	107
OC5_R	5.44	1.468	107
OC6_R	5.29	1.560	107
OC7	5.46	1.442	107
OC8_R	5.54	1.327	107

Table 4.12

Item statistics for the organisational commitment scale (continued)

Inter-Item Correlation Matrix								
	OC1	OC2	OC3	OC4_R	OC5_R	OC6_R	OC7	OC8_R
OC1	1.000	.678	.330	.314	.430	.386	.637	.601
OC2	.678	1.000	.418	.193	.330	.283	.635	.504
OC3	.330	.418	1.000	.436	.357	.377	.401	.328
OC4_R	.314	.193	.436	1.000	.314	.399	.471	.261
OC5_R	.430	.330	.357	.314	1.000	.821	.577	.715
OC6_R	.386	.283	.377	.399	.821	1.000	.607	.662
OC7	.637	.635	.401	.471	.577	.607	1.000	.692
OC8_R	.601	.504	.328	.261	.715	.662	0.692	1.000

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	5.082	3.626	5.542	1.916	1.528	.407	8
Item Variances	2.393	1.760	3.489	1.729	1.983	.344	8
Inter-Item Correlations	.470	.193	.821	.628	4.247	.026	8

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
OC1	35.76	58.639	.647	.576	.855
OC2	35.19	64.965	.594	.601	.859
OC3	35.72	63.656	.498	.337	.872
OC4_R	37.03	67.556	.454	.371	.873
OC5_R	35.21	62.567	.685	.728	.850
OC6_R	35.36	61.573	.679	.725	.850
OC7	35.20	60.669	.795	.693	.838
OC8_R	35.11	63.270	.739	.673	.846

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
40.65	80.625	8.979	8

The Reliability Statistics section of Table 4.12 shows that a satisfactory Cronbach's alpha of .871 was obtained for the *organisational commitment* scale. None of the items in the subscale presented with extreme means (high or low), and none presented as outliers in the item standard deviation distribution. This suggests that there are no normatively insensitive items present in the subscale.

None of the items consistently correlated lower than the mean inter-item correlation (.470) with the remaining items of the scale. Additionally, none of the items showed themselves as outliers in the corrected item-total correlation or squared multiple correlation distributions. All items in the *organisational commitment* scale were therefore retained.

4.5.5 Item Analysis for the Intention to Quit Scale

The *intention to quit* scale consisted of four items each measured on a five-point frequency scale. Table 4.13 provides the item analysis results for *the intention to quite* scale.

The results indicate that a satisfactory Cronbach's alpha of .895 was obtained, exceeding the critical cut-off point of .80. This suggests that about 89% of the variance in the items was systematic or true score variance and 11% was random error variance. Item IQ1 had the lowest standard deviation and the highest mean, however, neither sufficiently extreme enough to warrant flagging the item as problematic.

It was further evident that none of the items consistently correlated lower than the mean inter-item correlation (.685) with the remaining items of the scale, and none stood out as outliers in the corrected item-total correlation or squared multiple correlation distributions. None of the items, if deleted, would have increased the current Cronbach's alpha. As such no items were deleted.

Table 4.13

Item statistics for the intention to quit scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.895	.897	4

Item Statistics			
	Mean	Std. Deviation	N
IQ1	2.46	.861	107
IQ2	2.30	1.011	107
IQ3	2.07	.924	107
IQ4	1.75	1.038	107

Inter-Item Correlation Matrix				
	IQ1	IQ2	IQ3	IQ4
IQ1	1.000	.708	.709	.553
IQ2	.708	1.000	.726	.621
IQ3	.709	.726	1.000	.794
IQ4	.553	.621	.794	1.000

Table 4.13

Item statistics for the intention to quit scale (continued)

Summary Item Statistics						
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	2.143	1.748	2.458	.710	1.406	.095	4
Item Variances	.924	.741	1.077	.336	1.453	.024	4
Inter-Item Correlations	.685	.553	.794	.241	1.437	.007	4

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
IQ1	6.11	7.138	.728	.584	.879
IQ2	6.27	6.313	.766	.608	.865
IQ3	6.50	6.366	.860	.755	.830
IQ4	6.82	6.336	.730	.637	.880

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
8.57	11.229	3.351	4

4.5.6   Item Analysis for the Organisational Citizenship Behaviour Scale (OCB)

The *OCB* scale was measured using sixteen items developed by Lee and Allen (2002). Eight items assessed organisational citizenship behaviours directed at individuals (OCBI), and eight items assessed organisational citizenship behaviours directed at the organisation (OCBO). Item analysis was performed on the subscale level. Even though Lee and Allen (2002) confirmed an empirical distinction between OCBI and OCBO, the reliability of the composite *personal engagement* score was still calculated via Nunnally's (1978) formula.

4.5.6.1 Item Analysis of the OCBI Subscale of the OCB Scale

Table 4.14 provides the item analysis results for the OCBI subscale of the OCB scale.

Table 4.14

Item statistics for the OCBI subscale of the OCB scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.803	.805	8

Item Statistics			
	Mean	Std. Deviation	N
OCBI1	3.88	.710	107
OCBI2	4.13	.778	107
OCBI3	3.40	.950	107
OCBI4	4.24	.799	107
OCBI5	4.25	.631	107
OCBI6	3.62	.820	107
OCBI7	3.94	.799	107
OCBI8	3.39	.909	107

Inter-Item Correlation Matrix								
	OCBI1	OCBI2	OCBI3	OCBI4	OCBI5	OCBI6	OCBI7	OCBI8
OCBI1	1.000	.405	.367	.252	.174	.211	.271	.162
OCBI2	.405	1.000	.464	.495	.470	.405	.361	.274
OCBI3	.367	.464	1.000	.317	.412	.417	.490	.417
OCBI4	.252	.495	.317	1.000	.457	.201	.258	.205
OCBI5	.174	.470	.412	.457	1.000	.335	.478	.138
OCBI6	.211	.405	.417	.201	.335	1.000	.370	.508
OCBI7	.271	.361	.490	.258	.478	.370	1.000	.226
OCBI8	.162	.274	.417	.205	.138	.508	.226	1.000

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.857	3.393	4.252	.860	1.253	.124	8
Item Variances	.648	.398	.903	.505	2.269	.026	8
Inter-Item Correlations	.341	.138	.508	.369	3.671	.013	8

Table 4.14

Item statistics for the OCBI subscale of the OCB scale (continued)

	Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
OCBI1	26.98	14.792	.393	.222	.797
OCBI2	26.73	13.275	.628	.450	.764
OCBI3	27.46	12.269	.641	.435	.759
OCBI4	26.62	14.069	.456	.326	.790
OCBI5	26.61	14.486	.533	.415	.781
OCBI6	27.24	13.506	.541	.386	.777
OCBI7	26.92	13.682	.528	.355	.779
OCBI8	27.47	13.761	.424	.331	.797

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
30.86	17.442	4.176	8

The Reliability Statistics section of Table 4.14 indicates that a satisfactory Cronbach's alpha of .803 was obtained for the subscale. None of the items in the subscale presented with extreme high or low means, and none presented as outliers in the item standard deviation distribution. This suggests that there are no normatively insensitive items present in the subscale.

None of the items consistently correlated lower than the mean inter-item correlation (.341) with the remaining items of the scale. Additionally, none of the items showed themselves as outliers in the corrected item-total correlation or squared multiple correlation distributions. All the items therefore responded to a common underlying source of systematic variance, albeit not necessarily a unidimensional source nor necessarily the focal latent OCB dimension. All items where therefore retained.

4.5.6.2 Item Analysis of the OCBO Subscale of the OCB Scale

The OCBO subscale comprised eight items, measured on 5-point scale, that assessed organisational citizenship behaviours directed at the organisation. The item analysis results for the OCBO subscale of the OCB scale are shown in Table 4.15.

Table 4.15

Item statistics for the OCBO subscale of the OCB scale

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.895	.897	8

Item Statistics			
	Mean	Std. Deviation	N
OCBO1	3.79	1.026	107
OCBO2	3.83	.937	107
OCBO3	3.83	.966	107
OCBO4	4.46	.717	107
OCBO5	3.71	.991	107
OCBO6	4.19	.814	107
OCBO7	3.78	1.031	107
OCBO8	3.94	.930	107

Inter-Item Correlation Matrix								
	OCBO1	OCBO2	OCBO3	OCBO4	OCBO5	OCBO6	OCBO7	OCBO8
OCBO1	1.000	.504	.612	.552	.387	.476	.500	.453
OCBO2	.504	1.000	.469	.383	.618	.339	.566	.357
OCBO3	.612	.469	1.000	.588	.451	.676	.672	.640
OCBO4	.552	.383	.588	1.000	.414	.676	.472	.477
OCBO5	.387	.618	.451	.414	1.000	.430	.546	.382
OCBO6	.476	.339	.676	.676	.430	1.000	.613	.612
OCBO7	.500	.566	.672	.472	.546	.613	1.000	.725
OCBO8	.453	.357	.640	.477	.382	.612	.725	1.000

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.942	3.710	4.458	.748	1.202	.065	8
Item Variances	.869	.515	1.062	.548	2.064	.037	8
Inter-Item Correlations	.521	.339	.725	.386	2.141	.012	8

Table 4.15

Item statistics for the OCBO subscale of the OCB scale (continued)

	Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
OCBO1	27.74	24.440	.641	.479	.885
OCBO2	27.70	25.400	.605	.518	.888
OCBO3	27.70	23.759	.774	.640	.871
OCBO4	27.07	26.617	.656	.540	.885
OCBO5	27.82	25.110	.594	.460	.889
OCBO6	27.35	25.511	.707	.627	.879
OCBO7	27.76	23.205	.777	.684	.871
OCBO8	27.59	24.829	.679	.595	.881

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
31.53	31.987	5.656	8

The results indicated a highly satisfactory Cronbach's alpha of .895. OCBO4 had the lowest item standard deviation, though not sufficiently low to warrant flagging the item an outlier in the item standard deviation distribution. None of the items consistently correlated lower than the mean inter-item correlation (.521) with the remaining items of the subscale. No items showed themselves as true outliers in the corrected item-total correlation distribution or the squared multiple correlation distribution. All the items therefore responded to a common underlying source of systematic variance, albeit, not necessarily a unidimensional source nor necessarily the focal latent OCB dimension. As such, none of the items were flagged as problematic and all items were retained.

4.5.6.3 Reliability of the Total Score on the OCB Scale

The reliability of the *OCB* total score was calculated using Nunnally's (1978) formula as the unweighted sum of the two *OCB* subscale scores.

The unweighted total score reliability for the overall *state engagement* scale was calculated as:

$$rtot = 1 - \left[\frac{\left[\Sigma_{i=1}^{52} S^2 i - \Sigma_{i=1}^{52} rttiS^2 i \right]}{S^2 t} \right]$$

$$rtot = 1 - \left[\frac{49.430 - 42.624}{76.656} \right]$$

$$rtot = 1 - .089$$

$$rtot = .911$$

The resultant value of .91 was considered highly satisfactory[49].

4.5.7 Summary of the Item Analysis results

For the most part, the reliability of the scales (and subscales) used to operationalise the latent variables in the structural model depicted in Figure 4.1 can be considered satisfactory.

The only subscales where the Cronbach alpha coefficients failed to exceed the critical cut-off value (.80) were the three *personal engagement* subscales (cognitive, .724; emotional, .360; physical, .613) and vigour subscale of the state engagement scale (.751). It is acknowledged that the reliability of the *personal engagement* subscales is problematic in this study, particularly the emotional and physical subscales. The reliability of the composite personal engagement score was however acceptable (.775). Moreover, the reliability of the composite *state engagement* score was highly satisfactory (.915).

The only noteworthy, problematic item that was flagged and deleted in this study was item SE16_ded from the absorption subscale of the *state engagement* scale. No further items presented as problematic after deleting item SE16_ded.

4.5 DIMENSIONALITY ANALYSIS

The items comprising each unidimensional scale (i.e. scale developed to measure a unidimensional construct) and subscale used in this study were designed to operate as sets of stimuli to which individuals respond with behaviour that is a primary expression of a specific unidimensional underlying latent variable. Dimensionality analysis was performed on each of the scales developed to measure a unidimensional construct and each of the subscales developed to measure a unidimensional latent dimension of a multivariate construct through EFA. As mentioned in Chapter 3, the objective of EFA was to evaluate the success with which each item, along with the rest of the items in the particular

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[49] The value of .911 contrasted with the value of .898 that would have been obtained if all the OCB items would have simply been combined in a single item analysis.

subscale, measures the specific unidimensional latent variable it was designed to reflect. Items deleted during the item analysis were not included in the EFA.

The inter-item correlation matrices indicate the extent to which items correlate with each other and share one or more common sources of variance. For the scales to be considered factor analysable, the correlation matrix should show numerous statistically significant (p<.05) and reasonably high correlations ($r_{ij} \geq .30$). In addition, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy values should exceed at least .6 and the Bartlett's Test of Sphericity should be statistically significant (p<.05). Principal axis factor analysis with oblique rotation (via SPSS, 25) was used on the various unidimensional scales and subscales to determine unidimensionality. The eigenvalue-greater-than-one rule combined with the scree plot was used to determine the number of factors to be extracted.

4.5.1 Dimensionality Analysis of the Personal Engagement Scale

The *personal engagement* latent variable was conceptualised as a construct that comprises of three correlated latent dimensions, namely; cognitive, emotional, and physical engagement (Kahn, 1990). The reduced structural model depicted in Figure 4.1 used *personal engagement* as a complex multidimensional construct and did not distinguish the specific latent dimensions of the construct in the hypothesised structural model. Exploratory factor analysis (EFA) was nevertheless performed on each of the three dimensions to determine whether the assumption that each subscale successfully measured a unidimensional latent *personal engagement* dimension was tenable.

All but one of the inter-item correlations for the *cognitive* subscale exceeded .30 and all were statistically significant (p<.05). The *cognitive* subscale obtained a KMO of .723 and the Bartlett's test of sphericity returned a statistically significant chi-square statistic (p<.05) which meant that the identity matrix H_0 could be rejected. This provides evidence that the correlation matrix was factor analysable. The position of the elbow in the scree plot and the fact that only one factor obtained an eigenvalue greater than one (2.241) indicated the extraction of only one factor. The single-factor factor structure is shown in Table 4.16.

Table 4.16

Extracted factor matrix for the cognitive subscale of the personal engagement scale

Factor Matrix[a]	
	Factor
	1
PE1_cog	.789
PE4_cog	.728
PE3_cog	.623
PE2_cog_R	.428

PE2_cog_R was the only item with factor loading less than .50, though only relatively marginally so. The credibility of the extracted one-factor solution as an explanation of the observed correlation matrix was deemed acceptable, as only one (16%) of the non-redundant residual correlations obtained absolute values greater than .05. The single-factor factor structure therefore provided an acceptably valid and credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was therefore corroborated for the *cognitive* subscale of the *personal engagement* scale.

Four of the six inter-item correlations for the *emotional* subscale were smaller than .30. Three of the six inter-item correlations were statistically insignificant (p>.05). The *emotional* subscale obtained a KMO of .541 (<.6). These findings placed the factor analysability of the correlation matrix under strain. The Bartlett's test of sphericity returned a statistically significant chi-square statistic (p<.05) which meant that the identity matrix null hypothesis could be rejected. This indicates that the correlation matrix was factor analysable. The position of the inflection point[50] in the scree plot suggested the extraction of a single factor but the eigen-value-greater-than-one rule indicated the extraction of two factors. The pattern matrix in Table 4.17 shows that item PE5_emo, PE6_emo and PE7_emo_R loaded on the first factor whilst PE8_emo loaded on the second factor. There were zero (0.0%) nonredundant residuals obtained absolute values greater than .05. The two-factor factor structure therefore provided a highly valid and credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was therefore not met for the *emotional* subscale of the *personal engagement* scale. The pattern matrix is shown in Table 4.17.

Table 4.17

Pattern matrix for the emotional subscale of the personal engagement scale

Pattern Matrix[a]		
	Factor	
	1	2
PE5_emo	**.769**	.343
PE6_emo	**.541**	.101
PE7_emo_R	**.303**	-.160
PE8_emo	.056	**.583**

Table 4.18 indicates a low positive correlation between the two extracted factors.

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[50] It is, however, acknowledged that the elbow in the scree plot was very subtle and almost approached 170 degrees.

Table 4.18

Factor correlation matrix for the emotional subscale of the personal engagement scale

Factor Correlation Matrix		
Factor	1	2
1	1.000	.110
2	.110	1.000

Item PE8_emo states "My own feelings are affected by how well I perform my job,". Item PE5_emo, that obtained the highest loading on factor 1 in the pattern matrix, states "I really put my heart into my job." Item PE6_emo states, "I get excited when I perform well on my job." and item PE7_emo_R states "I often feel emotionally detached from my job.". The current study was unable to interpret the identity of the extracted factors with sufficient confidence.

The ideal would have been to fit a second-order *emotional personal engagement* measurement model so as to calculate the indirect effect of the second-order emotional engagement factor on the item responses, and to test the statistical significance of these indirect effects. Such a second-order measurement model would, however, be under-identified and will have negative degrees of freedom due to the small number of items comprising the subscale.

Eight of the ten inter-item correlations for the *physical* subscale fell below .30. Two of the ten inter-item correlations were statistically insignificant (p>.05). The *physical* subscale also obtained a KMO of.548. These findings brought the fruitfulness of factor analysing the correlation matrix into question. The Bartlett's test of sphericity did, however, return a statistically significant chi-square statistic (p<.05) which meant that the identity matrix null hypothesis could be rejected. This suggested that the correlation matrix was factor analysable. The position of the elbow in the scree plot was ambiguous and suggested either the extraction of a single factor or the extraction of 3 factors. The eigenvalue-greater-than-unity rule, in contrast, indicated the extraction of two factors. The pattern matrix is provided in Table 4.19. The small percentage of large residual correlations (10%) indicated that the two-factor solution provided a plausible and credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was therefore not corroborated for the *physical* subscale of the *personal engagement* scale.

Table 4.19

Pattern matrix for the physical subscale of the personal engagement scale

Pattern Matrix[a]		
	Factor	
	1	2
PE11_phy_R	**.984**	-.116
PE13_phy_R	**.716**	-.009
PE12_phy	**.236**	.137
PE9_phy	-.118	**.909**
PE10_phy	.105	**.568**

Item PE11_phy_R, PE13_phy_R and PE12_phy loaded on the first factor whilst PE9_phy and PE10_phy loaded on factor 2. Table 4.20 indicates a modest positive correlation between the two factors that were extracted. Item PE11_phy_R loading on factor 1 states "I avoid working overtime whenever possible.", item PE13_phy_R states "I avoid working too hard.", and item PE12_phy states "I take work home to do." The two items loading on factor 2 state "I exert a lot of energy performing my job." (PE9_phy), and "I stay until the job is done." (PE10_phy). The current study was unable to interpret the identity of the extracted factors with sufficient confidence.

Table 4.20

Factor correlation matrix for the physical subscale of the personal engagement scale

Factor Correlation Matrix		
Factor	1	2
1	1.000	.315
2	.315	1.000

The number of items comprising the *physical personal engagement* subscale allowed the fitting of the second-order *physical personal engagement* measurement model, albeit with low statistical power. This would allow the calculation of the indirect effect of the second-order *physical personal engagement* factor on the items of the subscale and the evaluation of the statistical significance of these indirect effects. The first-order *physical personal engagement* measurement model was fitted first. The first-order measurement model showed poor fit in the sample (RMSEA=.094; p>.05). Due to the small degrees of freedom the test of close fit had low statistical power. Despite the poor fit in the sample the close fit null hypothesis was nonetheless not rejected. Despite this, the current study chose the more prudent option not to fit the second-order *physical personal engagement* measurement model, due to the poor fit of the first-order model. There were some indications that a bifactor model might be appropriate in that four of the ten modification index values associated with the off-diagonal of Θ_δ were statistically significant (p<.05). The fitting of a bifactor model was, however, not possible, because it

would be under-identified due to the small number of unique variance and covariance terms in the observed covariance matrix.

4.5.1.1 Confirmatory Factor Analysis of the Personal Engagement Scale

The construct validity of the *personal engagement* scale was evaluated by fitting the measurement model implied by the scoring key of the scale. The inter-item covariance matrix was evaluated using robust maximum likelihood estimation. The data didn't follow a multivariate normal distribution, even after the data was normalised using PRELIS. Normalising the data did however result in a significant decrease in the chi-square statistic from 277.785 to 31.903.

The first-order *personal engagement* measurement model showed poor fit (RMSEA=.114; p<.05). This wasn't altogether surprising given the dimensionality results of the three subscales reported above. The statistically significant (p<.01) modification indices shown in Figure 4.2 indicate that the *personal engagement* items reflect a general source of systematic variance that the current model doesn't acknowledge. A bi-factor model was subsequently fitted (Reise, 2012).
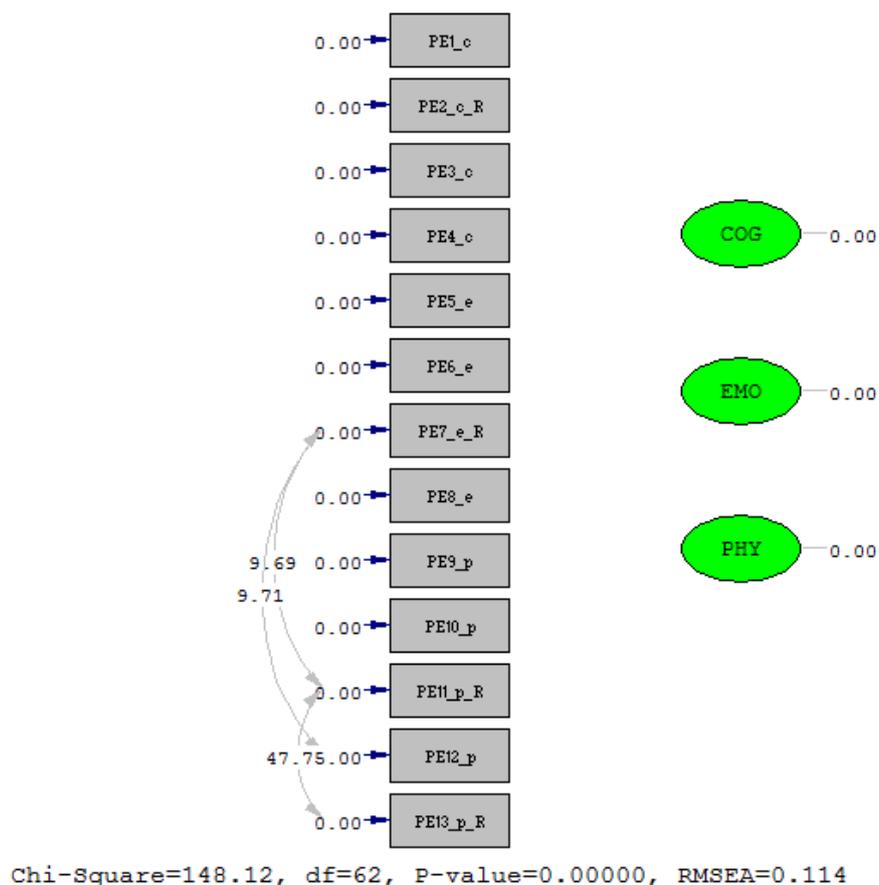
Figure 4.2. Statistically significant modification indices calculated for the first-order personal engagement measurement model.

The bi-factor model in Figure 4.3, which made provision for a general *personal engagement* factor along with the three more specific subfactors, showed close fit (RMSEA=.063; p>.05). The unstandardised factor loading matrix is provided in Table 4.21.

Table 4.21 shows that all of the items designed to reflect the *cognitive* dimension of *personal engagement* statistically significantly (p<.05)[51] loaded on the broad, general *personal engagement* factor and their designated narrow-group factor. With regards to the *emotional* and *physical* dimensions, all of the items that loaded insignificantly (p>.05) onto the general factor still loaded statistically significantly (p<.05) onto their designated narrow-group factors (PE7_e_R; PE11_p_R; PE13_p_R). Similarly, all of the items that loaded insignificantly (p>.05) onto their narrow, specific latent dimension they were designed to reflect, still loaded statistically significantly (p<.05) onto the general, broad *personal engagement* factor (PE8_e and PE9_p).
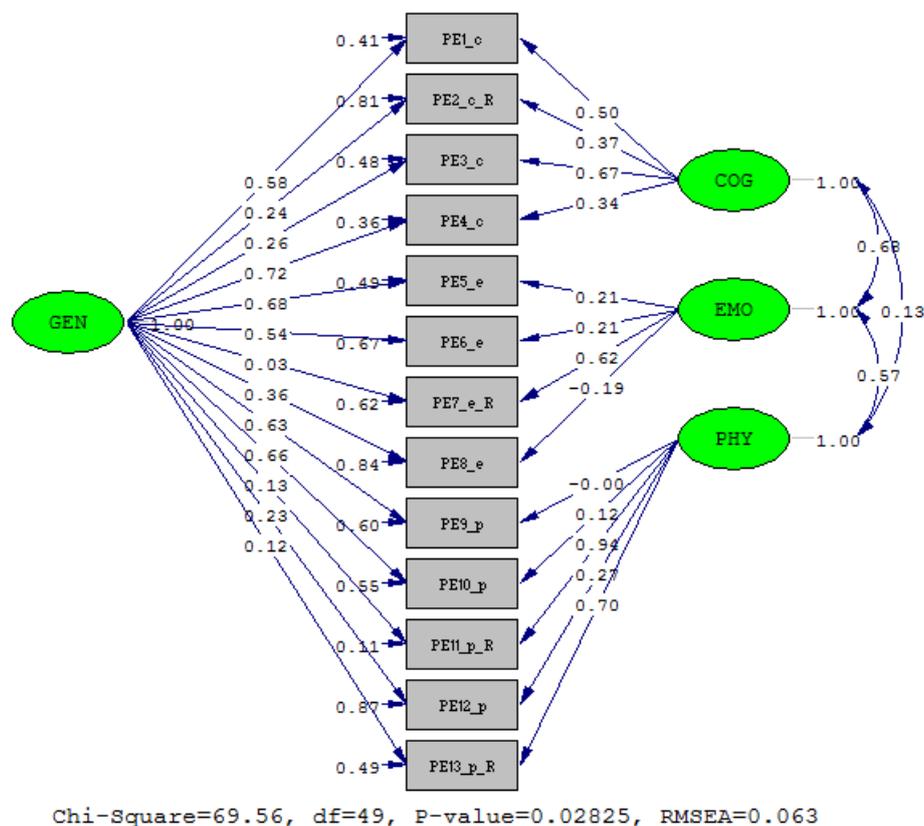
Figure 4.3. Bi-factor personal engagement measurement model (completely standardised solution).

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[51] The statistical significance of the factor loadings were evaluated against directional Ha hypotheses via one-tailed significance tests.

Table 4.21

Unstandardised lambda-X matrix for the bi-factor personal engagement scale

	COG	EMO	PHY	GEN
PE1_c	.734*	- -	- -	.850*
	(.159)			(.143)
	4.611			5.939
PE2_c_R	.466*	- -	- -	.312*
	(.164)			(.113)
	2.832			2.755
PE3_c	1.015*	- -	- -	.394*
	(.166)			(.158)
	6.111			2.496
PE4_c	.349*	- -	- -	.744*
	(.105)			(.123)
	3.313			6.052
PE5_e	- -	.146*	- -	.473*
		(.080)		(.119)
		1.813		3.992
PE6_e	- -	.129*	- -	.324*
		(.062)		(.091)
		2.095		3.555
PE7_e_R	- -	.653*	- -	**.035**
		(.200)		**(.141)**
		3.266		**.249**
PE8_e	- -	**-.263**	- -	.498*
		(.166)		(.141)
		-1.583		3.523
PE9_p	- -	- -	**-.003**	.523*
			(.082)	(.090)
			-.040	5.838
PE10_p	- -	- -	**.109**	.600*
			(.095)	(.167)
			1.149	3.598
PE11_p_R	- -	- -	1.937*	**.264**
			(.348)	**(.258)**
			5.560	**1.022**
PE12_p	- -	- -	.371*	.312*
			(.172)	(.182)
			2.159	1.712

Table 4.21

Unstandardised lambda-X matrix for the bi-factor personal engagement scale (continued)

	COG	EMO	PHY	GEN
PE13_p_R	- -	- -	.906*	**.157**
			(.151)	**(.136)**
			6.013	**1.152**

* (p<.05)

Note: COG refers to cognitive personal engagement, EMO refers to emotional personal engagement, PHY refers to physical personal engagement, GEN refers to a general personal engagement factor

Two of the *emotional engagement* items (PE5_e and PE6_e) loaded statistically significantly (p<.05) on both the narrow *emotional engagement* factor and on the broad, general *personal engagement* factor. Only one of *physical engagement* items (E12_p) loaded statistically significantly (p<.05) on both the narrow *physical engagement* factor and on the broad, general *personal engagement* factor. All the items of the *personal engagement* scale therefore loaded statistically significantly on at least one factor.

The proportion of variance explained in each item by the two factors they were set to represent (i.e. the general *personal engagement* factor and their respective narrow, more specific group factors) are provided in Table 4.22. In Chapter 3 is was decided that an individual item (in contrast to a composite indicator variable) would be considered acceptable if the completely standardised factor loading was at least .50 and therefore if the latent dimension it was designated to reflect explain 25% or more of the variance in the item. The assumption was that each item would load on a single latent dimension of the multidimensional construct. The same line of reasoning, however, also applies when items load on more than one factor like in the case of a bifactor model. The results indicate that the two factors explained less than 25% of the variance in 10 of the 13 items, with items PE2_c_R, PE8_e and PE12_p being of concern. All items were nevertheless retained.

Table 4.22

Personal engagement item squared multiple correlations

PE1_c	PE2_c_R	PE3_c	PE4_c	PE5_e	PE6_e	PE7_e_R
.595	.193	.520	.641	.512	.335	.380

PE8_e	PE9_p	PE10_p	PE11_p_R	PE12_p	PE13_p_R
.164	.398	.453	.893	.125	.510

4.5.2　Dimensionality Analysis of the State Engagement Scale

The state engagement latent variable was conceptualised as a multidimensional construct that comprises of three correlated latent dimensions, namely; vigour, dedication, and absorption (Shaufeli et al., 2002). EFA was performed on each of the dimensions separately to determine whether the assumption that

each of the three subscales successfully measured a unidimensional latent *state engagement* dimension was tenable.

Eight if the 15 inter-item correlations for the *vigour* subscale were smaller than .30. One of the inter-item correlations were statistically insignificant (p>.05). These findings commented less favourably on the success with which the design intention of the subscale was achieved. The *vigour* subscale obtained a satisfactory KMO of .757. The statistically significant Bartlett's test of sphericity allowed for the rejection of the identify matrix H_0, meaning that the correlation matrix was factor analysable. Both the eigenvalue-greater-than-one rule and scree plot indicated that a single factor should be extracted. The single-factor structure is shown in Table 4.23

The one-factor solution, however, failed to provide a credible explanation for the observed inter-item correlation matrix with 40% of the non-redundant residual correlations obtained being greater than .05. Thus, the extraction of two factors were forced and the analysis run again. The resultant obliquely rotated two-factor solution is shown in Table 4.24. The unidimensionality assumption was therefore not supported for the *vigour* subscale of the *state engagement* scale.

Table 4.23

Extracted factor matrix for the vigour subscale of the state engagement subscale

Factor Matrix[a]	
	Factor
	1
SE4_vig	.881
SE8_vig	.664
SE1_vig	.589
SE15_vig	.541
SE12_vig	.494
SE17_vig	.351

Table 4.24

Pattern matrix for the vigour subscale with two factors forced

Pattern Matrix[a]		
	Factor	
	1	2
SE15_vig	**.608**	-.010
SE12_vig	**.548**	-.014
SE4_vig	**.536**	-.435
SE17_vig	**.440**	.044
SE1_vig	-.075	**-.866**
SE8_vig	.315	**-.439**

Items SE15_vig, SE12_vig, SE4_vig and SE17_vig loaded positively on factor 1 whereas SE1_vig and SE8_vig loaded negatively on the second factor. The reasonably small percentage of large residual correlations (20%) indicated that the two-factor solution now provided a more satisfactory and credible explanation for the observed correlation matrix than the original single-factor solution. The factor correlation matrix shown in Table 4.25 indicates a moderately high negative correlation between the two extracted factors. Based on the common theme shared by the items that loaded on factor 1 "At my job, I am very resilient, mentally." (SE15_vig), "I can continue working for very long periods at a time." (SE12_vig), "At my job, I feel strong and vigorous." (SE4_vig), and "At my work I always persevere, even when things do not go well." (SE17_vig), factor 1 was interpreted as an *energy-to-keep-going* factor. Based on the common theme shared by the items that loaded on factor 2 "At my work, I feel that I am bursting with energy." (SE1_vig) and "When I get up in the morning, I feel like going to work" (SE8_vig), factor 2 was interpreted as an *abundance-of-energy-to-want-to-work* factor

Table 4.25

Extracted factor correlation matrix for vigour subscale with two factors forced

Factor Correlation Matrix		
Factor	1	2
1	1.000	-.527
2	-.527	1.000

The two-factor first-order *vigour* measurement model was subsequently fitted with the items loading in accordance with their highest loading in the pattern matrix shown in Table 4.24. The first-order *vigour* measurement model obtained exact fit (RMSEA=0; p>.05) and all items loading statistically significantly on their designated factors. The second-order *vigour* measurement model was consequently fitted via robust diagonally weighted least squares (RDWLS) estimation, with a single second-order *vigour* factor and both first-order *vigour* factors loading on the single second-order factor. The second-order vigour measurement model is shown in Figure 4. 4.

Chi-Square=6.88, df=7, P-value=0.44108, RMSEA=0.000
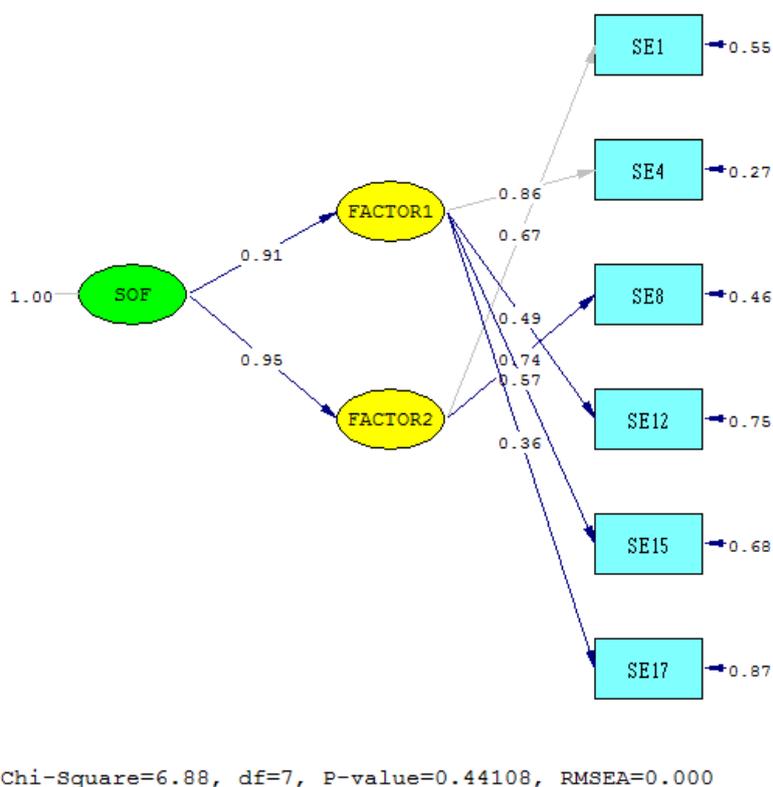
Figure 4.4. Second-order vigour measurement model (completely standardised solution).

The second-order *vigour* measurement model also showed exact fit (RMSEA=0; p>.05). The indirect effect of the second-order factor on the individual *vigour* subscale items were consequently subsequently calculated by translating the SIMPLIS syntax that was used to fit the second-order measurement model to LISREL syntax and using the AP and CO commands to calculate the indirect effects (PA$_i$)[52] and to evaluate the statistical significance of the indirect effects. The unstandardised indirect effects are shown in Table 4.26.

Table 4.26

Indirect effects of the second-order vigour factor on the vigour subscale items

PA(1)	PA(2)	PA(3)	PA(4)	PA(5)	PA(6)
0.81*	0.43*	0.64*	0.29*	0.73*	1.11*
(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
8.36	4.41	6.54	3.02	7.53	11.47

Note: PA(i) represents the ith indirect effect. Footnote 53 explicates the nature of the ith indirect effect.
* (p<.05)

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[52] CO PAR1 = LY(2,1)*GA(1,1)
CO PAR2 = LY(4,1)*GA(1,1)
CO PAR3 = LY(5,1)*GA(1,1)
CO PAR4 = LY(6,1)*GA(1,1)
CO PAR5 = LY(1,2)*GA(2,1)
CO PAR6 = LY(3,2)*GA(2,1)

Table 4.26 indicates that all six indirect effects were statistically significant (p<.05). This means that all six items of the *vigour* subscale statistically significantly(p<.05) reflect test-takers standing on the second-order *vigour* factor.

All the inter-item correlations of the *dedication* subscale were larger than .30 and all were statistically significant (p<.05). The *dedication* subscale obtained a KMO of .850 and the Bartlett's Test of Sphericity returned a statistically significant chi-square statistic (p<.05). This allowed for the identity matrix null hypothesis to be rejected, thus presenting strong evidence that the correlation matrix was factor analysable. The eigenvalue-greater-than-one rule as well as the position of the elbow in the scree plot indicated the extraction of a single factor. The extracted factor structure is shown in Table 4.27.

Table 4.27

Extracted factor matrix for the dedication subscale of the state engagement subscale

Factor Matrix[a]	
	Factor
	1
SE7_ded	.903
SE5_ded	.795
SE2_ded	.762
SE10_ded	.686
SE13_ded	.580

All of the items in the *dedication* subscale loaded very satisfactorily on the single underlying factor (>.50). Zero nonredundant residuals obtained absolute values greater than .05. This suggests that the factor structure provides a highly satisfactory and credible explanation for the observed correlation matrix. The unidimensionality assumption for the *dedication* subscale was thus corroborated.

All the inter-item correlations of the *absorption* subscale were larger than .30 and all were statistically significant (p<.05). The *absorption* subscale obtained a KMO of .771 and the Bartlett's Test of Sphericity returned a statistically significant chi-square statistic (p<.05). This allowed for the identity matrix null hypothesis to be rejected, thus presenting strong evidence that the correlation matrix was factor analysable. The eigenvalue-greater-than-one rule as well as the position of the elbow in the scree plot indicated the extraction of a single factor. The extracted factor structure is shown in Table 4.28.

Table 4.28

Extracted factor matrix for the absorption subscale of the state engagement subscale[53]

Factor Matrix[a]	
	Factor
	1
SE11_abs	.709
SE6_abs	.695
SE9_abs	.688
SE3_abs	.671
SE14_abs	.639

All of the items loaded very satisfactorily on the single underlying factor (>.50). The one-factor solution however failed to provide a credible explanation for the observed inter-item correlation matrix with 60% of the non-redundant residual correlations obtained being greater than .05. Thus, the extraction of two factors were forced and the analysis run again. The resultant obliquely rotated two-factor solution is shown in Table 4.29. The unidimensionality assumption was therefore not supported for the *absorption* subscale of the *state engagement* scale.

Table 4.29 shows that items SE3_abs, SE11_abs and SE6_abs loaded positively on one factor, while SE9_abs and SE14_abs loaded negatively on another factor. The factor correlation matrix shown in Table 4.30 indicates a moderately high negative correlation between the two extracted factors.

Table 4.29

Pattern matrix for the absorption subscale with two factors forced

Pattern Matrix[a]		
	Factor	
	1	2
SE3_abs	**.827**	.094
SE11_abs	**.670**	-.083
SE6_abs	**.626**	-.108
SE9_abs	-.064	**-.954**
SE14_abs	.164	**-.554**

Based on the common theme shared by the items that loaded on factor 1 "Time flies when I'm working." (SE3_abs), "I am immersed in my work." (SE11_abs), and "When I am working, I forget everything else around me." (SE6_abs), factor 1 was interpreted as a *work-immersion* factor. Based on the common theme shared by the items that loaded on factor 2 "I feel happy when I am working intensely."

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[53] Item SE16_abs was not included in the EFA analysis since it was flagged and deleted as a problematic item in the item analysis.

(SE9_abs) and "I get carried away when I'm working." (SE14_abs), factor 2 was interpreted as an *enjoyment-of-work-immersion* factor.

Table 4.30

Extracted factor correlation matrix for the absorption subscale with two factors forced

Factor Correlation Matrix		
Factor	1	2
1	1.000	-.649
2	-.649	1.000

The absence (0.0%) of residual correlations with absolute values greater than .05 indicated that the two-factor structure provided a plausible and credible explanation for the observed correlation matrix.

The two-factor first-order *absorption* measurement model was subsequently fitted with the items loading in accordance with their highest loading in the pattern matrix shown in Table 4.29. The first-order *absorption* measurement model obtained exact fit (RMSEA=.062; p>.05)[54] and all items loading statistically significantly on their designated factors. The second-order *absorption* measurement model was consequently fitted via robust diagonally weighted least squares (RDWLS) estimation. with a single second-order *absorption* factor and both first-order absorption factors loading on the single second-order factor. The second-order *absorption* measurement model is shown in Figure 4. 5.

The second-order *absorption* measurement model also showed exact fit (RMSEA=.013; p>.05). The indirect effect of the second-order factor on the individual *absorption* subscale items were consequently subsequently calculated by translating the SIMPLIS syntax that was used to fit the second-order measurement model to LISREL syntax and using the AP and CO commands to calculate the indirect effect (PA_i)[55] of the second-order *absorption* factor on the *absorption* subscale items and to evaluate the statistical significance of the indirect effects. The unstandardised indirect effects are shown in Table 4.31.

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[54] Again the low statistical power of the test of exact fit is acknowledged due to the small degrees of freedom (4).

[55] CO PAR1 = LY(1,1)*GA(1,1)
 CO PAR2 = LY(2,1)*GA(1,1)
 CO PAR3 = LY(4,1)*GA(1,1)
 CO PAR4 = LY(3,2)*GA(2,1)
 CO PAR5 = LY(5,2)*GA(2,1)

Table 4.31

Indirect effects of the second-order absorption factor on the absorption subscale items

PA(1)	PA(2)	PA(3)	PA(4)	PA(5)
0.60*	0.76*	0.63*	0.72*	0.73*
(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
6.18	7.87	6.48	7.44	7.49

Note: PA(i) represents the ith indirect effect. Footnote 55 explicates the nature of the ith indirect effect.
* (p<.05)
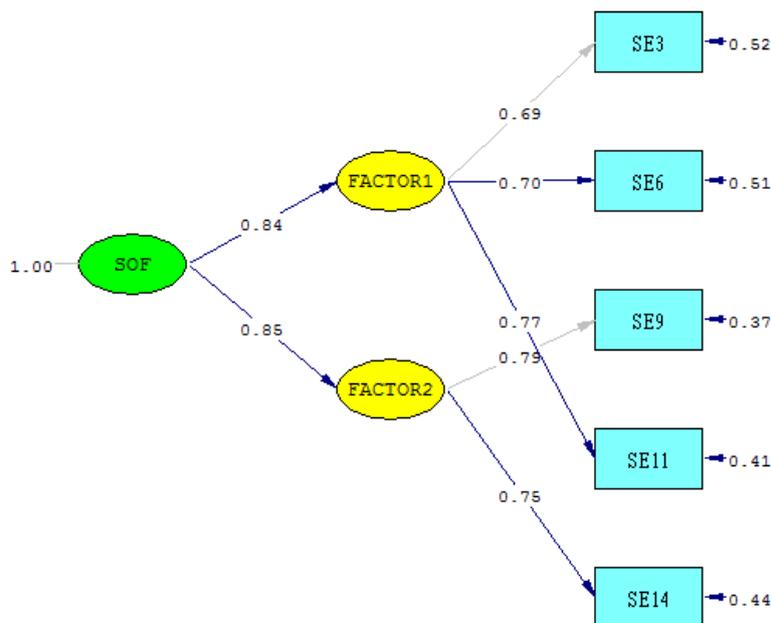
Chi-Square=3.05, df=3, P-value=0.38375, RMSEA=0.013

Figure 4.5. Second-order vigour measurement model (completely standardised solution).

Table 4.31 shows that all five indirect effects were statistically significant (p<.05). This means that all *absorption* items statistically significantly(p<.05) reflect test-takers standing on the second-order *absorption* factor.

4.5.2.1 Confirmatory Factor Analysis of the State Engagement Scale

The construct validity of the *state engagement* scale was evaluated by fitting the measurement model implied by the scoring key of the scale. The multivariate normality assumption was not met. This was the case even after the data was not normalised using PRELIS. Normalising the data did however result in a substantial decrease in the chi-square statistic from 163.447 to 48.988.

The first-order *state engagement* measurement model showed poor fit (RMSEA=.083; p<.05)[56]. The modification indices calculated for the first-order model (Figure 4.6) also exposed a number of statistically significant (p<.01) modification values for the measurement error covariances.

Chi-Square=175.25, df=101, P-value=0.00001, RMSEA=0.083
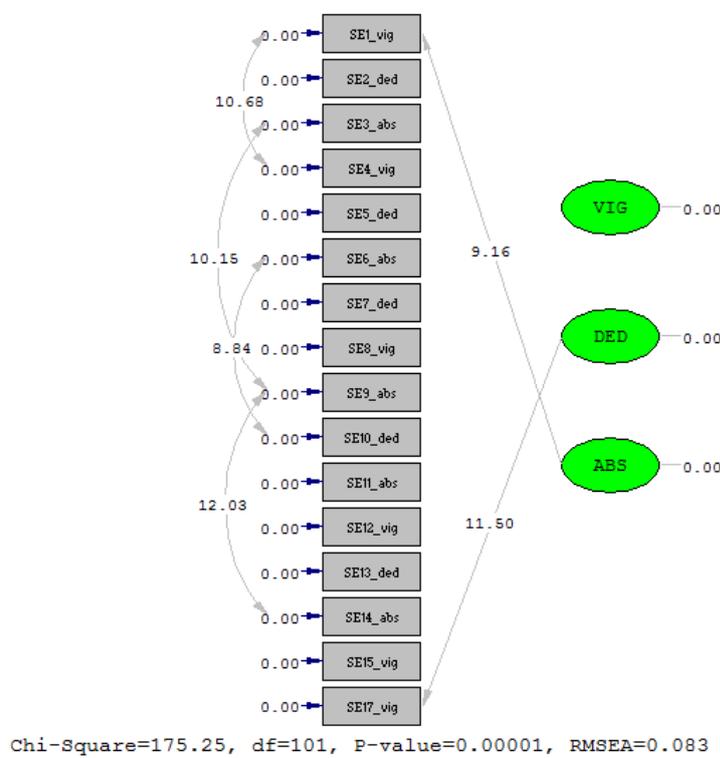
Figure 4.6. Statistically significant (p<.01) modification indices calculated for the first-order state engagement measurement model.

This suggests that the items comprising the scale reflect a general source of systematic variance that is unaccounted for in the current model. In light of this, a bi-factor model was fitted.

The bi-factor *state engagement* measurement model is depicted in Figure 4.7. The model obtained closed fit (RMSEA=.060, p>.05).

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[56] Item SE16_abs was not included in the CFA analysis since it was flagged and deleted as a problematic item in the item analysis.

Chi-Square=117.19, df=85, P-value=0.01186, RMSEA=0.060
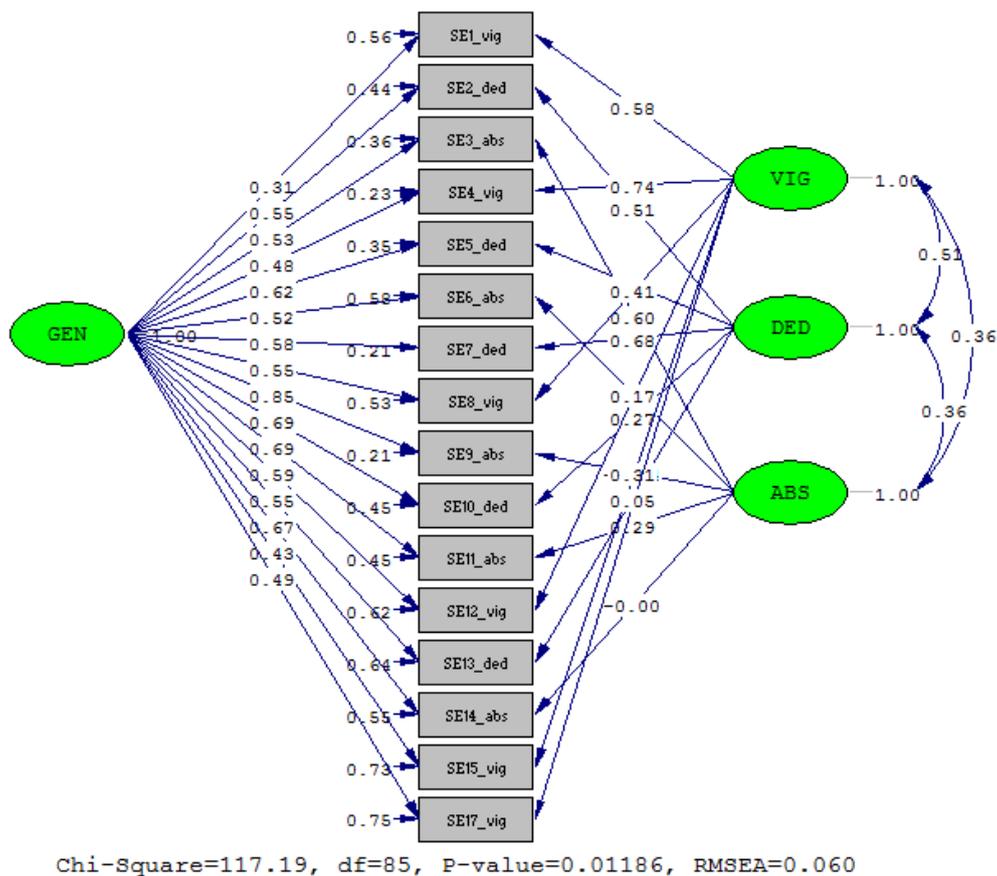
*Figure 4.7.* Bifactor state engagement measurement model (completely standardised solution).

The unstandardised lambda-X matrix for the bi-factor *state engagement* measurement model is shown in Table 4.32.

Table 4.32

Unstandardised lambda-X matrix for the bi-factor state engagement scale

	VIG	DED	ABS	GEN
SE1_vig	.668*	- -	- -	.356*
	(.137)			(.142)
	4.875			2.510
SE2_ded	- -	.576*	- -	.625*
		(.093)		(.099)
		6.187		6.302
SE3_abs	- -	- -	.618*	.550*
			(.148)	(.123)
			4.163	4.454

Table 4.32

Unstandardised lambda-X matrix for the bi-factor state engagement scale (continued)

	VIG	DED	ABS	GEN
SE4_vig	.768*	- -	- -	.499*
	(.102)			(.109)
	7.561			4.577
SE5_ded	- -	.470*	- -	.574*
		(.093)		(.089)
		5.038		6.431
SE6_abs	- -	- -	.509*	.680*
			(.197)	(.126)
			2.582	5.402
SE7_ded	- -	.797*	- -	.680*
		(.093)		(.102)
		8.531		6.645
SE8_vig	.659*	- -	- -	.874*
	(.183)			(.157)
	3.604			5.580
SE9_abs	- -	- -	**-.256**	.919*
			(.184)	(.088)
			-1.391	10.389
SE10_ded	- -	.225*	- -	.584*
		(.084)		(.067)
		2.688		8.688
SE11_abs	- -	- -	.285*	.674*
			(.098)	(.089)
			2.914	7.585
SE12_vig	.161*	- -	- -	.560*
	(.079)			(.093)
	2.029			6.011
SE13_ded	- -	.272*	- -	.648*
		(.121)		(.119)
		2.255		5.443
SE14_abs	- -	- -	**.000**	.778*
			(.164)	(.106)
			-.001	7.360
SE15_vig	.375*	- -	- -	.522*
	(.140)			(.149)
	2.676			3.499
SE17_vig	**.042**	- -	- -	.437*
	(.096)			(.084)
	.442			5.223

* (p<.05)

Note: VIG refers to the latent *vigour* dimension of *state engagement*, DED refers to the latent *dedication*, dimension of *state engagement*, ABS refers to the latent *absorption* dimension of *state engagement*, GEN refers to a general state engagement factor

As evident in Table 4.32, all the *state engagement* items (with the exception of SE9_abs, SE14_abs and SE17_vig) loaded statistically significantly (p<.05) on both the general *state engagement* factor and their respective narrow group-factors. Even though items SE9_abs, SE14_abs and SE17_vig loaded insignificantly (p>.05) on their designated narrow group factors, they all loaded statistically significantly (p<.05) on the broad, general state *engagement* factor.

The *state engagement* item squared multiple correlations, showing the proportion of variance explained in each item by the two factors, are shown in Table 4.33.

Table 4.33

State engagement item squared multiple correlations

SE1_vig	SE2_ded	SE3_abs	SE4_vig	SE5_ded	SE6_abs
.438	.562	.635	.773	.647	.423
SE7_ded	SE8_vig	SE9_abs	SE10_ded	SE11_abs	SE12_vig
.794	.470	.786	.549	.555	.377
SE13_ded	SE14_abs	SE15_vig	SE17_vig		
.358	.455	.275	.246		

Table 4.33 shows that only in 1 (SE17_vig) of the 16 items[57] less than 25% of the variance in the item could be explained by the general overall factor and the more specific group factors they were designated to reflect. SE17_vig was nonetheless still retained.

4.5.3 Dimensionality Analysis of the Job satisfaction Scale

The measure used to assess the *job satisfaction* latent variable in this study has in the past (Weiss et al., 1967) been said to reflect three scales; intrinsic satisfaction, extrinsic satisfaction and general satisfaction. The intrinsic and extrinsic scales comprise of unique items. The general scale, however, comprises all the items from both the intrinsic and extrinsic scales plus two additional items [JS17 and JS18]. The current study doesn't recognise the general satisfaction scale as a subscale in its own right but rather as an overall scale measure of job satisfaction. The intrinsic and extrinsic subscales are nonetheless seen as specific latent dimensions underlying the job satisfaction construct in the model. As such, EFA was conducted on these two dimensions separately.

Thirty-nine of the sixty-six inter-item correlations in the *intrinsic satisfaction* inter-item correlation matrix fell below .30. Sixteen of the sixty-six inter-item correlations were statistically insignificant (p>.05). These findings comment negatively on the success with which the design intention underpinning the *intrinsic satisfaction* subscale had been achieved. The *intrinsic* subscale returned a

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[57] Item SE16_abs was deleted during the item analysis.

KMO estimate of .797. The Bartlett's test of sphericity returned a statistically significant chi-square statistic (p<.05) which allowed the identity matrix null hypothesis to be rejected. This suggested that the correlation matrix was factor analysable. The position of the elbow in the scree plot suggested the extraction of two factors whilst the eigenvalue-greater-than-unity rule indicated the extraction of three factors. The pattern matrix is provided in Table 4.34. The reasonably small percentage of large residual correlations (22%) indicated that the three-factor solution provided a plausible and credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was therefore not supported.[58]

Table 4.34

Pattern matrix for the intrinsic subscale of the job satisfaction scale

	Pattern Matrix[a]		
	Factor		
	1	2	3
JS16_int	**.976**	-.086	-.170
JS15_int	**.852**	-.120	-.065
JS20_int	**.489**	.340	.200
JS4_int	**.428**	.315	.032
JS3_int	**.425**	.026	.363
JS2_int	**.326**	.045	.225
JS1_int	-.176	**.724**	-.134
JS9_int	.024	**.650**	.061
JS8_int	-.010	**.559**	-.009
JS11_int	.220	**.459**	.177
JS7_int	.114	**.362**	.201
JS10_int	-.120	-.009	**.736**

Six of the items loaded on factor 1, five items loaded onto factor 2, and 1 of the items loaded onto factor 3[59]. Table 4.35 indicates modest positive correlations between the three extracted factors. Based on the theme shared by the items that loaded on factor 1 "The chance to try my own methods of doing the job." (JS16_int), "The freedom to use my own judgement." (JS15_int), "The feeling of accomplishment I get from the job." (JS20_int), "The chance to be "somebody" in the community." (JS4_int), "The chance to do different things from time to time." (JS3_int) and "The chance to work alone on the job." (JS2_int), factor 1 was interpreted as a *satisfaction-with-the-activities-the-job-allows-me-to-do* factor. Based on

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[58] The position that the intrinsic satisfaction subscale of the short version of the MSQ measures a unidimensional latent dimension of satisfaction was never a very strong position as this version of the MSQ was created from the long version by taking the psychometrically strongest item from each of 20 subscales developed to measure 20 latent facets of job satisfaction.
[59] An extracted factor structure where only a single item loads on a factor provides for a poorly defined factor and would thus be an outcome that one would preferably want to avoided. However, when forcing the extraction of only two factors item JS10_int loaded onto factor two with a low-modest loading (.311) but the percentage large residual correlations jumped to 40%.

the theme shared by the items that load on factor 2 "Being able to keep busy all the time." (JS1_int), "The chance to do things for other people." (JS9_int), "The way my job provides for steady employment." (JS8_int), "The chance to do something that makes use of my abilities." (JS11_int) and "Being able to do things that don't go against my conscience." (JS7_int), factor 2 was interpreted as a *satisfaction-with-the-freedom-the-job-allows-me* factor. Based on the theme underpinning the single item that loaded on factor 3 "The chance to tell people what to do." (JS10_int), factor 3 was interpreted as a *satisfaction-with-the-authority-the-job-offers-me* factor.

Table 4.35

Factor correlation matrix for the intrinsic subscale of the job satisfaction scale

Factor Correlation Matrix			
Factor	1	2	3
1	1.000	.208	.364
2	.208	1.000	.377
3	.364	.377	1.000

The three-factor first-order *intrinsic job satisfaction* measurement model was subsequently fitted with the items loading in accordance with their highest loading in the pattern matrix shown in Table 4.34. The first-order *intrinsic job satisfaction* measurement model obtained poor fit (RMSEA = .1246; p<.05) and an inadmissible solution due to the completely standardised factor loading of JS10_int on factor 3 exceeding unity, a negative $\theta_{\delta8,8}$ estimate and an R^2 (JS10_int) exceeding unity. The first-order *intrinsic job satisfaction* measurement model was subsequently refitted with the $\lambda_{8,3}$ fixed to .90 and $\theta_{\delta8,8}$ fixed to .19. The measurement model now converged with an admissible solution but still with poor fit (RMSEA=.1241; p<.05). The modification indices calculated for Θ_δ (see Figure 4.8) suggested that a bi-factor model (Reise, 2012) might more appropriately model the process that generated the inter-item covariance matrix. The bi-factor *intrinsic job satisfaction* measurement model was subsequently fitted using RDWLS estimation. The bi-factor model made provision for a broad, general *intrinsic satisfaction* factor to account for the covariance between the measurement error terms (see Figure 4.8). The broad, general *intrinsic satisfaction* factor was modelled to be independent of the three narrow, more specific *intrinsic satisfaction* factors.

Chi-Square=136.90, df=52, P-value=0.00000, RMSEA=0.124
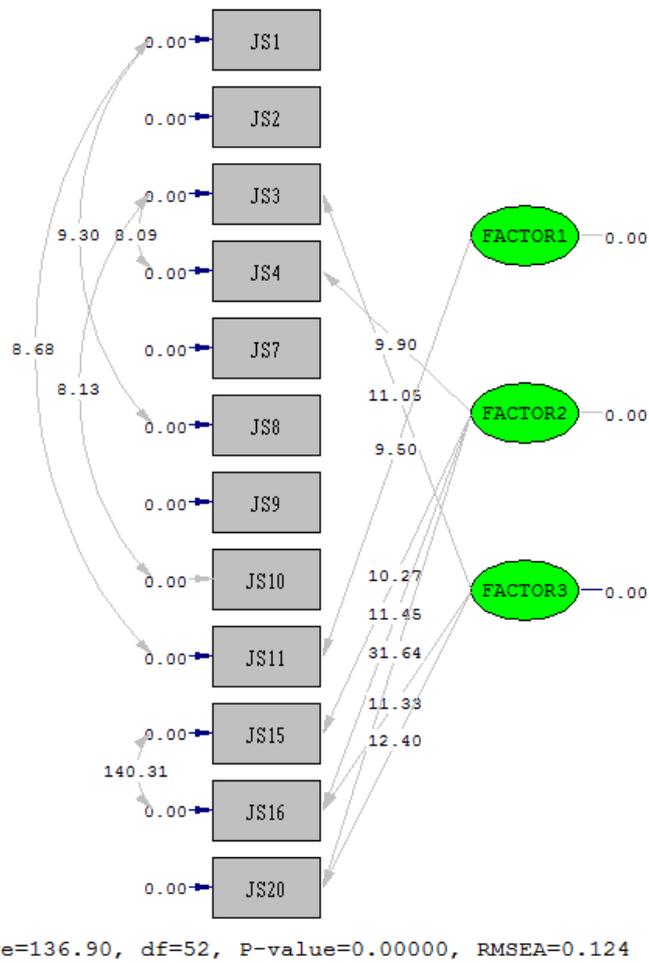
Figure 4.8. Statistically significant (p<.01) modification indices for the first-order intrinsic job satisfaction measurement model.

The completely standardised fitted bi-factor *intrinsic job satisfaction* measurement model is shown in Figure 4.9. The bi-factor model showed exact fit (RMSEA=.022; p>.05).

The unstandardised factor loading matrix is shown in Table 4.36.

Chi-Square=42.06, df=40, P-value=0.38159, RMSEA=0.022
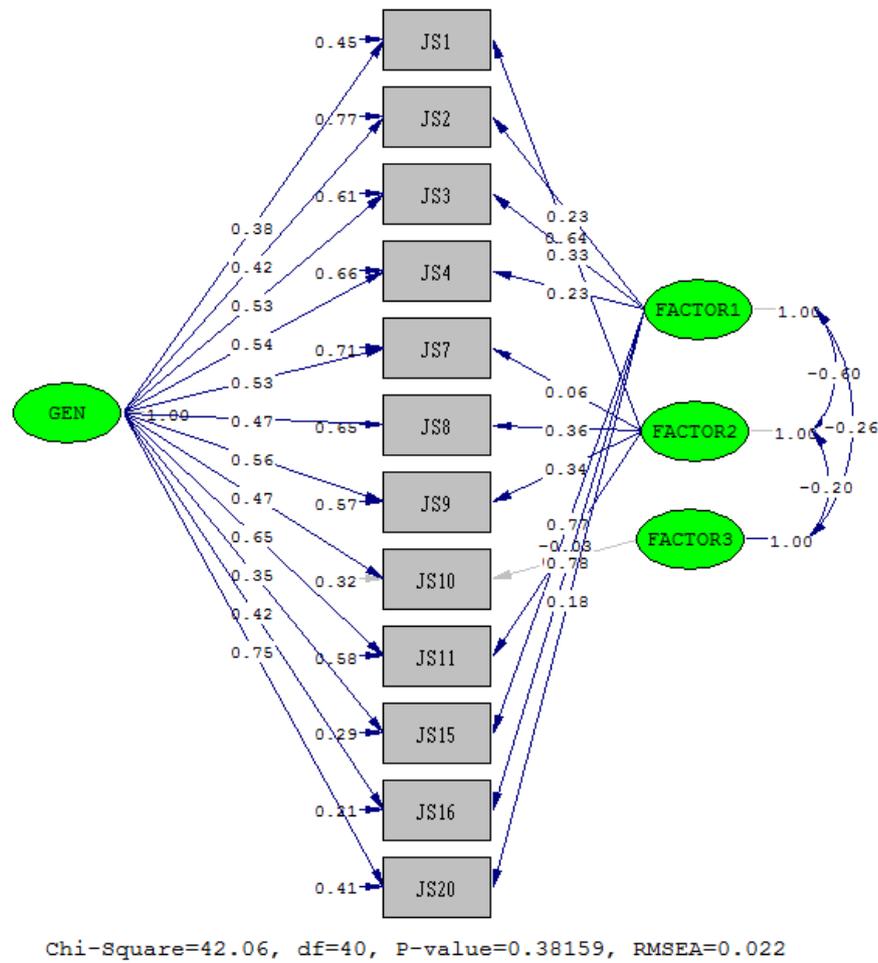
Figure 4.9. Bi-factor intrinsic job satisfaction measurement model (completely standardised solution).

Table 4.36

Unstandardised factor loading matrix for the bi-factor intrinsic job satisfaction measurement model

	FACTOR1	FACTOR2	FACTOR3	GEN
JS1	- -	.5186*	- -	.3112*
		(.1304)		(.1249)
		3.9762		2.4924
JS2	.1819*	- -	- -	.3276*
	(.0969)			(.0988)
	1.8778			3.3150
JS3	.3056*	- -	- -	.4881*
	(.1519)			(.1240)
	2.0120			3.9352
JS4	**.1984**	- -	- -	.4552*
	(.1246)			(.0935)
	1.5921			4.8666

Table 4.36

Unstandardised factor loading matrix for the bi-factor intrinsic job satisfaction measurement model (continued)

	FACTOR1	FACTOR2	FACTOR3	GEN
JS7	-	**.0499**	- -	.4434*
		(.1133)		(.0863)
		.4405		5.1368
JS8	- -	.2291*	- -	.2942*
		(.0870)		(.0744)
		2.6319		3.9531
JS9	- -	.2121*	- -	.3442*
		.1124)		(.0767)
		1.8872		4.4880
JS10	- -	- -	0.9000	.3613*
				(.0894)
				4.0412
JS11	- -	**-.0258**	- -	.5385*
		(.1879)		(.0801)
		-.1373		6.7207
JS15	.7195*	- -	- -	.3307*
	(.1137)			(.1988)
	6.3255			1.6635
JS16	.7382*	- -	- -	.3956*
	(.1257)			(.1998)
	5.8748			1.9799
JS20	**.1583**	- -	- -	.6551*
	(.1636)			(.0858)
	.9673			7.6389

* (p<.05)

Note: GEN represents the broad general *intrinsic job satisfaction factor*

All 12 *intrinsic job satisfaction* items loaded statistically significantly (p<.05) on the broad general *intrinsic job satisfaction* factor. Two items loaded statistically insignificantly (p>.05) on the narrow factor1 (JS4_int and JS20_int) and two items loaded statistically insignificantly (p>.05) on the narrow factor 2 (JS7_int and JS11_int).

The proportion of item variance that is explained in each item by the broad general *intrinsic job satisfaction* factor and the narrow, more specific *intrinsic job satisfaction* factor on which the item loaded is shown in Table 4.37. Only one item (JS2_int) failed to meet the .25 criterion. The reasonably high proportions of variance that the two factors explain in each item warrants the use of the subscale items in operationalising the multidimensional latent *intrinsic job satisfaction* dimension.

Table 4.37

Squared multiple correlations for the items of the intrinsic job satisfaction subscale

JS1	**JS2**	JS3	JS4	JS7	JS8
0.5516	**0.2293**	0.3944	0.3425	0.2875	0.3518
JS9	JS10	JS11	JS15	JS16	JS20
0.4324	0.6770	.4197	0.7108	0.7905	0.5946

Five of the 15 inter-item correlation in the *extrinsic satisfaction* inter-item correlation matrix fell below .30. This finding comments to a limited degree negatively on the success with which the design intention underpinning the *extrinsic satisfaction* subscale had been achieved. All of the 15 inter-item correlations were statistically significant ($p<.05$). The *extrinsic* subscale of the job satisfaction scale obtained a KMO estimate of .741. The Bartlett test returned a statistically significant ($p<.05$) chi square estimate which meant that the identity matrix null hypothesis could be rejected. The eigenvalue-greater-than-one indicated the extraction of two factors. The scree plot was somewhat ambiguous and could be interpreted to suggest the extraction of either 1 or 2 factors. The resultant pattern matrix is shown in Table 4.38.

The small percentage of large residual correlations (6%) indicated that the two-factor solution provided a satisfactory and credible explanation for the observed inter-item correlation matrix. The unidimensionality assumption was therefore not supported. Items JS5_ext, JS6_ext, JS19_ext and JS12_ext loaded on factor 1. Items JS14_ext and JS13_ext loaded on factor 2. All items loaded very satisfactory on their respective underlying factors (values greater than .50).

Based on the theme shared by the items that loaded on factor 1 "The way my boss handles his/her employees." (JS5_ext), "The competence of my supervisor in making decisions." (JS6_ext), "The praise I get (from my supervisor)[60] for doing a good job." (JS19_ext) and "The way company policies are put into practice (by my supervisor)." (JS12_ext), factor 1 was interpreted as a *satisfaction-with-supervision* factor. Based on the theme shared by the items that loaded on factor 2 "The chances for advancement on this job." (JS14_ext) and "The pay and the amount of work I do." (JS13_ext), factor 2 was interpreted as a *satisfaction-with-reward* factor.

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[60] Text in brackets added. The more general phrase *management* could also have been read in between the lines.

Table 4.38

Pattern matrix for the extrinsic subscale of the job satisfaction scale

Pattern Matrix[a]		
	Factor	
	1	2
JS5_ext	**.953**	-.072
JS6_ext	**.795**	-.016
JS19_ext	**.602**	-.011
JS12_ext	**.520**	.272
JS14_ext	-.048	**.908**
JS13_ext	.048	**.709**

Note: Bold factor loadings indicate the factor on which each item primarily loads

Table 4.39 indicates a modest positive correlation between the two extracted factors.

The two-factor first-order *extrinsic job satisfaction* measurement model was subsequently fitted with the items loading in accordance with their highest loading in the pattern matrix shown in Table 4.38. The first-order *extrinsic job satisfaction* measurement model obtained exact fit (RMSEA=.070; p>.05)[61] and all items loading statistically significantly on their designated factors. The second-order *extrinsic job satisfaction* measurement model was consequently fitted, via robust RDWLS estimation, with a single second-order *extrinsic job satisfaction* factor and both first-order *extrinsic job satisfaction* factors loading on the single second-order factor. The second-order *extrinsic job satisfaction* measurement model is shown in Figure 4. 10.

Table 4.39

Factor correlation matrix for the extrinsic subscale of the job satisfaction scale

Factor Correlation Matrix		
Factor	1	2
1	1.000	.452
2	.452	1.000

---

[61] It is acknowledged that the model fitted only reasonably in the sample and that the failure to reject the exact fit null hypothesis is due to the low statistical power due to the small degrees of freedom.
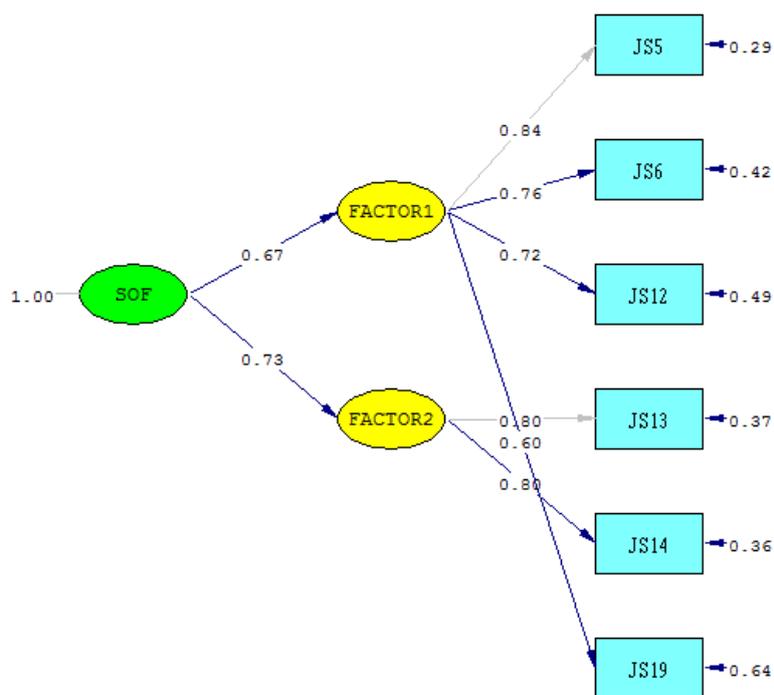
Chi-Square=12.41, df=7, P-value=0.08795, RMSEA=0.085

Figure 4.10. Second-order extrinsic job satisfaction measurement model (completely standardised solution).

The second-order *extrinsic job satisfaction* measurement model also showed exact fit (RMSEA=.085; p>.05)[62]. The indirect effect of the second-order factor on the individual *extrinsic job satisfaction* subscale items were nonetheless calculated by translating the SIMPLIS syntax that was used to fit the second-order measurement model to LISREL syntax and using the AP and CO commands to calculate the indirect effect (PA$_i$)[63] of the second-order *extrinsic job satisfaction* factor on the *extrinsic job satisfaction* subscale items, and to evaluate the statistical significance of the indirect effects. The unstandardised indirect effects are shown in Table 4.40.

---

[62] It is acknowledged that the model mediocre fit in the sample and that the failure to reject the exact fit null hypothesis is due to the low statistical power due t the small degrees of freedom.

[63] CO PAR1 = LY(1,1)*GA(1,1)
 CO PAR2 = LY(2,1)*GA(1,1)
 CO PAR3 = LY(3,1)*GA(1,1)
 CO PAR4 = LY(6,1)*GA(1,1)
 CO PAR5 = LY(4,2)*GA(2,1)
 CO PAR6 = LY(5,2)*GA(2,1)

Table 4.40

Indirect effects of the second-order extrinsic job satisfaction factor on the extrinsic job satisfaction subscale items

PA(1)	PA(2)	PA(3)	PA(4)	PA(5)	PA(6)
.53*	.53*	.41*	.38*	.64*	.59*
(.10)	(.10)	(.10)	(.10)	(.10)	(.10)
5.41	5.50	4.24	3.88	6.60	6.07

Note: PA(i) represents the ith indirect effect. Footnote 55 explicates the nature of the ith indirect effect.
* (p<.05)

Table 4.40 shows that all six indirect effects were statistically significant (p<.05). This means that all *extrinsic job satisfaction* items statistically significantly (p<.05) reflect test-takers standing on the second-order *extrinsic job satisfaction* factor.

4.5.3.1 Confirmatory Factor Analysis of the Job satisfaction Scale

Given that the *job satisfaction* scale used in this study was hypothesised to already present a bi-factor model type structure, it was decided to fit a bi-factor model from the onset. More specifically, since the scale is hypothesised to have two underlying subfactors with unique items comprising each subscale (intrinsic and extrinsic satisfaction) as well as an overall satisfaction scale where all items in the scale (including JS17 and JS18) load onto an overall measure of job satisfaction, it was decided to rather fit a bi-factor model implied by the scoring key of the scale then a first order measurement model. The multivariate normality assumption was not met, even after an attempt was made to normalise the data using PRELIS. Normalising the data did however result in a substantial decrease in the chi-square statistic from 209.295 to 89.482.

The original bi-factor model showed poor fit (RMSEA=.0924; p<.05). A modified bi-factor model that reflected the factor loadings prescribed in Tables 4.32 and 4.34 was then fitted but failed to converge due to inadmissible theta-delta values. Removing the two items that only loaded on the general *job satisfaction* factor (i.e., JS17 and JS18) didn't solve the problem. Specifying the factor loading ($\lambda_{14,5}$) and the error variance ($\theta_{\delta14,14}$) for the problematic item JS14_ext created an inadmissible error variance estimate for $\theta_{\delta10,10}$. The method of estimation was then changed to RDWLS and the model successfully converged. The completely standardised fitted bi-factor measurement model is shown in Figure 4.11 below.
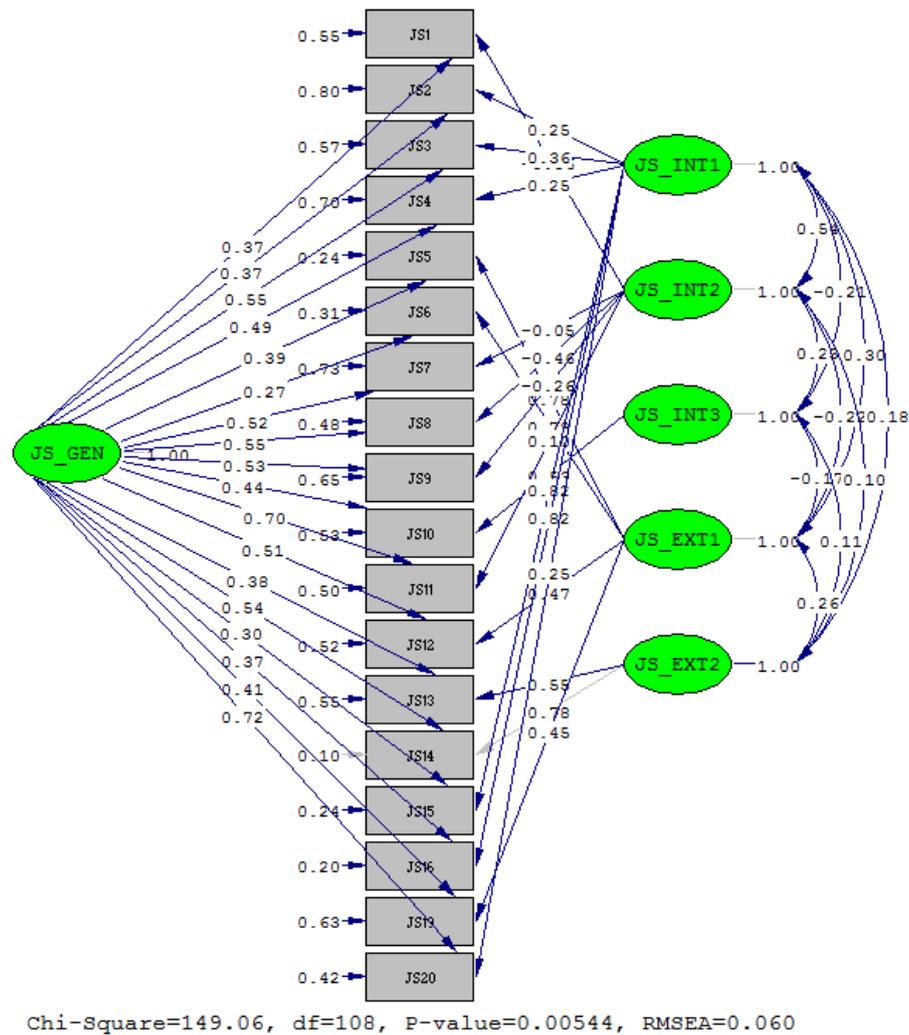
Figure 4.11. Bi-factor job satisfaction measurement model (completely standardised solution).

The final fitted *job satisfaction* bi-factor measurement model showed close fit (RMSEA=.06; p>.05). Table 4.41 shows that all the *extrinsic* subscale items, but for JS13, loaded statistically significantly (p<.05) onto their designated narrow, more specific group-factors. Six of the twelve *intrinsic* subscale items (JS3, JS4, JS7, JS9, JS11 and JS20) loaded statistically insignificantly (p>.05) on their respective more specific group-factors. Nevertheless, all the items that made up both the intrinsic and extrinsic dimensions of the job satisfaction scale that loaded statistically insignificantly (p>.05) on their designated narrow factor, statistically significantly (p<.05) loaded on the broad, general job satisfaction factor. Three items (JS1, JS15 and JS16) loaded statistically insignificantly (p>.05) on the broad, general factor. These three items did, however, load statistically significantly (p<.05) on their designated narrow, more specific factor. The proportion of variance that was explained in each item is shown in Table 4.42.

Table 4.41

Unstandardised lambda-X matrix for the bi-factor job satisfaction scale[64]

	JS_INT1	JS_INT2	JS_INT3	JS_EXT1	JS_EXT2	JS_GEN
JS1	- -	-.4534*	- -	- -	- -	**.3049**
		(.1409)				**(.2139)**
		-3.2183				**1.4253**
JS2	.1970*	- -	- -	- -	- -	.2885*
	(.1191)					(.1346)
	1.6545					2.1437
JS3	**.3268**	- -	- -	- -	- -	.5010*
	(.2706)					(.1821)
	1.2079					2.7511
JS4	**.2101**	- -	- -	- -	- -	.4163*
	(.2133)					(.1390)
	.9850					2.9944
JS5	- -	- -	- -	.7221*	- -	.3623*
				(.0971)		(.1352)
				7.4343		2.6791
JS6	- -	- -	- -	.8212*	- -	.2777*
				(.1119)		(.1544)
				7.3407		1.7987
JS7	- -	**-.0415**	- -	- -	- -	.4327*
		(.1997)				(.0974)
		-.2078				4.4429
JS8	- -	-.2899*	- -	- -	- -	.3465*
		(.1750)				(.1389)
		-1.6570				2.4943
JS9	- -	**-.1595**	- -	- -	- -	.3261*
		(.1545)				(.0932)
		-1.0324				3.4993
JS10	- -	- -	.4071*	- -	- -	.3347*
			(.1347)			(.0862)
			3.0226			3.8826
JS11	- -	**.0807**	- -	- -	- -	.5830*
		(.3494)				(.0930)
		.2309				6.2662

---

[64] The statistical significance of the factor loadings were evaluated by testing the null hypotheses via one-tailed tests against positive directional alternative hypotheses. In the case of the two statistically significant (p<.05) negative factor loadings of JS1 and JS8 on JS_INT2 the null hypotheses could nonetheless not be rejected.

Table 4.41

Unstandardised lambda-X matrix for the bi-factor job satisfaction scale (continued)

	JS_INT1	JS_INT2	JS_INT3	JS_EXT1	JS_EXT2	JS_GEN
JS12	- -	- -	- -	.4019*	- -	.4337*
				(.0958)		(.0975)
				4.1976		4.4479
JS13	- -	- -	- -	- -	**.6953**	.4198*
					(.7750)	(.1617)
					.8971	2.5967
JS14	- -	- -	- -	- -	.9000	.5425*
						(.1379)
						3.9334
JS15	.7687*	- -	- -	- -	- -	**.2828**
	(.1237)					**(.2569)**
	6.2161					**1.1007**
JS16	.7693*	- -	- -	- -	- -	**.3458**
	(.1541)					**(.2702)**
	4.9937					**1.2795**
JS19	- -	- -	- -	.4247*	- -	.3804*
				(.0839)		(.1017)
				5.0599		3.7395
JS20	**.2153**	- -	- -	- -	- -	.6316*
	(.2048)					(.1180)
	1.0516					5.3545

* ($p < .05$)

Note: JS_INT_i represents the three intrinsic satisfaction factors identified via the earlier dimensionality analysis, JS_EXT_i represents the two extrinsic satisfaction factors and JS_GEN represents the broad general satisfaction factor

In the case of the items that comprise the *intrinsic* and *extrinsic* dimensions of the *job satisfaction* scale, Table 4.42 shows that in the case of seventeen of the eighteen items 25% or more of the item variance could be explained by the general overall factor and the more specific group factor they were designated to reflect. All items were nevertheless retained.

Table 4.42

Job satisfaction item squared multiple correlations

JS1	JS2	JS3	JS4	JS5	JS6
.4501	.1994	.4255	.3021	.7558	.6893
JS7	JS8	JS9	JS10	JS11	JS12
.2728	.5165	.3486	.4722	.5002	.4804
JS13	JS14	JS15	JS16	JS19	JS20
.4502	.9009	.7605	.8017	.3719	.5829

4.5.4   Dimensionality Analysis of the Organisational Commitment Scale

The *organisational commitment* latent variable in this study is conceptualised as a unidimensional construct that measures the affective commitment latent dimension of the overall construct developed by Meyer and Allen (1991).

Only 1 of the 28 *organisational commitment* inter-item correlations fell below .30. All the inter-item correlations were statistically significant (p<.05). The *organisational commitment* scale returned a KMO estimate of .797. The Bartlett's test of sphericity returned a statistically significant chi-square statistic (p<.05) which allowed the identity matrix null hypothesis to be rejected. This suggested that the correlation matrix was factor analysable. The eigenvalue-greater-than-unity rule indicated the extraction of two factors. The position of the elbow in the scree plot was somewhat ambiguous and suggested the extraction of either 1, 2 or 4 factors. The pattern matrix is provided in Table 4.43.

Table 4.43

Pattern matrix for the organisational commitment scale

Pattern Matrix[a]		
	Factor	
	1	2
OC6_R	**.999**	-.121
OC5_R	**.888**	-.019
OC8_R	**.558**	.350
OC4_R	**.322**	.192
OC2	-.144	**.930**
OC1	.070	**.758**
OC7	.379	**.584**
OC3	.242	**.329**

All the negative items loaded onto factor one and all the positive items loaded onto the other. Factor 1 was therefore interpreted as a negatively keyed factor and factor 2 as a positively keyed factor. The reasonably small percentage of large residual correlations (28%) indicated that the two-factor solution provided an acceptably credible explanation for the observed inter-item correlation matrix. Table 4.44 indicates a modest positive correlation between the two extracted factors.

Table 4.44

Factor correlation matrix for the organisational commitment scale

Factor Correlation Matrix		
Factor	1	2
1	1.000	.560
2	.560	1.000

Based on the assumption that the items of the *organisational commitment* scale reflected (affective) *organisational commitment* as well as the (positive or negative) key in which the item was formulated, a bi-factor measurement model was fitted in which all items loaded on a general (affective) commitment factor, the negatively keyed items loaded on a negatively keyed factor and the positively keyed items loaded on a positively keyed factor. This model, however, fitted poorly (RMSEA=.107; p<.05) and returned an inadmissible solution ($\theta_{\delta ii}$ for OC2 and OC4_R were negative).

Given the borderline percentage of large residual correlations (28%), the EFA was repeated with the request to extract 3 factors and to obliquely rotate the solution to a simple structure. The 3-factor pattern matrix is shown in Table 4. 45. The 3-factor structure provided a highly valid and credible explanation for the observed inter-item correlation matrix with only 35 of the residual correlations exceeding .05. The 3 factors correlated moderately positively with each other (r_{12}=.509, r_{13}=.460 and r_{23}=.377).

Table 4.45

Three-factor pattern matrix for the organisational commitment scale

	Pattern Matrix[a]		
	Factor		
	1	2	3
OC5_R	**.930**	-.024	-.021
OC6_R	**.894**	-.110	.127
OC8_R	**.652**	.368	-.101
OC2	-.100	**.937**	-.006
OC1	.106	**.707**	.059
OC7	.324	**.507**	.214
OC4_R	-.021	-.044	**.899**
OC3	.087	.234	**.377**

Based on the theme shared by the items that loaded on factor 1 "I do not feel like 'part of the family' at my organisation." (OC5_R), "I do not feel 'emotionally attached' to this organisation." (OC6_R), and "I do not feel a strong sense of belonging to my organisation." (OC8_R), factor 1 was interpreted as a *lack-of-affective attachment* factor. Based on the theme shared by the items that loaded on factor 2 "I enjoy discussing my organisation with people outside it." (OC2), and "I would be very happy to spend the rest of my career with this organisation." (OC1), factor 2 was interpreted as a *positive-organisational-emotions* factor. Based on the theme shared by the items that loaded on factor 3 "I think that I could easily become as attached to another organisation as I am to this one." (OC4_R), and "I really feel as if this organisation's problems are my own." (OC3), factor 2 was interpreted as an *attachment-ambivalence* factor.

The first-order measurement model reflecting the loading pattern shown in Table 4.45 fitted poorly (RMSEA=.146; p<.05). The modification indices calculated for the 3-factor *organisational commitment*

measurement model indicated numerous statistically significant (p<.01) modification index values for the off-diagonal of Θ_δ. This in turn suggested that a broad, general (affective) *organisational commitment* factor explained variance in the scale items that the measurement model failed to model.

Chi-Square=55.26, df=17, P-value=0.00001, RMSEA=0.146
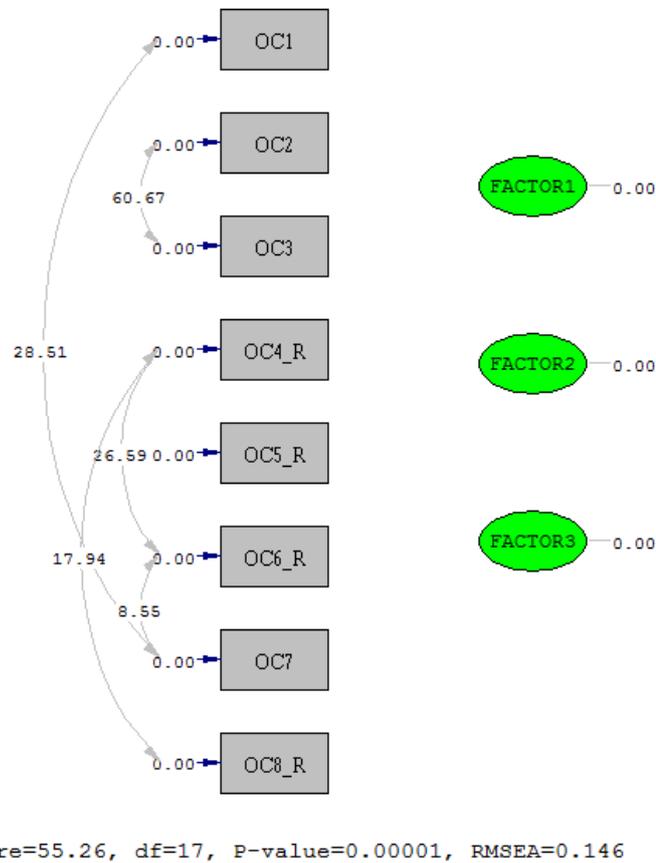
Figure 4.12. Modification indices calculated for the 3-factor organisational commitment measurement model.

A bi-factor model (Reise, 2012) was consequently fitted that made provision for such a broad, general (affective) *organisational commitment* factor in addition to the three narrow, more specific factors. Somewhat surprisingly the bifactor model still fitted poorly (RMSEA=.130; p<.05) and returned an inadmissible solution with negative measurement error variances for item OC2 and item OC3. Inspection of the modification indices calculated for the bi-factor model (see Figure 4.13) suggested that the model still lacked a source of systematic variance that specifically affected the negatively keyed items.

A negatively keyed factor was consequently added to the bi-factor model[65]. The resultant model showed exact fit (RMSEA=.045; p>.05) but the solution was inadmissible due to negative error variances associated with OC2, OC6_ and OC8_R.

Chi-Square=25.04, df=9, P-value=0.00293, RMSEA=0.130
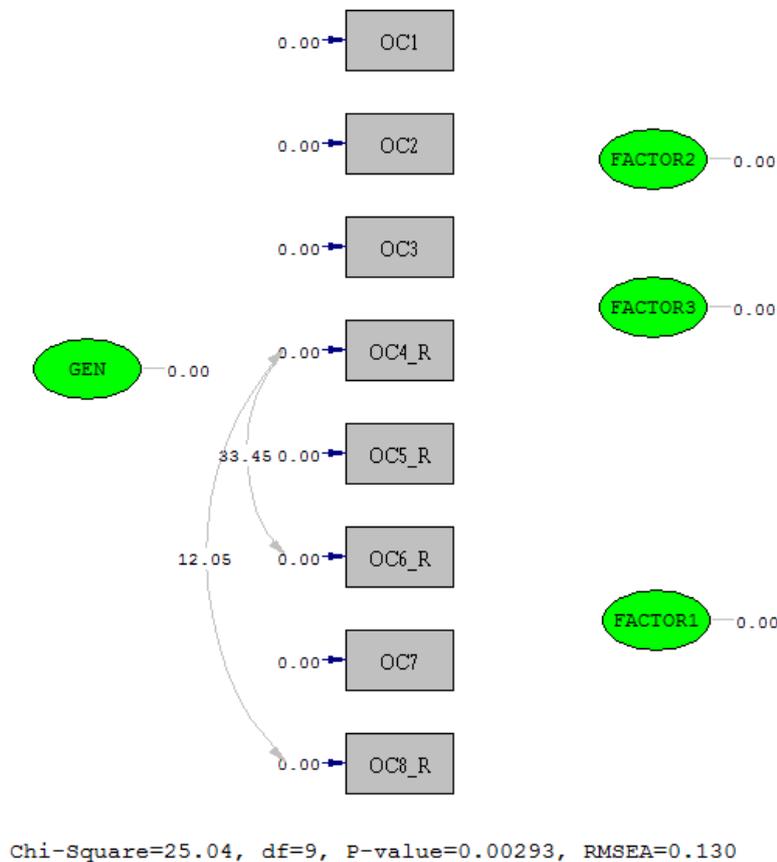
Figure 4.13. Modification indices calculated for the bi-factor 3-factor organisational commitment measurement model.

The factor loading of OC2 on the general factor, the factor loading of OC6_R on factor1 and the loading of OC8_R on the negatively keyed factor were subsequently fixed to .90 and the error variances of OC2, OC6_R and OC8_R were fixed to .10. The *organisational commitment* measurement model now converged with an admissible solution. The fitted bi-factor 4-factor *organisational commitment* measurement model is shown in Figure 4.14. The model showed exact fit (RMSEA=0; p>.05).

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[65] The broad, general *organisational commitment* factor were modelled to be independent of the three narrow, more specific factors and of the negatively keyed factor. The latter was, however, allowed to correlate with the narrow factors.
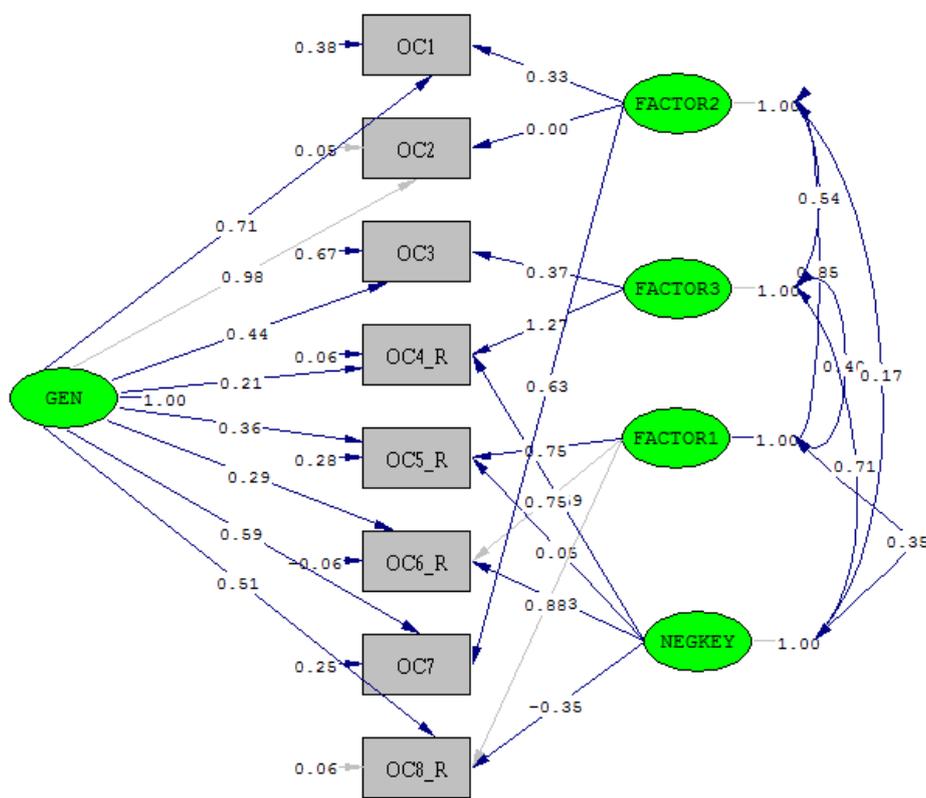
Chi-Square=4.51, df=5, P-value=0.47921, RMSEA=0.000

Figure 4.14. The bi-factor 4-factor organisational commitment measurement model (completely standardised solution).

The unstandardised factor loading matrix for the bi-factor 4-factor *organisational commitment* measurement model is shown in Table 4.46. Table 4.46 shows that the items OC1, OC5 and OC6_R, each loaded statistically significantly (p<.05) on one of the factors they were tasked to reflect. OC4_R and OC8_R loaded statistically significantly (p<.05) on two of the three factors they were tasked to reflect. and OC3 and OC7 loaded statistically significantly (p<.05) on both the factors that they were earmarked to reflect.

The model shown in Figure 4.14 provides a valid (i.e. permissible and plausible) description of the process that created the observed inter-item covariance matrix. Nonetheless, the complex nature of the model and the probing, exploratory nature of the process that eventually led to the model erodes confidence in the scale. The design intention to develop a unidimensional scale clearly did not succeed. All the factors, however, make conceptual sense. Moreover, as indicated in Table 4.47, substantial proportions of the variance in the items could be explained in terms of the factors each item was tasked to reflect. OC3 is the only exception with a rather modest approximately 34% of its variance explained by the model. All the items were therefore retained to calculate the composite indicators for the *organisational commitment* latent variable.

Table 4.46

Unstandardised lambda-X matrix for the bi-factor 4-factor organisational commitment measurement model

	FACTOR1	FACTOR2	FACTOR3	GEN	NEGKEY
OC1	- -	**.6178**	- -	.8592*	- -
		(.3856)		(.1414)	
		1.6022		6.0777	
OC2	- -	**.0047**	- -	.9000	- -
		(.4226)			
		.0112			
OC3	- -	- -	.6643*	.4971*	- -
			(.1978)	(.1147)	
			3.3583	4.3355	
OC4_R	- -	- -	1.9749*	**.1971**	-1.0014*
			(.2081)	**(.1946)**	(.1933)
			9.4888	**1.0128**	-5.1817
OC5_R	.8539*	- -	- -	**.3332**	**.0962**
	(.1045)			**(.2278)**	**(.1783)**
	8.1697			**1.4627**	**.5394**
OC6_R	.9000	- -	- -	**.2946**	.5766*
				(.2690)	(.1843)
				1.0952	3.1280
OC7	- -	.9113*	- -	.5485*	- -
		(.2248)		(.1987)	
		4.0539		2.7603	
OC8_R	.9000	- -	- -	.4443*	-.4553*
				(.2002)	(.1888)
				2.2191	-2.4120

* (p<.05)

Note: GEN represents the broad general organisational commitment factor and NEGKEY represents the negatively keyed factor. Bold values indicate statistically insignificant factor loadings (p > .05)

Table 4.47

Organisational commitment item squared multiple correlations

OC1	OC2	OC3	OC4_R	OC5_R	OC6_R	OC7	OC8_R
.6178	.9511	.3381	.9375	.7299	.9594	.7466	.9436

4.5.5   Dimensionality Analysis of the Intention to Quit Scale

The *intention to quit* latent variable was conceptualised as a unidimensional construct.

All the inter-item correlations for the *intention to quit* scale exceeded .30. All the inter-item correlations were statistically significant ($p<.05$). The *intention to quit* scale obtained a satisfactory KMO of .787 and the Bartlett's Test of Sphericity returned a statistically significant chi-square statistic ($p<.05$). This meant that the identity matrix null hypothesis could be rejected, thus presenting strong evidence that the correlation matrix was factor analysable. Both the eigenvalue-greater-than-one rule and the scree plot indicated the extraction of a single factor. The extracted factor matrix for this variables' scale is shown in Table 4.48 below.

Table 4.48

Extracted factor matrix for the intention to quit scale

Factor Matrix[a]	
	Factor
	1
IQ3	.936
IQ2	.820
IQ4	.782
IQ1	.776

All of the items loaded very satisfactorily on the single underlying factor ($>.50$). The high percentage of large residual correlations (50%) however indicated that the two-factor solution failed to provide a credible explanation for the observed inter-item correlation matrix. The extraction of two factors was subsequently forced and the analysis run again. The resultant obliquely rotated two-factor solution is shown in Table 4.49

Table 4.49

Pattern matrix for the intention to quit scale with two factors forced

Pattern Matrix[a]		
	Factor	
	1	2
IQ1	**.918**	.054
IQ2	**.640**	-.224
IQ4	-.045	**-.915**
IQ3	.306	**-.674**

Items IQ1 and IQ2 loaded onto factor one, and items IQ3 and IQ4 loaded onto factor 2. The factor correlation matrix in Table 4.50 indicates a reasonably high negative correlation between the two

extracted factors. Based on the theme shared by the items that loaded on factor 1 "Wanting to leave this organisation." (IQ1) and "Searching for another position." (IQ2), factor 1 was interpreted as a *distal-intention-to-quit* factor. Based on the theme shared by the items that loaded on factor 2 "Actually leaving this organisation within the next year." (IQ4) and "Planning to leave this organisation." (IQ3), factor 1 was interpreted as a *proximal-intention-to-quit* factor.

Table 4.50

Extracted factor correlation matrix for the intention to quit scale with two factors forced

Factor Correlation Matrix		
Factor	1	2
1	1.000	-.767
2	-.767	1.000

The absence (0%) of large residual correlations indicated that the two-factor structure provided a more plausible and satisfactory explanation for the observed correlation matrix. The *intention to quit* scale was too short to permit the fitting of a second-order measurement model or a bi-factor model. Both models would have been under-identified with negative degrees of freedom.

4.5.6 Dimensionality Analysis of the OCB Scale

As previously mentioned, Lee and Allen (2002) reported that a two-factor model was favoured over a one-factor model for the *OCB* scale used in this study. This would suggest an empirical distinction between *OCBI* and *OCBO* subscales. EFA was subsequently performed separately on each subscale.

Eleven of the twenty-eight *OCBI sub*scale inter-item correlations fell below .30. One of the twenty-eight inter-item correlations were statistically insignificant (p>.05). These findings commented negatively on the extent to which the design intention underpinning the *OCBI sub*scale succeeded. The *OCBI sub*scale obtained a satisfactory KMO of .8. The statistically significant Bartlett's test of sphericity allowed for the rejection of the identify matrix H_0 (p<.05), indicating that the correlation matrix was factor analysable. The eigenvalue-greater-than-one rule indicated that two factors should be extracted, whereas the inflection point in the scree plot suggested the extraction of a single factor. The pattern matrix for the *OCBI* subscale is provided in Table 4.51.

Table 4.51

Pattern matrix for the OCBI subscale

Pattern Matrix[a]		
	Factor	
	1	2
OCBI5	**.750**	-.109
OCBI2	**.702**	.062
OCBI4	**.637**	-.091
OCBI7	**.519**	.139
OCBI3	**.476**	.344
OCBI1	**.389**	.086
OCBI8	-.064	**.774**
OCBI6	.195	**.575**

The two-factor solution failed to provide a satisfactory explanation for the observed inter-item correlation matrix, as 32% of the non-redundant residual correlations obtained being greater than .05. Even though the percentage was only marginally above the 30% cut-off it was decided to force extract a third factor and perform the analysis again. The resultant obliquely rotated three-factor solution is shown in Table 4.52.

Table 4.52

Pattern matrix for the OCBI subscale with three factors forced

Pattern Matrix[a]			
	Factor		
	1	2	3
OCBI2	**.847**	.000	.005
OCBI4	**.506**	-.087	-.181
OCBI1	**.481**	.076	.059
OCBI8	.031	**.746**	.087
OCBI6	.026	**.597**	-.180
OCBI3	.227	**.383**	-.263
OCBI5	.099	-.079	**-.775**
OCBI7	.006	.220	**-.536**

Three of the items loaded factor 1, three onto factor two and the remaining two factors onto the third factor. The reasonably small percentage of large residual correlations (21%) suggested that the three-factor solution now provided a more plausible and credible explanation for the observed correlation matrix than the original pattern matrix shown in Table 4.51. Factors 1 and 2 were positively correlated, whereas factor 3 correlated negatively with the other two factors. (see Table 4.53).

Table 4.53

Extracted factor correlation matrix for OCBI subscale three factors forced

Factor Correlation Matrix			
Factor	1	2	3
1	1.000	.489	-.634
2	.489	1.000	-.361
3	-.634	-.361	1.000

Based on the theme shared by the items that loaded on factor 1 "Willingly give your time to help others who have work-related problems." (OCBI2), "Go out of the way to make newer employees feel welcome in the work group." (OCBI4) and "Help others who have been absent." (OCBI1), factor 1 was interpreted as a *help-with-difficulties* factor. Based on the theme shared by the items that loaded on factor 2 "Share personal property with others to help their work." (OCBI8) "Give up time to help others who have work or non-work problems." (OCBI6) and "Adjust your work schedule to accommodate other employees' requests for time off." (OCBI3), factor 2 was interpreted as a *willingness-to-sacrifice* factor. Based on the theme shared by the items that loaded on factor 3 "Show genuine concern and courtesy toward co-workers, even under the most trying business or personal situations." (OCBI5) and "Assist others with their duties." (OCBI7), "factor 3 was interpreted as a *concern and courtesy* factor.

The first-order three-factor *OCBI* measurement model was subsequently fitted. The model fitted closely (RMSEA=.073; p>.05). The second-order *OCBI* measurement model was consequently fitted in which each of the three *OCBI* first-order factors loaded on a single *OCBI* second-order factor. The second-order *OCBI* measurement model, shown in Figure 4.15, also showed close fit (RMSEA=.073; p>.05).
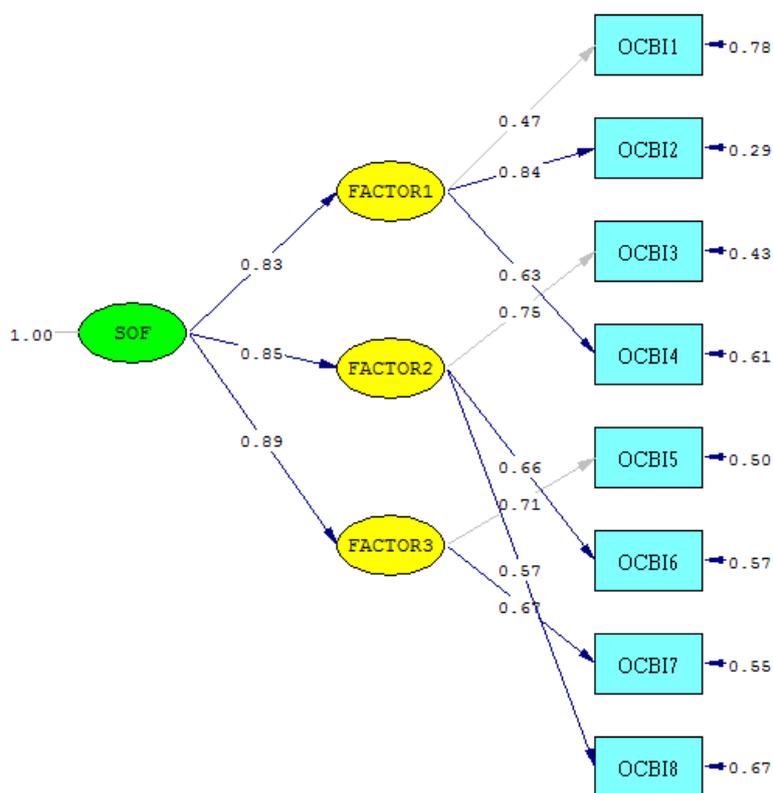
Chi-Square=26.48, df=17, P-value=0.06618, RMSEA=0.073

Figure 4.15. Second-order OCBI measurement model (completely standardised solution).

This allowed the calculation of the indirect effect[66] of the second-order *OCBI* factor on the items of the *OCBI* subscale items. The resultant indirect effects and their statistical significance are shown in Table 4.54.

Table 4.54

Indirect effect of the second-order OCBI factor on the items of the OCBI subscale items

PA(1)	PA(2)	PA(3)	PA(4)	PA(5)	PA(6)	PA(7)	PA(8)
.28	.54	.42	.61	.46	.44	.40	.48
(.07)	(.08)	(.11)	(.10)	(.08)	(.11)	(.07)	(.08)
4.06	6.92	3.74	6.33	5.52	4.10	6.08	5.65

Note: PA(i) represents the ith indirect effect. Footnote 67 explicates the nature of the ith indirect effect.
* (p<.05)

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[66] CO PAR1 = LY(1,1)*GA(1,1)
CO PAR2 = LY(2,1)*GA(1,1)
CO PAR3 = LY(4,1)*GA(1,1)
CO PAR4 = LY(3,2)*GA(2,1)
CO PAR5 = LY(6,2)*GA(2,1)
CO PAR6 = LY(8,2)*GA(2,1)
CO PAR7 = LY(5,3)*GA(3,1)
CO PAR8 = LY(7,3)*GA(3,1)

Table 4.54 shows that the second-order *OCBI* factor statistically significantly indirectly, via the three first-order factors, affected all the items of the *OCBI* subscale. These items, therefore, all may be legitimately used as indicators of the second-order *OCBI* factor.

All the inter-item correlations of the *OCBO* subscale exceeded .30. All the inter-item correlations were statistically significant. The *OCBO* subscale returned a KMO of .869. The identity matrix null hypothesis was rejected since the Bartlett's Test of Sphericity returned a statistically significant chi-square statistic (p<.05). This presented strong evidence that the correlation matrix was factor analysable. The eigenvalue-greater-than-one rule and the scree plot indicated the extraction of a single factor.

Table 4.55

Extracted factor matrix for the OCBO subscale

Factor Matrix[a]	
	Factor
	1
OCBO3	.834
OCBO7	.825
OCBO6	.768
OCBO8	.733
OCBO4	.702
OCBO1	.681
OCBO2	.618
OCBO5	.618

All of the items loaded very satisfactorily (>.61) on the single underlying factor (Table 4.55). That being said, the fact that 46% of the residual correlations returned as greater than .05 suggested that the one-factor solution failed to provide a credible vindication for the observed inter-item correlation. The extraction of two factors was subsequently forced and the analysis performed again. Table 4.56 displays the resultant obliquely rotated two-factor solution.

Table 4.56

Pattern matrix for the OCBO subscale with two factors forced

	Pattern Matrix[a]	
	Factor	
	1	2
OCBO6	**.911**	-.144
OCBO3	**.815**	.047
OCBO8	**.778**	-.035
OCBO4	**.713**	.005
OCBO7	**.656**	.235
OCBO1	**.528**	.214
OCBO2	-.045	**.995**
OCBO5	.269	**.489**

Table 4.56 shows that two items (OCB02 and OCBO5) loaded onto factor two. All other factors loaded onto the first factor. Now only 21% of the residual correlations returned absolute values greater than .05 indicating that the two-factor structure provided a more plausible explanation for the observed correlation matrix. Moreover, the two factors presented with a reasonably high positive correlation Table 4.57.

Table 4.57

Extracted factor correlation matrix for the OCBO subscale with two factors forced

Factor Correlation Matrix		
Factor	1	2
1	1.000	.570
2	.570	1.000

Based on the theme shared by the items that loaded on factor 1 "Express loyalty toward the organisation." (OCBO6), "Defend the organisation when other employees criticise it." (OCBO3), "Demonstrate concern about the image of the organisation." (OCBO8), "Show pride when representing the organisation in public." (OCBO4), "Take action to protect the organisation from potential problems." (OCBO7) and "Attend functions that are not required but that help the organisational image." (OCBO1), factor 1 was interpreted as a *taking-psychological ownership-of-the-organisation* factor. Based on the theme shared by the items that loaded on factor 2 "Keep up with developments in the organisation." (OCBO2) and "Offer ideas to improve the functioning of the organisation." (OCBO5), factor 2 was interpreted as a *contributing-towards-organisational-improvement* factor.

The first-order *OCBO* measurement model was subsequently fitted. The measurement model, however, showed poor fit (RMSEA=.120; p<.05). The second-order *OCBO* measurement model was consequently not fitted. Rather a bi-factor model was fitted based on the hypothesis that the current

model ignored a broad, general source of systematic variance that affected all the subscale items in addition to the two narrow, more specific factors. The hypothesis was rooted in the fact that 6 (out of 15) modification index values calculated for the off-diagonal of Θ_δ were statistically significant $(p<.05)$[67]. Nonetheless the model still fitted poorly (RMSEA=.128) and returned an inadmissible solution due to a negative error variance estimate for OCBO2.

These results seem to place a question mark behind the 2-factor solution and the initial decision to accept the 21% large residual correlations as indicative of a valid explanation of the observed inter-item correlation matrix. The EFA on the *OCBO* subscale was consequently reran with the request to extract three factors. The resultant pattern matrix is shown in Table 4.58.

Table 4.58

Pattern matrix for the OCBO subscale with the extraction of three factors requested

	Pattern Matrix[a]		
	Factor		
	1	2	3
OCBO4	**.881**	.046	.079
OCBO6	**.586**	-.085	-.364
OCBO1	**.458**	.261	-.092
OCBO2	-.004	**.981**	.032
OCBO5	.124	**.499**	-.163
OCBO7	-.087	.228	**-.836**
OCBO8	.097	-.065	**-.789**
OCBO3	**.420**	.093	**-.429**

The 3-factor solution offered a substantially more valid and credible solution than the previous 2-factor solution with only 3% of the residual correlations exceeding .05. Based on the theme shared by the items that loaded on factor 1 "Show pride when representing the organisation in public." (OCBO4), "Express loyalty toward the organisation." (OCBO6) and "Attend functions that are not required but that help the organisational image." (OCBO1), factor 1 was interpreted as a *proudly-flying-the-organisational-flag* factor. Based on the theme shared by the items that loaded on factor 2 "Keep up with developments in the organisation." (OCBO2) and "Offer ideas to improve the functioning of the organisation." (OCBO5), factor 2 was interpreted as a *contributing-towards-organisational-improvement* factor. "Take action to protect the organisation from potential problems." (OCBO7)

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[67] LISREL 8.5 by default shows the modification index values that are statistically significant on a 1% significance level on the path diagram. The danger of purely relying on the path diagram to indicate whether a bi-factor model should be considered is that it could leave the researcher unaware of potentially numerous Θ_δ modification index values significant on a 5% level. In the current instance there where only two Θ_δ modification index values significant on a 1% level. Inspection of the actual Θ_δ modification index matrix avoids this danger.

"Demonstrate concern about the image of the organisation." (OCBO8), and "Defend the organisation when other employees criticise it." (OCBO3), factor 3 was interpreted as a *protecting-the-organisation* factor. The factor fission of the *taking psychological ownership of the organisation* factor (factor 1 in the original 2-factor structure) into a *proudly-flying-the-organisational-flag* factor and a *protecting-the-organisation* factor was regarded as conceptually meaningful.

The 3-factor first-order measurement model was subsequently fitted. The model fitted poorly (RMSEA=.104; p<.05). The modification indices calculated for the off-diagonal of Θ_δ (see Table 4.59) revealed 6 (out of 28) statistically significant (p<.05) values that, if freed, would significantly (p<.05) improve the fit of the model. this suggested that the current measurement model failed to acknowledge a source of systematic variance that affects the subscale items in addition to the 3 narrow, more specific factors.

Table 4.59

Theta-delta modification index matrix calculated for the 3-factor first-order OCBO measurement model

	OCBO1	OCBO2	OCBO3	OCBO4	OCBO5	OCBO6	OCBO7	OCBO8
OCBO1	- -							
OCBO2	**6.8209**	- -						
OCBO3	2.0545	.0742	- -					
OCBO4	1.1664	.2634	1.4532	- -				
OCBO5	.4897	- -	.0316	.0164	- -			
OCBO6	**21.5280**	**7.9125**	.0002	**5.6310**	1.2802	- -		
OCBO7	.0028	**4.9181**	.4769	3.0112	.0878	.0904	- -	
OCBO8	.5446	**3.8501**	.9877	.0084	.6018	2.7684	- -	- -

A broad, general factor that affects each of the items of the *OCBO* subscale was consequently added to the first-order measurement model. The *OCBO* bi-factor model showed exact fit (RMSEA=.045; p>.05). The fitted bi-factor, 3 factor *OCBO* measurement model is shown in Figure 4.16.

The unstandardised factor loading matrix is shown in Table 4.60. All the items load statistically significantly (p<.05) [68] on the broad, general *OCBO* factor. The loadings of all the items that were earmarked to reflect the two narrow factors, factor 2 and factor 3 were also statistically significant (p<.05)[69]. Of the 4 items tasked to reflect factor 1, only OCBO1 loaded statistically significantly on the first narrow, more specific, *OCBO* factor.

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[68] The statistical significance of the loadings of the items on the broad, general factor was evaluated by testing the null hypothesis against a non-directional alternative hypothesis via a two-tailed test.

[69] The statistical significance of the loadings of the items on the narrow, more specific, factors was evaluated by testing the null hypothesis against a directional alternative hypothesis via a one-tailed test.
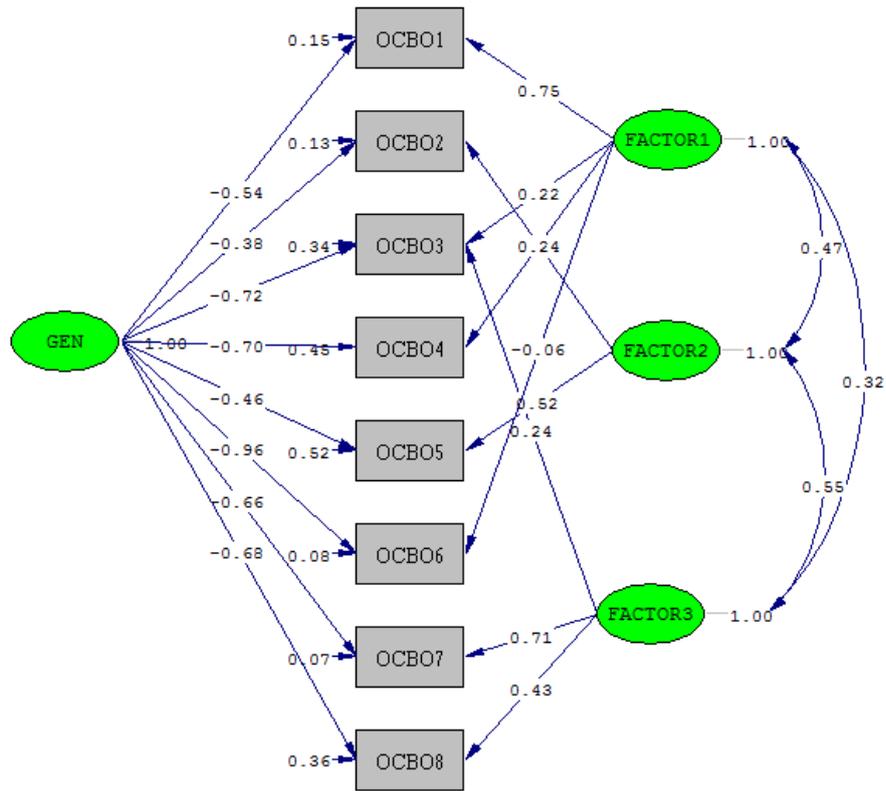
Chi-Square=9.75, df=8, P-value=0.28330, RMSEA=0.045

Figure 4.16. Bi-factor, 3 factor OCBO measurement model (completely standardised solution).

The proportion of variance that the factors that each item was tasked to represent explained in each item is shown in Table 4.61. The proportion of item variance explained by the fitted bi-factor, 3 factor *OCBO* measurement model in each of the subscale items was highly satisfactory.

Table 4.60

Unstandardised factor loading matrix for the bi-factor 3 factor OCBO measurement model

	FACTOR1	FACTOR2	FACTOR3	GEN
OCBO1	.7673*	- -	- -	-.5554*
	(.2620)			(.2778)
	2.9280			-1.9993
OCBO2	- -	.7973*	- -	-.3540*
		(.0999)		(.1652)
		7.9805		-2.1424
OCBO3	**.2141**	- -	.2292*	-.6942*
	(.1721)		(.1002)	(.1329)
	1.2440		2.2882	-5.2253
OCBO4	**.1750**	- -	- -	-.5021*
	(.1902)			(.0906)
	0.9197			-5.5418
OCBO5	- -	.5122*	- -	-.4586*
		(.1480)		(.1334)
		3.4617		-3.4371
OCBO6	**-.0464**	- -	- -	-.7778*
	(.2631)			(.0774)
	-.1763			-10.0555
OCBO7	- -	- -	.7315*	-.6763*
			(.0953)	(.1331)
			7.6721	-5.0831
OCBO8	- -	- -	.3955*	-.6290*
			(.1238)	(.0818)
			3.1935	-7.6917

* (p<.05)

Note: GEN represents the broad general *OCBO factor*

Table 4.61

Item R² for the bi-factor 3 factor OCBO measurement model

OCBO1	OCBO2	OCBO3	OCBO4	OCBO5	OCBO6	OCBO7	OCBO8
.8531	.8677	.6552	.5493	.4816	.9160	.9342	.6383

4.5.6.1 Confirmatory Factor Analysis of the OCB Scale

The construct validity of the *OCB* scale was evaluated by fitting the measurement model implied by the scoring key of the scale. The multivariate normality assumption was not met even after an attempt was made to normalise the data. The chi-square statistic nevertheless did decrease from 116.611 to 50.703.

The first-order *OCB* measurement model showed poor fit in the sample and the close fit null hypothesis therefore had to be rejected (RMSEA=.088; p<.05). The statistically significant (p<.01)

modification indices evident in Figure 4.17 indicated that the items comprising the *OCB* scale reflect a general source of systematic variance currently not acknowledged by the model. As such, a bi-factor model was fitted.

Chi-Square=187.27, df=103, P-value=0.00000, RMSEA=0.088
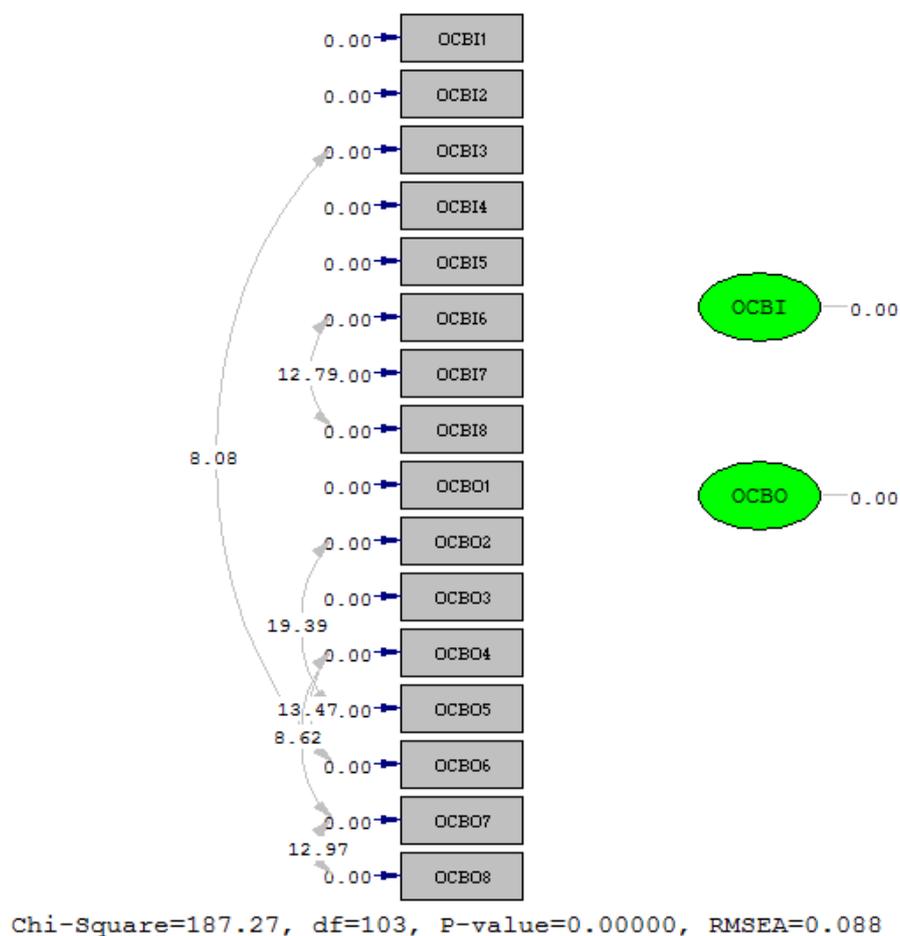
Figure 4.17. Statistically significant (p<.01) modification indices calculated for the first-order OCB measurement model.

The original bi-factor model showed poor fit (RMSEA=.075; p<.05). A modified bi-factor model that reflected the pattern matrices obtained for the two subscales was fitted. This model returned exact fit (RMSEA=.045), but, nonetheless also an inadmissible solution due to a negative error variance estimate[70] for OCBO6. The model was subsequently refitted with the loading of OCBO6 on OCBO_F1 fixed to .90 and its error variance fixed on .10. As evident in Figure 4.18, this bi-factor model showed exact fit (RMSEA=.049; p>.05) and obtained an admissible solution.

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[70] The completely standardised factor loading estimate was by implication also larger than 1 and the R² exceeded unity.

Chi-Square=91.82, df=73, P-value=0.06751, RMSEA=0.049
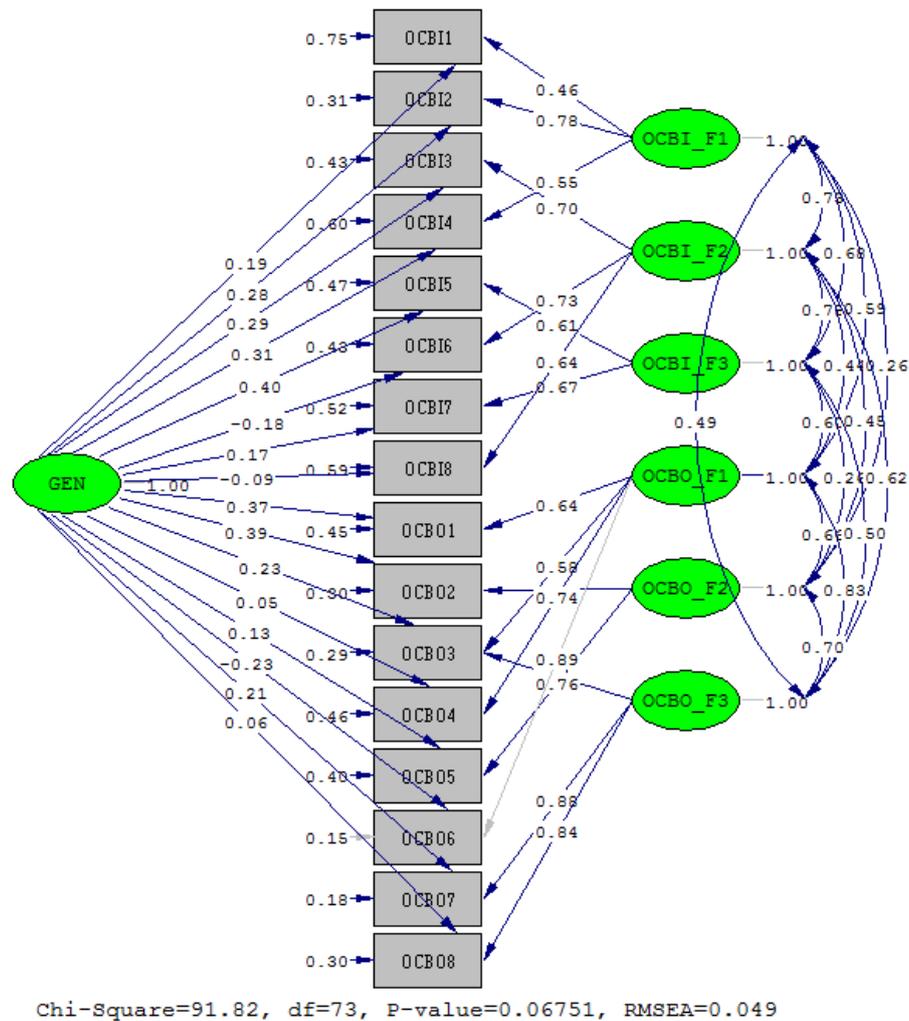
Figure 4.18. Bi-factor OCB measurement model (completely standardised solution).

The unstandardised lambda-X matrix for the bi-factor *OCB* scale (Table 4.62) indicates that, with the exception of OCBI4, OCBI5, OCBO1 and OCBO2, all the items of the OCB scale statistically insignificantly (p>.05) loaded on the general, overall OCB factor[71]. All the items, however loaded statistically significantly (p<.05) on the specific group-factors they were designated to represent.

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[71] In the bi-factor OCBO measurement model the items loaded statistically significantly on the broad, general OCBO factor. The possibility was considered that the insignificant loadings of the items on the broad general OCB factor in the bifactor OCB measurement model was due to the fact that there might actually be two related broad, general OCBI and OCBO factors. A measurement model reflecting this line of reasoning showed exact fit (RMSEA=.30; p>.05). The trend for the items to load statistically insignificantly (p>.05) on the broad, general OCBI and OCBO factors, however, persisted. This was also true when a measurement model was fitted that only made provision for a broad, general factor for the OCBO subscale (RMSEA=.049; p>.05).

Table 4.62

Unstandardised lambda-X matrix for the bi-factor OCB scale

	OCBI_F1	OCBI_F2	OCBI_F3	OCBO_F1	OCBO_F2	OCBO_F3	GEN
OCBI1	.3276*	- -	- -	- -	- -	- -	**.1331**
	(.0687)						**(.0940)**
	4.7699						**1.4169**
OCBI2	.6091*	- -	- -	- -	- -	- -	**.2151**
	(.0709)						**(.1630)**
	8.5880						**1.3200**
OCBI3	- -	.6660*	- -	- -	- -	- -	**.2718**
		(.1111)					**(.1865)**
		5.9960					**1.4575**
OCBI4	.4364*	- -	- -	- -	- -	- -	.2506*
	(.0955)						(.1261)
	4.5709						1.9872
OCBI5	- -	- -	.3822*	- -	- -	- -	.2516*
			(.0955)				(.0918)
			4.0019				2.7420
OCBI6	- -	.5994*	- -	- -	- -	- -	**-.1448**
		.0823)					**(.1539)**
		7.2855					**-.9409**
OCBI7	- -	- -	.5364*	- -	- -	- -	**.1324**
			(.0964)				**(.1354)**
			5.5645				**.9780**
OCBI8	- -	.5773*	- -	- -	- -	- -	**-.0850**
		(.1031)					**(.1462)**
		5.6005					**-.5813**
OCBO1	- -	- -	- -	.8154*	- -	- -	.3806*
				(.1687)			(.1879)
				4.8321			2.0260
OCBO2	- -	- -	- -	- -	.6928*	- -	.3615*
					.1009)		(.1341)
					6.8668		2.6963
OCBO3	- -	- -	- -	.6934*	- -	.2507*	**.2218**
				(.1823)		(.1250)	**(.1954)**
				3.8042		2.0048	**1.1349**
OCBO4	- -	- -	- -	.6520*	- -	- -	**.0379**
				.0781)			**(.1310)**
				8.3511			**.2888**
OCBO5	- -	- -	- -	- -	.7551*	- -	**.1315**
					(.0811)		**(.1652)**
					9.3061		**.7959**
OCBO6	- -	- -	- -	.9000	- -	- -	**-.1884**
							(.1719)

Table 4.62

Unstandardised lambda-X matrix for the bi-factor OCB scale (continued)

	OCBI_F1	OCBI_F2	OCBI_F3	OCBO_F1	OCBO_F2	OCBO_F3	GEN
							-1.0960
OCBO7	- -	- -	- -	- -	- -	.9046*	**.2196**
						(.0922)	**(.2129)**
						9.8158	**1.0312**
OCBO8	- -	- -	- -	- -	- -	.7777*	**.0578**
						(.0532)	**(.2017)**
						14.6279	**.2867**

* (p<.05)

Note: GEN represents the broad general *OCBO factor*

Table 4.63 reveals that for most of the items (except OCBI1) at least 25% of the variance in each of the items could be explained by the narrower specific group-factors and the broad *OCB* factor. In the case of 12 of the 16 *OCB* items more than 50% of the item variance could be explained by the model. although the results indicated that the design intention with the *OCB* scale did not succeed as originally intended, the results nonetheless bolster confidence in the use of the *OCB* scale items to operationalise the *OCB* latent variable in the structural model.

Table 4.63

OCB item squared multiple correlations

OCBI1	OCBI2	OCBI3	OCBI4	OCBI5	OCBI6	O CBI7	OCBI8
.2482	.6892	.5730	.3967	.5262	.5654	.4782	.4124
OCBO1	OCBO2	OCBO3	OCBO4	OCBO5	OCBO6	OCBO7	OCBO8
.5527	.6963	.7093	.5449	.5987	.8501	.8156	.7032

4.5.7 Summary of the Dimensionality analysis results

The objective behind the dimensionality analyses reported above was to provide insight into the functioning of the (sub)scales used to measure the latent variables comprising the proposed model. None of the (sub)scales successfully passed the unidimensionality assumptions that were originally hypothesised. The factor fission in most cases was meaningful. The results, moreover, bolstered confidence in the use of the items to operationalise the latent variables comprising the structural model in that either the indirect effect of a second-order factor on the subscale items was statistically significant (p<.05) (in those cases where a second-order measurement model fitted closely) or the proportion of variance explained in the items by the model was substantial enough (in the case of bi-factor measurement models).

4.6   DATA SCREENING PRIOR TO FITTING THE REDUCED EMPLOYEE ENGAGEMENT MEASUREMENT AND STRUCTURAL MODELS

As previously discussed in section 3.9.3.1, the employee engagement model was fitted using indicator variables that were calculated by forming item parcels. Using individual scale items to operationalise the latent variables often results in very complex models that requires the estimation of a large number of parameters, and thus much larger sample sizes to ensure an acceptable ratio of observations to freed parameters. Hence, using item parcels served as a solution to reduce this complexity with the added benefits of a higher statistical power, an increase in indicator variability and greater systematic variable distributions (Little et al., 2002; Reitz, 2019). Item parcels were subsequently calculated to form two composite indicator variables for each latent variable in the modified employee engagement model (Figure 4.1) by taking the mean of the even and uneven numbered items of each scale.

The item parcel indicators were interpreted as continuous rather than discrete variables in the current study (Muthén & Kaplan, 1985). Maximum likelihood (ML; the default estimation method used when fitting measurement and structural models to continuous data) assumes that the distribution of the indicator variables follows a multivariate normal distribution (Mels, 2003). Therefore, in order to determine the appropriate estimation technique, it was necessary to test the H_0 that the indicator variables followed a multivariate distribution. The assumption of univariate and multivariate normality was tested using PRELIS.

The univariate normality assumption was not met for 5 of the 12 indicator variables. This lack of univariate normality made the prospect of multivariate normality a dubious outcome. This was substantiated by the results of the test of multivariate normality before normalisation shown in Table 4.64.

Table 4.64

Test of multivariate normality before normalisation

Skewness			Kurtosis			Skewness and Kurtosis	
Value	Z-Score	p-value	Value	Z-Score	p-value	Chi-Square	p-value
35.600	8.270	.000	184.989	4.226	.000	86.248	.000

Table 4.64 indicates that the H_0 that the data (i.e., indicators variables) follows a multivariate normal distribution had to be rejected ($X^2 = 86.248$; p<.05). Thus, to allow for the analysis of the normalised data and to continue using ML estimation, an attempt was made to normalise the data using PRELIS. The results are provided in Table 4.65.

Table 4.65

Test of multivariate normality after normalisation

	Skewness			Kurtosis			Skewness and Kurtosis	
Value	Z-Score	p-value	Value	Z-Score	p-value	Chi-Square	p-value
29.043	5.074	.000	178.215	3.094	.002	35.319	.000

The results indicate that the even after normalising the data, the null hypothesis of multivariate normality still had to be rejected ($X^2 = 35.319$; p<.05). The assumption of multivariate normality was therefore not satisfied. Normalising the data did nevertheless result in a decrease in the chi-square statistic (X^2), indicating that the process of normalisation still succeeded in reducing the deviation between the observed indicator distribution and the theoretical multivariate normal distribution. In light of this, robust maximum likelihood (RML) was utilised as an estimation technique and the remaining analyses were performed on the normalised data.

4.7   EVALUATING THE FIT OF THE REDUCED EMPLOYEE ENGAGEMENT MEASUREMENT MODEL

Prior to testing the fit of the structural model or the substantive relationships of interest, it is critical to first ascertain the psychometric integrity of the measures used to operationalise the latent variables comprising the model. The measurement model represents the hypothesised relationships between the latent variables and the indicator variables created to represent them. Thus, evaluating the fit of the measurement model, which sheds light on the extent to which the operationalisation of the latent variables comprising the structural model was successful, needed to take place before evaluating the fit of the comprehensive LISREL model.

CFA via LISREL was used to assess the fit of the measurement model. This analysis provides a variety of fit indices enabling a credible verdict on the fit of the model. In addition to the basket of LISREL fit indices, the quality of the measurement model fit was determined by evaluating the measurement model covariance residuals and modification indices calculated for Θ_δ and Λ^X. In the event that the measurement model obtained at least reasonable model fit, then the parameter estimates and squared multiple correlations (R^2) for the indicators were interpreted.

The initial measurement model obtained a Satorra-Bentler chi-square statistic of 47.387 (p=.168). The H_0 of exact fit was therefore not rejected (p<.05) suggesting that the model could display exact fit in the parameter.[72] This was an unexpected outcome given that the assumption that a model fits the

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[72] More specifically. The probability that such a degree of model fit could have been attained in a sample taken from a population where the model fitted exactly was sufficiently large not to reject that possibility. Again it is, however, acknowledged that due to the small sample the statistical power of the test of exact fit was not optimal.

population exactly is fairly improbable. Its far more realistic to assume that the model might fit closely. To this end, the model found close fit (RMSEA=.0450; p=.543). However, despite the promising fit statistics for the original measurement model, a negative error variance estimate was obtained for OCP1 indicator of the organisational *commitment* latent variable. This made the whole solution inadmissible. Specifying starting values for OCP1 didn't work. Fixing the loading for OCP1 to .90 and the error variance to .19 did, however, solve the problem. A visual representation of the modified measurement model (with the constraints imposed) is shown in Figure 4.19.
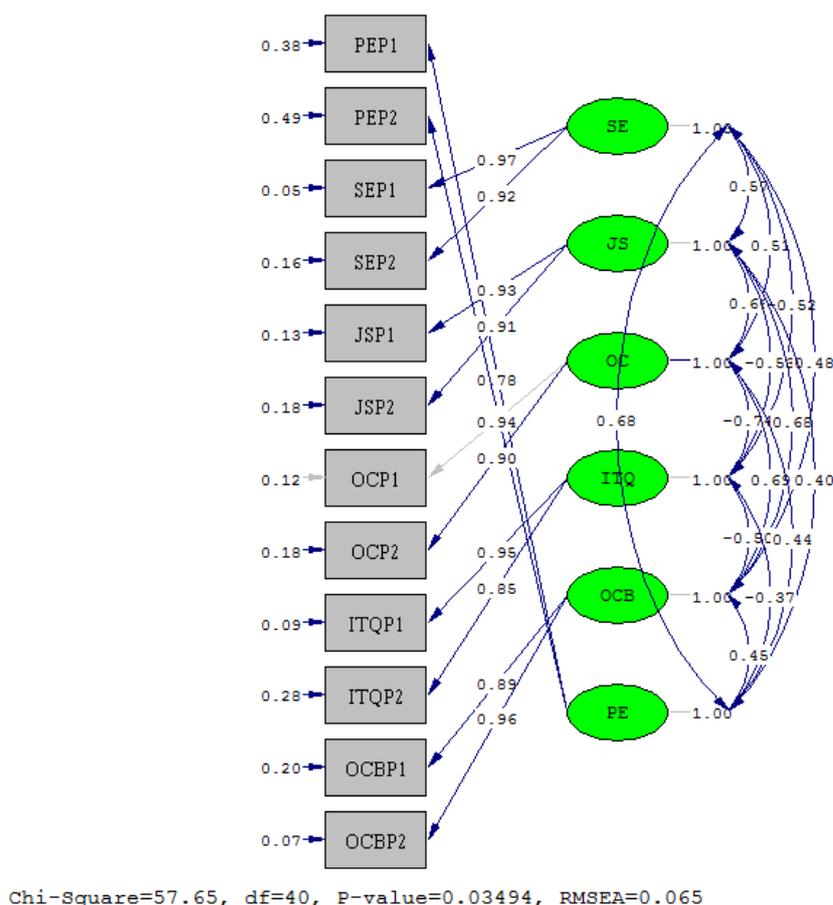
Figure 4.19. Visual representation of the employee engagement measurement model (completely standardised solution).

4.7.1   Examining the measurement model fit statistics

Two overarching measurement model fit hypotheses were tested, the exact fit and close fit null hypotheses (H_{014a} and H_{014b}). The full set of fit indices generated by LISREL are provided in Table 4.66.

Table 4.66

Goodness of fit statistics for the reduced employee engagement measurement model

Goodness of Fit Statistics
Degrees of Freedom = 40
Minimum Fit Function Chi-Square = 59.547 (P = .0240)
Normal Theory Weighted Least Squares Chi-Square = 55.178 (P = .0556)
Satorra-Bentler Scaled Chi-Square = 57.649 (P = .0349)
Chi-Square Corrected for Non-Normality = 102.913 (P = .000)
Estimated Non-centrality Parameter (NCP) = 17.649
90 Percent Confidence Interval for NCP = (1.363; 41.926)
Minimum Fit Function Value = .562
Population Discrepancy Function Value (F0) = 0.166
90 Percent Confidence Interval for F0 = (.0129; .396)
Root Mean Square Error of Approximation (RMSEA) = .0645
90 Percent Confidence Interval for RMSEA = (.0179; .0994)
P-Value for Test of Close Fit (RMSEA < .05) = .248
Expected Cross-Validation Index (ECVI) = 1.261
90 Percent Confidence Interval for ECVI = (1.107; 1.490)
ECVI for Saturated Model = 1.472
ECVI for Independence Model = 16.875
Chi-Square for Independence Model with 66 Degrees of Freedom = 1764.785
Independence AIC = 1788.785
Model AIC = 133.649
Saturated AIC = 156.000
Independence CAIC = 1832.859
Model CAIC = 273.216
Saturated CAIC = 442.481
Normed Fit Index (NFI) = .967
Non-Normed Fit Index (NNFI) = .983
Parsimony Normed Fit Index (PNFI) = .586
Comparative Fit Index (CFI) = .990
Incremental Fit Index (IFI) = .990
Relative Fit Index (RFI) = .946
Critical N (CN) = 118.111

Table 4.66

Goodness of fit statistics for the reduced employee engagement measurement model (continued)

Goodness of Fit Statistics
Root Mean Square Error of Approximation (RMSEA) = .0645
Root Mean Square Residual (RMR) = .0193
Standardized RMR = .0340
Goodness of Fit Index (GFI) = .918
Adjusted Goodness of Fit Index (AGFI) = .840
Parsimony Goodness of Fit Index (PGFI) = .471

The measurement model obtained a Satorra-Bentler chi-square statistic of 57.649 (p=.0349). The exact fit null hypothesis H_{014a}: RMSEA=0 was therefore rejected (p<.05) suggesting that the model did not fit exactly in the parameter.

Table 4.66 shows that the close fit null hypothesis H_{014b}: RMSEA≤.05 could not be rejected (RMSEA=.0645; p=.248). This suggested that the model fitted the data closely or reasonably well in the sample and that close fit in the parameter was plausible. More specifically, it suggested that the probability of obtaining a RMSEA estimate of .0645, under the assumption that the model fitted closely in the parameter, was sufficiently large (.248) to not reject the null hypothesis of close fit.

The measurement model also achieved a standardised root mean square residual (SRMR) of .0340, providing further evidence of good fit (SRMR<.05) (Diamantopoulos & Siguaw, 2000). The goodness-of-fit index (GFI) and adjusted goodness-of-fit index (AGFI), both prudent measures of model fit, were also investigated. Values for these indices should range between 0 and 1 and any value larger than .90 indicates good fit ((Diamantopoulos & Siguaw, 2000; Reitz, 2019). Table 4.66 indicates values of .918 (GFI) and .840 (AGFI).

The normed-fit index (NFI), non-normed fit index (NNFI) and comparative-fit index (CFI) provide an indication of model fit when compared to a baseline independent model. According to Hu and Bentler (1999) values equal or greater than .95 suggest good fit. Table 4.66 shows that all index three values exceeded this cut-off (NFI=.967; NNFI=.983; CFI=.990), suggesting that the model fitted well.

In light of the above goodness of fit statistics, it was deemed reasonable to advocate that the reduced employee engagement measurement model showed good fit. Next, as part of the evaluation of measurement model fit, the magnitude and distribution of the standardised co-variance residuals were examined.

4.7.2   Examining the measurement model standardised residuals

As previously mentioned, standardised residuals (which are interpreted as z-scores) should be evenly distributed around zero and are considered large if they exceed ± 2.58 (Diamantopoulos & Siguaw, 2000). Negative residuals imply that explanatory paths need to be remove (overestimation) whereas positive residuals suggest that paths need to be added (underestimation).

The summary statistics in Table 4.67 below show that only three extreme residuals ([3/78]*100=3.85%) were found (one negative and two positive). This small percentage of extreme standardised residuals indicated that the model was able to reasonably accurately reproduce the observed inter-indicator variance-covariance matrix. Thus, supporting the evidence on measurement model close fit.

Table 4.67

Summary statistics for the measurement model standardised residuals

	Value
Summary statistics for standardised residuals	
Smallest standardised residual	-6.577
Median standardised residual	.000
Largest standardised residual	3.551
Largest negative standardised residuals	
Residual for OCBP1 and ITQP2	-6.577
Largest positive standardised residuals	
Residual for ITQP2 and OCP2	3.551
Residual for OCBP1 and ITQP1	3.224

Lastly, before making the final decision regarding model fit, the magnitude and the statistical significance of the measurement model modification indices calculated for lambda-X ($\mathbf{\Lambda^X}$) and theta-delta ($\mathbf{\Theta_\delta}$) were examined.

4.7.3   Examining the measurement model modification indices

Large, statistically significant, modification indices indicate the extent to which the fit of the model would improve if model parameters, currently fix to zero, are set free. If modification index values are larger than 6.64, statistically significant (p<.01) decreases in the models X^2 fit statistic would occur. The intention behind investigating the modification indices was not to determine any specific parameters to be set free or to modify the model, but rather to provide insight into the integrity of the model fit. A small percentage of large, significant (p<.01) modification indices would indicate a well-fitting model. Conversely if there were numerous ways of improving the fit of the measurement model it would comment negatively on the validity of the model as an explanation of the observed covariance

matrix. Table 4.68 and 4.69 present the modification indices for the lambda-X and the theta-delta matrices respectively.

Table 4.68

Measurement model modification indices for the Lambda-X matrix

	PE	SE	JS	OC	ITQ	OCB
PEP1	- -	- -	3.152	.015	.986	.038
PEP2	- -	6.103	2.220	.008	.478	.032
SEP1	- -	- -	2.935	1.010	1.221	3.362
SEP2	1.521	- -	1.118	.486	.687	2.953
JSP1	.374	3.198	- -	2.408	1.250	1.652
JSP2	.365	2.330	- -	1.118	.859	.875
OCP1	.106	4.970	5.498	- -	3.538	**8.326***
OCP2	.095	3.090	**7.248***	- -	**11.536***	6.105
ITQP1	3.553	.002	.162	- -	- -	**9.699***
ITQP2	2.070	.000	.062	2.408	- -	5.489
OCBP1	3.010	1.541	.205	.158	1.389	- -
OCBP2	2.860	1.369	.161	.128	1.397	- -

* (p<.01)

Note: PEP$_i$ represent the item parcel indicators for the *personal engagement* latent variable, SEP$_i$ represent the item parcel indicators for the *state engagement* latent variable, JSP$_i$ represent the item parcel indicators for the *job satisfaction* latent variable, OCP$_i$ represent the item parcel indicators for the *organisational commitment* latent variable, ITQ$_i$ represent the item parcel indicators for the *intention to quit* latent variable, OCBP$_i$ represent the item parcel indicators for the *organisational citizenship behaviour* latent variable.

Table 4.69

Measurement model modification indices for the Theta-Delta matrix

	PEP1	PEP2	SEP1	SEP2	JSP1	JSP2
PEP1	- -					
PEP2	- -	- -				
SEP1	1.448	.578	- -			
SEP2	1.098	.380	- -	- -		
JSP1	3.293	3.815	.003	.469	- -	
JSP2	.617	.675	.039	.196	- -	- -
OCP1	.072	2.085	.037	.222	.002	.262
OCP2	1.402	.290	.600	2.553	1.224	.295
ITQP1	.080	1.029	4.191	2.823	.197	.101
ITQP2	.131	3.910	4.377	3.187	.209	2.014

Table 4.69

Measurement model modification indices for the Theta-Delta matrix (continued)

	OCP1	OCP2	ITQP1	ITQP2	OCBP1	OCBP2
OCBP1	1.813	.091	.569	2.631	.368	.011
OCBP2	1.056	.001	.166	.053	.126	.011
OCP1	**15.707***					
OCP2	- -	- -				
ITQP1	3.709	2.511	- -			
ITQP2	.787	.188	- -	- -		
OCBP1	.508	.172	.942	.084	- -	
OCBP2	.045	.285	.204	3.265	- -	- -

* (p<.01)

Note: PEP_i represent the item parcel indicators for the *personal engagement* latent variable, SEP_i represent the item parcel indicators for the *state engagement* latent variable, JSP_i represent the item parcel indicators for the *job satisfaction* latent variable, OCP_i represent the item parcel indicators for the *organisational commitment* latent variable, ITQ_i represent the item parcel indicators for the *intention to quit* latent variable, $OCBP_i$ represent the item parcel indicators for the *organisational citizenship behaviour* latent variable.

It is evident from Table 4.68 that there were only 4 ([4/60]*100=6.67%) statistically significant (p<.01) modification indices for Λ^X that, if set free, would result in a statistically significant (p<.01) improvement in model fit. Similarly, only 1 ([1/66]8100=1.52%) of the covariance terms in the theta-delta matrix (Θ_δ) would, if set free, significantly (p<.01) decrease the X^2 statistic (Table 4.69). Thus, these low observations of large statistically significant modification indices again provide support for a well-fitting model.

The satisfactory evidence presented above on the fit of the measurement model thus warranted the interpretation of the measurement model parameter estimates and squared multiple correlations.

4.7.3 Examining the measurement model parameter estimates and squared multiple correlations

Chapter 3 outlined that operationalisation of the latent variables comprising the proposed model was considered successful if:

- The unstandardised factor loading estimates are all statistically significant (p<.05);
- The completely standardised factor loading estimates are all larger than .71;
- The unstandardised measurement error variances are all statistically significant (p<.05);
- The completely standardised measurement error variances are all smaller than .50;
- All ϕ_{ij} are smaller than .90.

The factor loading estimates were evaluated by testing the following null hypotheses:

$$H_{0i}: \lambda_{jk} = 0; \; i=15, 16, ..., 26; \; j=1, 2, ..., 12; \; k=1, 2, ..., 6$$

$$H_{ai}: \lambda_{jk} \neq 0; \; i=15, 16, ..., 26; \; j=1, 2, ..., 12; \; k=1, 2, ..., 6$$

Table 4.70

Measurement model unstandardised Lambda-X Matrix

	PE	**SE**	**JS**	**OC**	**ITQ**	**OCB**
PEP1	.610*	- -	- -	- -	- -	- -
	(.077)					
	7.913					
PEP2	.438*	- -	- -	- -	- -	- -
	(.066)					
	6.684					
SEP1	- -	.711*	- -	- -	- -	- -
		(.055)				
		12.993				
SEP2	- -	.693*	- -	- -	- -	- -
		(.057)				
		12.088				
JSP1	- -	- -	.466*	- -	- -	- -
			(.038)			
			12.413			
JSP2	- -	- -	.464*	- -	- -	- -
			(.039)			
			11.954			
OCP1	- -	- -	- -	.900	- -	- -
OCP2	- -	- -	- -	72.539*	- -	- -
				(4.713)		
				15.391		
ITQP1	- -	- -	- -	- -	.785*	- -
					(.056)	
					13.993	
ITQP2	- -	- -	- -	- -	.782*	- -
					(.073)	
					10.776	

Table 4.70

Measurement model unstandardised Lambda-X Matrix (continued)

	PE	SE	JS	OC	ITQ	OCB
OCBP1	- -	- -	- -	- -	- -	.537*
						(.045)
						11.899
OCBP2	- -	- -	- -	- -	- -	.517*
						(.038)
						13.549

* (p<.05)

Note: PEP_i represent the item parcel indicators for the *personal engagement* latent variable, SEP_i represent the item parcel indicators for the *state engagement* latent variable, JSP_i represent the item parcel indicators for the *job satisfaction* latent variable, OCP_i represent the item parcel indicators for the *organisational commitment* latent variable, ITQ_i represent the item parcel indicators for the *intention to quit* latent variable, $OCBP_i$ represent the item parcel indicators for the *organisational citizenship behaviour* latent variable.

The unstandardised Lambda-X ($\mathbf{\Lambda^X}$) matrix in Table 4.70 sheds light on valuable information related to the unstandardised parameter estimate, standard error term, and the z-value (which indicates the level of significance of the relationship). Table 4.70 illustrates that all of the factor loadings were statistically significant (z≥1.6449; p<.05). Therefore, H_{0i}: $\lambda_{jk} = 0$; i=15, 16, ..., 26; j=1, 2, ..., 12; k=1, 2, ..., 6 was rejected for all i, j and k in favour of H_{ai}: $\lambda_{jk} \neq 0$; i=15, 16, ..., 26; j=1, 2, ..., 12; k=1, 2, ..., 6

The completely standardised solution for $\mathbf{\Lambda^X}$, presented in Table 4.71, shows that all of the factor loading estimates met the required cut-off criterion of .71.

Table 4.71

Measurement model completely standardised Lambda-X matrix

	PE	**SE**	**JS**	**OC**	**ITQ**	**OCB**
PEP1	.785	- -	- -	- -	- -	- -
PEP2	.713	- -	- -	- -	- -	- -
SEP1	- -	.975	- -	- -	- -	- -
SEP2	- -	.915	- -	- -	- -	- -
JSP1	- -	- -	.933	- -	- -	- -
JSP2	- -	- -	.908	- -	- -	- -
OCP1	- -	- -	- -	.939	- -	- -
OCP2	- -	- -	- -	.903	- -	- -
ITQP1	- -	- -	- -	- -	.952	- -
ITQP2	- -	- -	- -	- -	.848	- -
OCBP1	- -	- -	- -	- -	- -	.894
OCBP2	- -	- -	- -	- -	- -	.962

Note: PEP_i represent the item parcel indicators for the *personal engagement* latent variable, SEP_i represent the item parcel indicators for the *state engagement* latent variable, JSP_i represent the item parcel indicators for the *job satisfaction* latent variable, OCP_i represent the item parcel indicators for the *organisational commitment* latent variable, ITQ_i represent the item parcel indicators for the *intention to quit* latent variable, $OCBP_i$ represent the item parcel indicators for the *organisational citizenship behaviour* latent variable.

Table 4.72 below presents the proportion of variance in the indicator variables explained by the latent variable it's meant to represent (R^2). A (preferred) high R^2 value would suggest that the variance in a particular indictor, to a large degree, reflected variance in the latent variable it was mean to represent. The remaining, unexplained variance can be attributed to systematic, random error variance (Diamantopoulos and Siguaw, 2000). All of the indicator variables reflect sufficiently large R^2 (>.50), indicating that the measurement model displays satisfactory validity – i.e. the indicators provide a satisfactory, valid representation of the latent variables they were designed to express. Consequently, by implication, this further implied satisfactory reliability.

Table 4.72

Squared Multiple Correlations for X – Variables

PEP1	PEP2	SEP1	SEP2	JSP1	JSP2
.616	.508	.950	.838	.870	.824
OCP1	OCP2	ITQP1	ITQP2	OCBP1	OCBP2
.881	.815	.906	.719	.799	.926

Note: PEP$_i$ represent the item parcel indicators for the *personal engagement* latent variable, SEP$_i$ represent the item parcel indicators for the *state engagement* latent variable, JSP$_i$ represent the item parcel indicators for the *job satisfaction* latent variable, OCP$_i$ represent the item parcel indicators for the *organisational commitment* latent variable, ITQ$_i$ represent the item parcel indicators for the *intention to quit* latent variable, OCBP$_i$ represent the item parcel indicators for the *organisational citizenship behaviour* latent variable.

The unstandardised theta-delta matrix $\mathbf{\Theta_\delta}$ (Table 4.73) shows the variance in measurement error terms of the indicator variables (treated as exogenous latent variables) in the measurement model. To interpret the measurement error variance estimates, the following null hypotheses were tested:

$$H_{0i}: \Theta_{\delta jj} = 0; j = 27, 28, ..., 38;$$

$$H_{ai}: \Theta_{\delta jj} > 0; j = 27, 28, ..., 38;$$

Again, its preferred to interpret the magnitude of the error variances in the completely standardised $\mathbf{\Theta_\delta}$, however, the unstandardised theta-delta matrix in Table 4.73 provides an indication of the statistical significance of the error variance estimates.

Table 4.73

Measurement model unstandardised Theta-Delta matrix

PEP1	PEP2	SEP1	SEP2	JSP1	JSP2
.232*	.186*	.026	.093*	.032*	.046*
(.069)	(.043)	(.025)	(.028)	(.011)	(.014)
3.364	4.317	1.061	3.272	2.947	3.295
OCP1	OCP2*	ITQP1	ITQP2	OCBP1	OCBP2
.190	.206	.064	.239*	.072*	.021
	(.053)	(.045)	(.060)	(.018)	(.013)
	3.891	1.422	3.969	3.994	1.594

* (p<.05)

Note: PEP$_i$ represent the item parcel indicators for the *personal engagement* latent variable, SEP$_i$ represent the item parcel indicators for the *state engagement* latent variable, JSP$_i$ represent the item parcel indicators for the *job satisfaction* latent variable, OCP$_i$ represent the item parcel indicators for the *organisational commitment* latent variable, ITQ$_i$ represent the item parcel indicators for the *intention to quit* latent variable, OCBP$_i$ represent the item parcel indicators for the *organisational citizenship behaviour* latent variable.

Table 4.73 shows that all of the indicators, with the exception of SEP1, ITQP1 and OCBP2, were statistically significantly plagued by measurement error ($z \geq 1.6449$; $p<.05$). As such, H_{0i}: $\Theta_{\delta ij} = 0$; i =22, 23, 25, 26, 27, 28, 29, 31, 32 was rejected. This finding was somewhat unexpected as it suggests it's plausible to regard SEP1, ITQP1 and OCBP2, in the parameter, as perfectly reliability and valid measures; a somewhat unrealistic and disconcerting attainment to say the least. Table 4.74 provides the completely standardised measurement error variances.

Table 4.74

Measurement model completely standardised Theta-Delta matrix

PEP1	PEP2	SEP1	SEP2	JSP1	JSP2
.384	.492	.050	.162	.130	.176
OCP1	OCP2	ITQP1	ITQP2	OCBP1	OCBP2
.119	.185	.094	.281	.201	.074

Note: PEP$_i$ represent the item parcel indicators for the *personal engagement* latent variable, SEP$_i$ represent the item parcel indicators for the *state engagement* latent variable, JSP$_i$ represent the item parcel indicators for the *job satisfaction* latent variable, OCP$_i$ represent the item parcel indicators for the *organisational commitment* latent variable, ITQ$_i$ represent the item parcel indicators for the *intention to quit* latent variable, OCBP$_i$ represent the item parcel indicators for the *organisational citizenship behaviour* latent variable.

The completely standardised Theta-delta matrix ($\mathbf{\Theta_\delta}$) indicated that all of the indicator variables reflected an acceptably small (a critical value $\leq.50$) portion of measurement error variance.

4.7.4   Discriminant validity

Discriminant validity refers to the extent to which each (inter-related or correlated) construct is empirically unique and therefore was measured as a phenomenon not represented by other latent variables in the measurement model (Franke & Sarstedt, 2019). According to Farrell (2010, p. 324) when evaluating relationships between latent variables that lack discriminant validity "researchers cannot be certain whether results confirming hypothesised structural paths are real or whether they are a result of statistical discrepancies". The latent variables comprising the proposed reduced employee engagement model (Figure 4.1), although related (i.e., expected to correlate), are conceptualised to be empirically unique and thus should correlate with each other but not is a manner that is excessively high. The phi matrix (Φ) in Table 4.75 presents the latent variable inter-correlations. These inter-correlation estimates were interpreted by testing the following null hypotheses:

$$H_{0i}: \phi_{pk} = 0; \text{ i =39, 40..., 53; p=1, 2...,6; k=1, 2...,6; j} \neq \text{k}$$

$$H_{ai}: \phi_{pk} > 0; \text{ i =39, 40..., 53; p=1, 2...,6; k=1, 2...,6; j} \neq \text{k}$$

Table 4.75

Measurement model unstandardised Phi matrix

	SE	JS	OC	ITQ	OCB	PE
SE	1.000					
JS	.570*	1.000				
	(.075)					
	7.606					
OC	.007*	.009*	1.000			
	(.001)	(.001)				
	4.677	7.516				
ITQ	-.521*	-.532*	-.010*	1.000		
	(.076)	(.073)	(.001)			
	-6.883	-7.328	-9.302			
OCB	.485*	.679*	.009*	-.496*	1.000	
	(.079)	(.059)	(.001)	(.091)		
	6.116	11.526	7.206	-5.444		
PE	.682*	.397*	.006*	-.370*	.446*	1.000
	(.094)	(.133)	(.002)	(.108)	(.111)	
	7.283	2.987	3.702	-3.436	4.021	

* (p<.05)

Note: SE represents *state engagement*, JS represents *job satisfaction*, OC represents *organisational commitment*, ITQ represents *intention to quit*, OCB represents *organisational citizenship behaviour*, PE represents *personal engagement*

Table 4.75 illustrates that all ϕ_{jk} estimates were statistically significant and as such, the H_{0i}: $\phi_{pk} = 0$; i =39, 40..., 53; p=1, 2...,6; k=1, 2...,6; j≠k could be rejected for all i running from 39 to 53, j from 1 to 6 and k from 1 to 6. Moreover, none of the statistically significant unstandardised ϕ_{ij} estimates exceeded .90[73]. In light of this, the conclusion was drawn that the manner in which the constructs comprising the proposed employee engagement structural model were operationalised, succeeded in discriminating between the latent variables as related albeit empirically unique variables.

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[73] None of the ϕ_{jk} estimates even came close to .80. hence it was not considered necessary to calculate the 95% confidence intervals for the ϕ_{jk} estimates.

4.7.5   Overall verdict on the reduced employee engagement measurement model

Taking into consideration the criteria outlined in section 4.7.3, the following can be concluded with regard to the fit of the reduced employee engagement measurement model. The measurement model showed exact fit, as reported in the goodness-of-fit statistics. The completely standardised factor loadings (lambda-X) were all statistically significant (p<.05) and acceptable high (>.71). Moreover, all of the measurement error terms were acceptably small and mostly statistically significant (p<.05). It was found that all of the indicator variables provided a valid account of the latent variables they were designed to represent, and lastly, discriminant validity was also demonstrated.

Therefore, it was subsequently concluded that the operationalisation of the latent variables in the employee engagement model was successful. Sufficient information was therefore provided to warrant evaluating the fit of the employee engagement structural model.

4.8   EVALUATING THE FIT OF THE REDUCED EMPLOYEE ENGAGEMENT STRUCTURAL MODEL

The structural model forms one part of the comprehensive employee engagement LISREL model and reflects the structural relationships that were hypothesised in Chapter 2 to exist between the various latent variables. The following section evaluates the employee engagement structural model. More specifically, this section evaluates the fit of the structural model (via the goodness of fit statistics), the statistical significance and magnitude of the structural model parameter estimates, the squared multiple correlations for the endogenous latent variables, and the modification indices for gamma (Γ) and beta ($\mathbf{B}$).

The statistical null hypotheses for exact (H_{01a}) and close (H_{01b}) model fit that were tested (via LISREL) to determine the degree of model fit for the comprehensive LISREL model are provided below.

$$H_{01a}: \text{RMSEA} = 0$$

$$H_{a1a}: \text{RMSEA} > 0$$

$$H_{01b}: \text{RMSEA} \leq .05$$

$$H_{a1b}: \text{RMSEA} > .05$$

Initially, the employee engagement structural showed poor fit (RMSEA=.0926; p<.05). Both H_{01a} and H_{01b} therefore had to be rejected in favour of H_{a1a} and H_{a1b}. support was therefore not obtained for the reduced engagement structural model shown in Figure 4.1. Earlier Van Deventer's (2015) concern was noted that insufficient effort had been made in the past to clearly separate the empirical testing of the overarching and path-specific substantive hypotheses that have been developed through theorising in

response to the research initiating question and subsequent attempts to modify the original comprehensive hypothesis based on findings derived from the study. The current study committed itself to strive to conform to Van Deventer's (2015) suggestion and to use the modification indices calculated for Γ and **B** purely to derive data-driven suggestions for future research. Despite this commitment the current study chose not to merely conclude with the foregoing but to attempt to modify the model to obtain close fit. It is, however, emphasised that the modified model and the interpretation of its structural model parameter estimates should be seen as part of the data-driven theorising underpinning recommendations for future research.

The modification indices for Γ and **B** were subsequently inspected. The highest modification index value was for a path from *organisational commitment* to *OCB*. This made strong theoretical sense. That is, it seems plausible to expect that individuals who possess a strong sense of commitment towards their organisation are indeed probably more inclined to exhibit discretionary behaviours that go beyond that of formal obligations recognised by the formal reward system – i.e., going over and beyond that which is required of them when performing their job. In addition, the standardised expected change was positive and reasonably substantial. Therefore, a path was added between *organisational commitment* and *OCB* and the structural model was fitted once again. A visual representation of the modified employee engagement comprehensive LISREL model (fitted without the constraints that were imposed on OCP1 in the measurement model[74]) is shown in Figure 4.20. The structural model fit statistics are presented in the section to follow.

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[74] The constraints imposed on OCP1 when fitting the measurement model were not necessary in the structural model. Moreover, in the interest of consistency, when the constraints were imposed on the modified structural model it was found that despite showing close fit, imposing the constraints worsened the fit model.
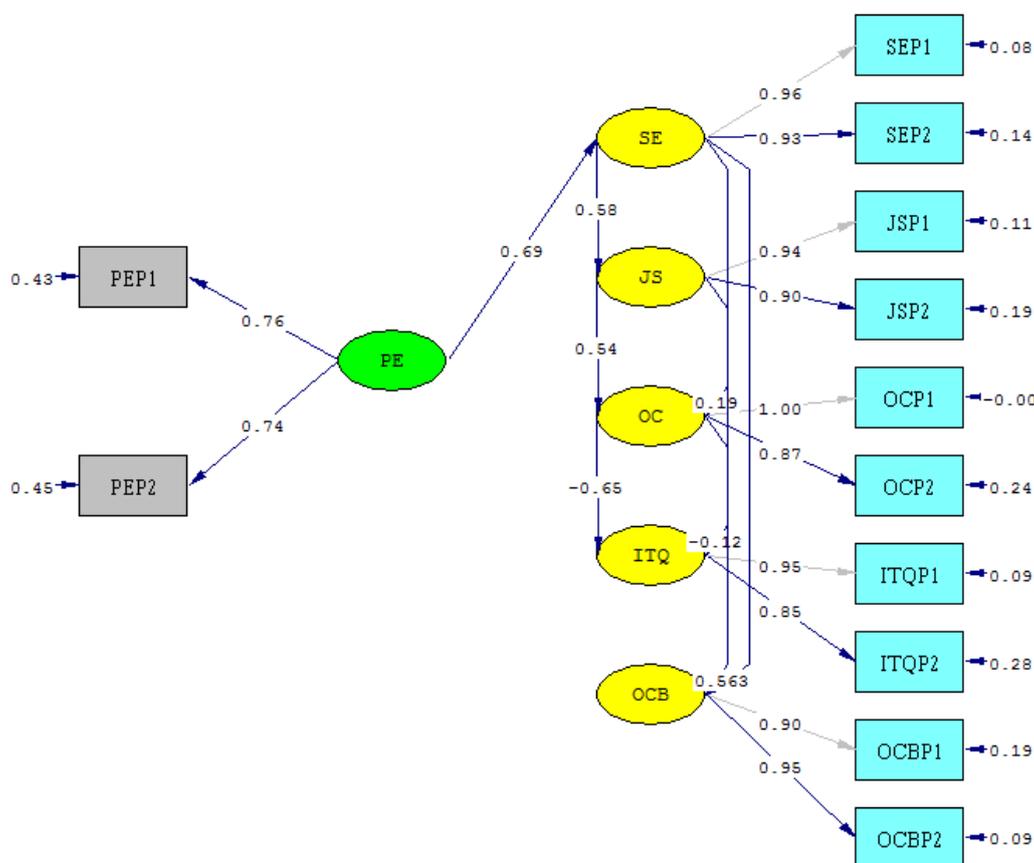
Chi-Square=62.84, df=46, P-value=0.04987, RMSEA=0.059

Figure 4.20. Visual representation of the employee engagement structural model (completely standardised solution).

4.8.1   Examining the structural model fit statistics

Table 4.76 presents LISREL's full array of fit indices for the comprehensive LISREL model. As with the measurement model, the decision on structural model fit was based on a basket of evidence and not just a single indictor of fit.

Table 4.76

Goodness of fit statistics for the reduced employee engagement structural model

Goodness of Fit Statistics
Degrees of Freedom = 46
Minimum Fit Function Chi-Square = 66.861 (P = .0239)
Normal Theory Weighted Least Squares Chi-Square = 65.199 (P = .0326)
Satorra-Bentler Scaled Chi-Square = 62.845 (P = .0499)
Chi-Square Corrected for Non-Normality = 133.864 (P = .00)
Estimated Non-centrality Parameter (NCP) = 16.845
90 Percent Confidence Interval for NCP = (.0110; 41.723)
Minimum Fit Function Value = .631

Table 4.76

Goodness of fit statistics for the reduced employee engagement structural model (continued)

Goodness of Fit Statistics
Population Discrepancy Function Value (F0) = .159
90 Percent Confidence Interval for F0 = (.000104; .394)
Root Mean Square Error of Approximation (RMSEA) = .0588
90 Percent Confidence Interval for RMSEA = (.00150; .0925)
P-Value for Test of Close Fit (RMSEA < .05) = .327
Expected Cross-Validation Index (ECVI) = 1.197
90 Percent Confidence Interval for ECVI = (1.038; 1.431)
ECVI for Saturated Model = 1.472
ECVI for Independence Model = 16.875
Chi-Square for Independence Model with 66 Degrees of Freedom = 1764.785
Independence AIC = 1788.785
Model AIC = 126.845
Saturated AIC = 156.000
Independence CAIC = 1832.859
Model CAIC = 244.375
Saturated CAIC = 442.481
Normed Fit Index (NFI) = .964
Non-Normed Fit Index (NNFI) = .986
Parsimony Normed Fit Index (PNFI) = .672
Comparative Fit Index (CFI) = .990
Incremental Fit Index (IFI) = .990
Relative Fit Index (RFI) = .949
Critical N (CN) = 121.096
Root Mean Square Residual (RMR) = .0305
Standardized RMR = .0592
Goodness of Fit Index (GFI) = .907
Adjusted Goodness of Fit Index (AGFI) = .842
Parsimony Goodness of Fit Index (PGFI) = .535

Table 4.76 reveals that the Satorra-Bentler scaled chi-square statistic (62.845) was statistically significant (p<.05). The exact fit null hypothesis (H_{01a}) was therefore rejected, and the comprehensive LISREL model failed to show exact fit. The RMSEA statistic (.0588) was statistically insignificant (p>.05). This meant that the close fit null hypothesis (H_{01b}) was not rejected, the model showed reasonable fit in the sample and it was admissible to hold the claim that the comprehensive LISREL model showed close fit in the parameter.

The GIF statistic (.907) indicated good fit (>.90). The AGFI statistic (.842) fell only just blow the cut-off value of .90 and the SRMR value of .059 fell only just above the .05 threshold. Table 4.76 further shows that the NFI (.964), NNFI (.986), CFI (.990) and IFI (.990) fit indices all exceed the more

stringent cut-off value of .95. The RFI still exceeded the less stringent cut-off value of .90. These indices therefore suggested convincing evidence to corroborate a good (close) fitting model.

In light of the above, it can be advocated that the modified reduced employee engagement comprehensive LISREL model showed good fit. The standardised variance-covariance residuals and modification indices (for Gamma, Beta and Phi) were subsequently examined to draw a final conclusion on the quality of the model fit.

4.8.2 Examining the comprehensive LISREL model standardised residuals

As previously mentioned, standardised covariance residuals are deemed large if they exceed $\pm$ 2.58. Table 4.77 shows that there were only one negative and two positive large residuals in the model. This small percentage $(3/\ ((12*(12+1))/2) = 0.0385*100 = 3.19\%)$ of extreme standardised residuals served as corroborating evidence on the close fit of the comprehensive LISREL model.

Table 4.77

Summary statistics for the comprehensive LISREL model standardised residuals

	Value
Summary statistics for standardised residuals	
Smallest standardised residual	-3.050
Median standardised residual	.000
Largest standardised residual	4.356
Largest negative standardised residuals	
Residual for OCBP2 and ITQP2	-3.050
Largest positive standardised residuals	
Residual for OCBP2 and JSP1	3.497
Residual for OCBP2 and JSP2	4.356

4.8.3 Examining the structural model modification indices

The objective behind investigating the modification indices for the Beta ($\mathbf{B}$), Gamma (Γ) and Psi (Ψ) was twofold. Firstly, to serve as corroborating evidence on model fit (i.e. a small percentage of large, significant (p<.05) modification indices would indicate to a well-fitting model). Secondly (as with the initial structural model mentioned at the start of this section), large ($\geq$6.64) and statistically significant (p<.05) modification indices specify the extent to which the fit of the model would improve if additional paths or relationships were added to this likely underestimated model. The modification indices for $\mathbf{B}$, Γ and Ψ are found in Tables 4.78, 4.79 and 4.80 respectively. As previously mentioned, the modification indices calculated for phi (Ψ) served only to comment on the fit of the structural model and not to suggest modifications. In Chapter 5 the modification indices for $\mathbf{B}$ and Γ are discussed from the perspective of data-driven suggestions for future research.

Table 4.78

Structural model modification indices for Beta

	SE	JS	OC	ITQ	OCB
SE	- -	.009	.218	.833	.884
JS	- -	- -	- -	1.570	**8.775***
OC	- -	- -	- -	- -	**6.768***
ITQ	4.999	- -	- -	- -	.111
OCB	- -	**7.442***	- -	.158	- -

* (p<.01)

Note: SE represents *state engagement*, JS represents *job satisfaction*, OC represents *organisational commitment*, ITQ represents *intention to quit*, OCB represents *organisational citizenship behaviour*, PE represents *personal engagement*

Table 4.79

Structural model modification indices for Gamma

	PE
SE	- -
JS	.013
OC	1.188
ITQ	1.829
OCB	2.141

* (p<.01)

Note: SE represents *state engagement*, JS represents *job satisfaction*, OC represents *organisational commitment*, ITQ represents *intention to quit*, OCB represents *organisational citizenship behaviour*,

Table 4.80

Structural model modification indices for Psi

	SE	JS	OC	ITQ	OCB
SE	- -				
JS	.011	- -			
OC	1.124	- -	- -		
ITQ	2.995	**12.473***	- -	- -	
OCB	2.188	**9.748***	7.023	.820	- -

* (p<.01)

Note: SE represents *state engagement*, JS represents *job satisfaction*, OC represents *organisational commitment*, ITQ represents *intention to quit*, OCB represents *organisational citizenship behaviour*

Table 4.78 shows that of the eleven Beta matrix parameters, that could be considered as additional paths between endogenous latent variables, only three (27%), if set free, would result in a statistically significant (p<.01) improvement in model fit. The largest modification index value suggests that *job satisfaction* should be allowed to directly affect *organisational citizenship behaviour*.

It is evident from Table 4.79 that none (0%) of the parameters currently fixed to zero in the Gamma matrix, if set free, would result in a statistically significant (p<.05) improvement in model fit.

Lastly, two of the ten (20%) fixed covariances terms visible in the Psi matrix (Table 4.80), if set free, would statistically significantly (p<.01) improve the fit of the comprehensive LISREL model. Taken together, these percentages are indicative of reasonable to good model fit. The potential modifications above will be discussed as part of the data driven recommendations in section 5.3.1.

Collectively, the results reported above for the model fit statistics, standardised residuals and modification indices were an indication of good fit for the employee engagement comprehensive LISREL model. Subsequently, this together with the very good measurement model fit, led to the inference that the employee engagement structural model exhibited sufficiently good model fit. This finding merited the testing of the structural model parameter estimates.

4.8.4   Examining the modified structural model parameter estimates and squared multiple correlations

The objective behind investigating the structural model parameter estimates was to determine whether the hypothesised theoretical causal relationships embedded in the structural model (Figure 4.1) were supported by the data. The poor fit of the reduced engagement comprehensive LISREL model meant that it had to be concluded that the psychological mechanism depicted in Figure 4.1 did not provide a plausible description of the manner in which personal engagement affects state engagement and how state engagement affects downstream latent outcome variables. A small tweak to the reduced engagement structural model (i.e. allowing *organisational commitment* to directly affect *OCB*) did, however, cause the reduced engagement comprehensive LISREL model to show exact fit[75]. This justified the interpretation of the modified reduced engagement structural model so as to obtain detailed data-driven suggestions for future research[76]. This involved testing of path-specific (Beta and Gamma)

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[75] The modified reduced engagement structural model cannot be regarded as empirically corroborated in the current study because the modification to the original reduced model had been derived from the current data. The current data cannot, therefore, be used to suggest the modification and then to also corroborate/support the modified model. Fresh data is required to empirically test the modified model and only if it demonstrates similar fit their can it be regarded as corroborated.

[76] The fact that the modified reduced engagement LISREL model fitted the data does not necessarily mean support for the hypothesised structural effects. It means that the fitted model, with its statistically significant and statistically insignificant structural paths, provides a valid (i.e. permissible) description of a mechanism that could have produces the observed covariance matrix. The detailed data-driven suggestions thus focus on paths that should be retained, paths that should be rethought and paths that should be considered for addition.

statistical null hypotheses similar to those presented in paragraph 4.3. The path-specific substantive hypotheses listed in paragraph 4.3 and the corresponding statistical hypotheses are strictly speaking not the same as those tested here just as much as those hypotheses listed in Chapter 4 are not the same as those listed in Chapter 3. It was earlier stressed that the phrase *in the proposed employee engagement structural model it is hypothesised that* used in the formulation of the path-specific hypotheses is important. It emphasised the fact that the hypotheses posit that a specific exogenous latent variable ξ_j or endogenous latent variable η_i causes unique variance in a specific endogenous latent variable η_i when controlling for the other ξ_p and η_q in the model linked to η_i. The precise meaning of the path-specific substantive hypotheses is dependent on the larger nomological net the path is embedded in. For convenience sake the path-specific substantive hypotheses listed in paragraph 4.3 and the corresponding statistical hypotheses are nonetheless referred to here in the interpretation of **B**, Γ and Ψ.

Table 4.81

Structural model unstandardised Beta matrix

	SE	JS	OC	ITQ	OCB
SE	- -	- -	- -	- -	- -
JS	.585*	- -	- -	- -	- -
	(.092)				
	6.370				
OC	.189*	.543*	- -	- -	- -
	(.112)	(.108)			
	1.681	5.018			
ITQ	- -	**-.117**	-.646*	- -	- -
		(.126)	(.114)		
		-.927	-5.650		
OCB	.226*	- -	.562*	- -	- -
	(.113)		(.089)		
	2.001		6.327		

* (p<.01)

Note: SE represents *state engagement*, JS represents *job satisfaction*, OC represents *organisational commitment*, ITQ represents *intention to quit*, OCB represents *organisational citizenship behaviour*

Table 4.82

Structural model completely standardised Beta matrix

	SE	JS	OC	ITQ	OCB
SE	- -	- -	- -	- -	- -
JS	.585	- -	- -	- -	- -
OC	.189	.543	- -	- -	- -
ITQ	- -	-.117	-.646	- -	- -
OCB	.226	- -	.562	- -	- -

Note: SE represents *state engagement*, JS represents *job satisfaction*, OC represents *organisational commitment*, ITQ represents *intention to quit*, OCB represents *organisational citizenship behaviour*

Table 4.83

Structural model unstandardised Gamma matrix

	PE
SE	.691*
	(.120)
	5.740
JS	- -
OC	- -
ITQ	- -
OCB	- -

* (p<.01)

Note: PE represents personal engagement, SE represents *state engagement*, JS represents *job satisfaction*, OC represents *organisational commitment*, ITQ represents *intention to quit*, OCB represents *organisational citizenship behaviour*

Table 4.84

Structural model completely standardised Gamma matrix

	PE
SE	.691
JS	- -
OC	- -
ITQ	- -
OCB	- -

Note: SE represents *state engagement*, JS represents *job satisfaction*, OC represents *organisational commitment*, ITQ represents *intention to quit*, OCB represents *organisational citizenship behaviour*

Table 4.81 and Table 4.83 to 4.71 show that the signs for all the parameter estimates between the various latent variables in the structural model were consistent with the nature of the hypothesised paths. All of the β and γ estimates transformed to |z-values| were greater than the one-tailed critical value on a 5% significance level of 1.6449, with the exception of β_{42} (H_{06}). Therefore, bar β_{42}, all β and γ estimates were statistically significant (p<.05) and, bar H_{06}, all null hypotheses (H_{02}, H_{03}, H_{04}, $H_{05,}$ H_{07} and H_{08}) could be rejected.

Support was therefore not found in this study for the hypothesised theoretical relationship between *job satisfaction* and *intention to quit* (Hypothesis 6). In other terms, this study was unable to validate the hypothesis that *job satisfaction* negatively affects *intention to quit*. More specifically the current study found that *job satisfaction* did not statistically significantly (p>.05) explain unique variance in *intention to quit* when controlling for the effect of *organisational commitment*.

On the other hand, support was obtained for the remaining path-specific hypotheses in this study. More specifically, the following hypotheses were supported by the data:

- Hypothesis 2: *Personal engagement* positively influences employee *state engagement*.

- Hypothesis 3: *State engagement* positively influences *job satisfaction*.

- Hypothesis 4: *State engagement* positively influences *organisational commitment* when controlling for the effect of *job satisfaction*.

- Hypothesis 5: *Job satisfaction* positively influences *organisational commitment* when controlling for the effect of *state engagement.*

- Hypothesis 7: *Organisational commitment* negatively affects *intention to quit* when controlling for the effect of *job satisfaction*.

- Hypothesis 8: *State engagement* positively influences *organisational citizenship behaviour* when controlling for the effect of *organisational commitment*.

- Hypothesis 9 [77] : *Organisational commitment* positively affects *OCB* when controlling for the effect of *state engagement.*

Table 4.82 and Table 4.84 that all the statistically significant (p<.05) effects were moderate in magnitude. The effect of *state engagement* on *organisational commitment*, when controlling for *job satisfaction*, was the smallest whilst the effect of *personal engagement* on *state engagement* was the strongest. This strong support for this pivotal hypothesis 2 was extremely gratifying.

Table 4.85 below provides the unstandardised structural error variance estimates (ψ_{jj}). The expectation is that these variances should be significant (p<.05) but small (.20-.39), given that the model would never be considered perfect or complete. As evident from Table 4.85, all of the structural error variances were statistically significant (z>1.664; p<.05). The completely standardised Psi matrix (Table 4.86), that allows the interpretation of the magnitude of the error variances, paints a picture that acknowledges that the psychological mechanism that regulates state engagement and its outcomes is complex. All of the Psi variances are relatively large. This indicates that a significant portion of variance in each endogenous latent variable is not explained by the current model. Despite these findings, it is acknowledged that the ultimate goal of cumulative research is to whittle away at the magnitudes of such error variances, by further elaborating and expanding on the current model through successive studies.

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[77] Hypothesis 9 was not originally posited as part of the theorising and was not listed in paragraph 4.3 but rather was derived from the modification indices calculated for **B** in the current study.

Table 4.85

Structural model unstandardised Psi matrix

SE	JS	OC	ITQ	OCB
.522*	.658*	.549*	.470*	.504*
(.135)	(.107)	(.092)	(.090)	(.117)
3.855	6.165	5.983	5.198	4.316

* (p<.01)

Note: SE represents *state engagement*, JS represents *job satisfaction*, OC represents *organisational commitment*, ITQ represents *intention to quit*, OCB represents *organisational citizenship behaviour*

Table 4.86

Structural model completely standardised Psi matrix

SE	JS	OC	ITQ	OCB
.522	.658	.549	.470	.504

Note: SE represents *state engagement*, JS represents *job satisfaction*, OC represents *organisational commitment*, ITQ represents *intention to quit*, OCB represents *organisational citizenship behaviour*

The squared multiple correlations (R^2) shown in Table 4.87 indicate the proportion of variance accounted for in each of the endogenous latest variables by the employee engagement structural model. Only in the case of *intention to quit* and very nearly *organisational citizenship behaviour* did the model explain more than 50% of variance in these latent variables. The remaining R^2 values for *state engagement*, *job satisfaction* and *organisational commitment* were relatively low. Overall these results complement the findings in Table 4.86 that the model wasn't very successful at explaining variance in these latent variables.

Table 4.87

Squared multiple correlations for the endogenous latent variables in the employee engagement structural model

SE	JS	OC	ITQ	OCB
.478	.342	.451	.530	.496

Note: SE represents *state engagement*, JS represents *job satisfaction*, OC represents *organisational commitment*, ITQ represents *intention to quit*, OCB represents *organisational citizenship behaviour*

The unstandardised indirect effect of *personal engagement* on *job satisfaction*, *organisational commitment*, *OCB* and *intention to quit* are shown in Table 4.88. Table 4.88 indicates that personal engagement as the only exogenous latent variable in the modified reduced engagement structural model,

statistically significantly (p<.05) indirectly affects all the endogenous latent variables in the model to which it is not directly linked. The indirect effects of personal engagement on *job satisfaction*, *organisational commitment*, *OCB* and *intention to quit* are therefore all statistically significant (p<.05).

Table 4.88

Indirect effects of the exogenous latent variable on the endogenous latent variables

	PE
SE	- -
JS	.4043*
	(.1031)
	3.9224
CO	.3503*
	(.0912)
	3.8413
OCB	.3530*
	(.0958)
	3.6849
ITQ	-.2736*
	(.0741)
	-3.6896

* (p<.01)

Note: PE represents *personal engagement*, SE represents *state engagement*, JS represents *job satisfaction*, OC represents *organisational commitment*, ITQ represents *intention to quit*, OCB represents *organisational citizenship behaviour*

The unstandardised indirect effects amongst the endogenous latent variables are shown in Table 4.89.

Table 4.89

Indirect effects of the endogenous latent variable on the endogenous latent variables

	SE	JS	CO	OCB	ITQ
SE	- -	- -	- -	- -	- -
JS	- -	- -	- -	- -	- -
CO	.3179*	- -	- -	- -	- -
	(.0744)				
	4.2730				
OCB	.2850*	.3056*	- -	- -	- -
	(.0731)	(.0881)			
	3.8994	3.4706			

Table 4.89

Indirect effects of the endogenous latent variable on the endogenous latent variables (continued)

	SE	JS	CO	OCB	ITQ
ITQ	-.3958*	-.3513*	- -	- -	- -
	(.0732)	(.0833)			
	-5.4081	-4.2151			

* (p<.01)

Note: SE represents *state engagement*, JS represents *job satisfaction*, OC represents *organisational commitment*, ITQ represents *intention to quit*, OCB represents *organisational citizenship behaviour*

Table 4.89 shows that *state engagement* has a statistically significant (p<.05) indirect effect on *organisational commitment*, *OCB* and *intention to quit*. Likewise, the indirect effect of *job satisfaction* on *OCB* and *intention to quit* is shown to be statistically significant (p<.05). Therefore, even though the direct effect of *job satisfaction* on *intention to quit* was found to be statistically insignificant (p>.05), the indirect effect of *job satisfaction* on *intention to quit,* mediated by *organisational commitment* was found to be statistically significant (p<.05).

4.8.5 Overall verdict on the reduced employee engagement structural model

In order to test the modified reduced employee engagement structural model, the goodness of fit statistics, standardised residuals and modification indices, calculated for the modified reduced comprehensive LISREL model, were investigated. In addition, the magnitude and statistical significance of the model parameter estimates and the dependent latent variables' R^2 were evaluated.

The comprehensive LISREL model showed close fit (RMSEA=.0588; p>.05) and H_{01b} was not rejected. Moreover, good fit was corroborated by a small percentage (3.19%) of extreme standardised residuals. Section 5.3.1 discusses the modification indices with respect to potential data driven future recommendations. In light of a good close-fitting model, the current study went on to interpret the structural model parameter estimates.

The study failed to substantiate the reduced engagement structural model that was developed via theorising in Chapter 2. The study failed to substantiate the hypothesis that *job satisfaction* negatively affects *intention to quit* when controlling for the effect of *organisational commitment*. However, on the other hand, the study was delighted to find support for the hypotheses that: *State engagement* positively influences *job satisfaction*; *State engagement* positively influences *organisational commitment*; *Job satisfaction* positively influences *organisational commitment*; *Organisational commitment* negatively affects *intention to quit*. *State engagement* positively influences *organisational citizenship behaviour and personal engagement* positively influences *state engagement*. What is more, even though not

initially theorised in this study and embedded in the employee engagement structural model shown in Figure 4.1, the study found support to suggest a relationship between *Organisational commitment* and *OCB*. As discussed at the start of section 4.8, the initial model failed to show exact or close fit ($p < .05$). The highest modification value indicated that a path be added from *organisational commitment* to *OCB*. After adding the path, the goodness of fit statistics indicated good close fit ($p > .05$).

The colour-coded path diagram in Figure 4.21 below provides a visual summary of the findings with respect to the significance of the various hypothesised paths in the employee engagement model. The next chapter discusses the conclusions and implications of the results obtained in this study.
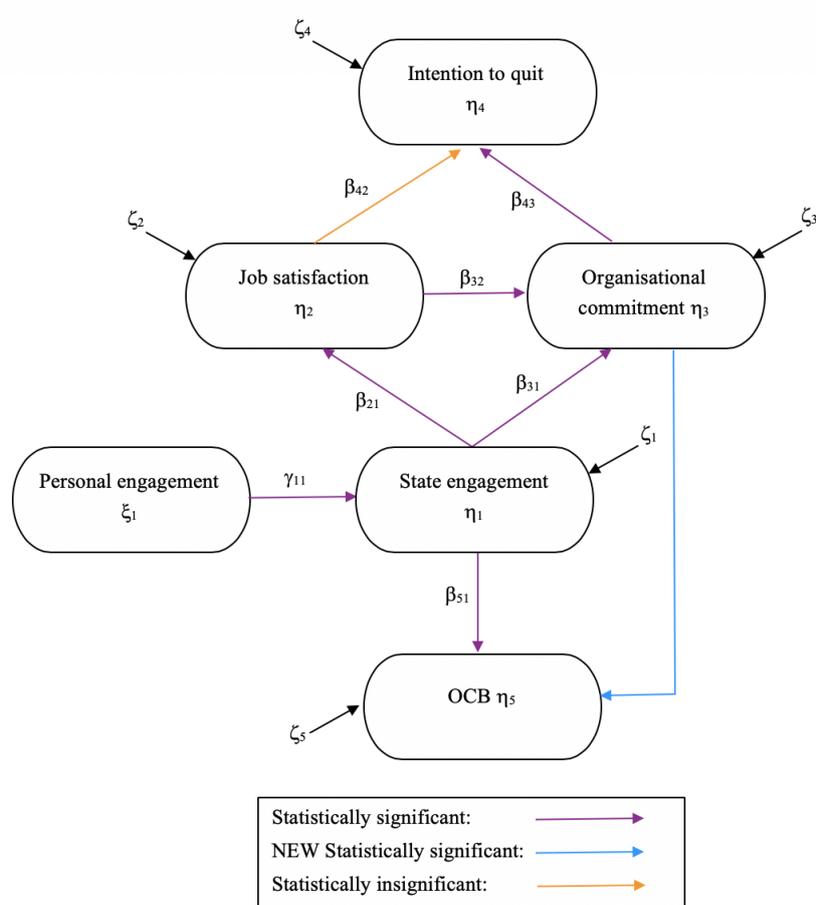
Figure 4.21. Visual summary of the significance of the hypothesised paths in the reduced employee engagement structural model.

CHAPTER 5
CONCLUSIONS, RECOMMENDATIONS, IMPLICATIONS AND LIMITATIONS

5.1   INTRODUCTION

Chapter 1 presented that, in the face of today's challenges, one crucial way in which HR practitioners can enhance both employee performance and wellbeing is through interventions that foster employee state engagement. In fact, employee state engagement (and subsequent increasingly applied interventions to enhance it) have come to be described by practitioners as "the keystone to talent management and business success" (Shuck & Reio, 2011, p. 420). This is likely due to the influx of empirical evidence suggesting that an engaged workforce significantly enhances levels of employee performance; discretionary effort in the form of organisational citizenship behaviours (OCBs); job satisfaction; organisational commitment; wellbeing and psychological climate; overall profit, revenue and economic growth; and customer service (Christian, Garza, & Slaughter, 2011; Fleming & Asplund, 2007; Rich, LePine, & Crawford, 2010; Richman, 2006; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). What's more, empirical studies advocate employee engagement as a key driver in reducing employee turnover as well as on the job accidents ensuring an elevated overall perception of safety (May, Gilson, & Harter, 2004; Saks, 2006; Shuck, Reio, & Rocco, 2011). All these potential leverage points, and subsequent rapid growth in the interest of developing employee state engagement interventions, has HR practitioners turning towards their fellow HR scholars and researchers for empirically proven means of successfully cultivating employee state engagement in organisations.

The success at which HR can purposefully promote the development of high engagement in employees is dependent on the extent to which the nomological network of latent variables that merge to affect performance on the various dimensions of state engagement is validly understood. In light of this, the current study set out to answer the research initiating question – why does variance exist in the level of state engagement of employees? More specifically, and true to the nature of cumulative research that works from a unifying perspective, the primary objective of this study was to structurally link an existing employee personal engagement structural model theorised by Kahn (1990) and developed/tested by May et al. (2004) with the state engagement construct and to expand and modify this model further. The full hypothesised expanded employee engagement structural model is provided in Figure 2.4. Unfortunately, due to a lower than hoped for sample size a reduced model was tested for the purposes of this study. The model tested in this study is shown in Figure 4.1.

With great regret, the reduced model opted to refrain from testing May et al.'s (2004) section of the expanded model (with the exception of their *personal engagement* latent variable). Due to the persuasiveness of the theoretical arguments which led to the hypothesised paths in May et al.'s (2004) revised model (presented in Section 2.3) and the statistical significance (p<.05) of the standardised path coefficients (as presented in Figure 2.3), the current study focused on the section of the expanded model

that had yet to be empirically tested. The desire was to still, to some extent, contribute to the cumulative nature of progressive studies that seek to further unify and expand on existing models of employee engagement. As such, the study sought to investigate the relationship between *personal engagement* and *state engagement* – i.e., whether they are indeed two empirically distinct yet insightfully related constructs – as well as the various outcomes variables that would serve as the mechanisms by which to impact job performance

As previously stated, while outcome variables do not directly influence employee engagement it is reasonable to expect that downstream latent variables will eventually influence upstream variables. Employee engagement should be considered complex in that feedback loops exist that link latent employee engagement outcome variables to the employee engagement potential latent variables and through them, the employee engagement variables that originally (directly/indirectly) determined the outcome latent variables so as to create a dynamic system (Cilliers, 1998). Outcome variables were subsequently explored to gain a more powerful understanding of the psychological dynamics underlying employee engagement.

The present chapter discusses the various conclusions drawn from the results presented in Chapter 4. Thereafter, the chapter goes on to discuss study limitations, recommendations for future research as well as practical managerial implications brought forth by the study.

5.2   CONCLUSION AND DISCUSSION

Testing the psychological explanation for employee engagement as expressed in the proposed reduced model in Figure 4.1, was regarded satisfactory if:

- The measurement model fitted the data well,
- The comprehensive LISREL model fitted the data well,
- The path coefficients for the hypothesised structural relations were statistically significant (p<.05) and moderate to large, and
- The proposed model was found to explain a substantial segment of the variance in each of the endogenous latent variables.

Prior to fitting the measurement model item analysis was performed on each subscale used to operationalise the various latent variables in the employee engagement model. Expect for item SE16_ded from the absorption subscale of the *state engagement* scale, which was deleted, the reliability of all items (and subscales) was considered satisfactory. Next, dimensionality analysis (via EFA) was performed on each of the scales to determine whether a substantial and sufficient proportion of observed variance in each item is explained by the particular variable they were designed to represent. Even though none of (sub)scales successfully passed the unidimensionality assumptions that were originally

hypothesised the factor fission was in most cases meaningful and in most cases the items were acceptable indicators of the multidimensional construct as indicated either by an acceptable R² or by statistically significant (p<.05) indirect effects of a second-order factor on the subscale items. .

The measurement model showed close fit (RMSEA=.0645; p=.248). The completely standardised factor loadings (lambda-X) were all statistically significant (p<.05) and acceptable high (>.71). All of the measurement error terms were adequately small and mostly statistically significant. All of the indicator variables were found to provide a valid account of the latent variables they were designed to reflect, and lastly, discriminant validity was also demonstrated. Discriminant validity was particularly insightful with regards *personal engagement* and *state engagement*, as the results suggest it's reasonable to consider these two forms of engagement as empirically unique and distinct measurement constructs.

The reduced comprehensive LISREL model showed poor fit (RMSEA=.0926; p<.05). Both H_{01a} and H_{01b} therefore had to be rejected in favour of H_{a1a} and H_{a1b}. Support was therefore not obtained for the reduced engagement structural model shown in Figure 4.1. The reduced structural model was subsequently modified, based on feedback obtained from the modification indices calculated from the poor fitting reduced model, by adding a path from *organisational commitment* to *OCB*. The modified reduced comprehensive LISREL model showed close fit (RMSEA=.0588; p>.05). Good model fit was further supported by a small percentage (3.19%) of extreme standardised residuals. The relatively large Psi variances (Table 4.86) and squared multiple correlations (R^2), on the other hand, both indicated that the employee engagement structural model was not very successful at explaining variance in these latent variables.

The current study failed to uncover support for the hypothesis that *job satisfaction* negatively affects *intention to quit* when controlling for *organisational commitment*. This was surprising given that a number of studies have reported that *job satisfaction* is negatively related to turnover and *intention to quit* (Irvine & Evans, 1995; Masum et al., 2016; Tarigan & Ariani, 2015; Yücel, 2012). Such a superficial comparison of findings is, however, questionable. Results are really only comparable if the same hypotheses have been tested[78]. In light of the arguments provided in section 2.4.2.2.3, no seemingly apparent flaw could be identified in the theorising underpinning this hypothesised path.

On the other hand, the study was ecstatic to find that the results found support for the hypothesis that *state engagement* positively influences *personal engagement*. Kahn's conceptualisation of *personal engagement* focuses on moments of *personal engagement* and the temporary conditions under which people are fully psychologically present at work. This stands in contrast to the construct of *state engagement* (Shaufeli et al., 2002; Bakker & Schaufeli, 2008; Demerouti & Bakker, 2006) which refers

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[78] This comment also applies to the comparison of the subsequent discussions of the positive findings of the current study.

to a *psychological state* characterised by energy, dedication and absorption. *State engagement*, rather than a psychological act of committing, rendering, giving or investing the self, refers to "a more persistent and pervasive affective-cognitive state that is not focused on any particular object, event, individual or behaviour". Essentially, the argument here lies in the fact that before a *state* of engagement can be achieved, the opportunity to psychologically embraced and actively take it upon oneself to personally engage in one's work needs to take place. It is only if the employee frequently and regularly commits, renders, and gives of themselves to the job that the psychological state of *state engagement* can emerge.

The current study found support for the hypothesis that *state engagement* positively influences *job satisfaction*. *Job satisfaction* refers to a satisfying or positive emotional state that arises from an employee's appraisal of their job or job experience. Engaged employees frequently experience positive emotions (e.g. happiness, joy, and enthusiasm) as evident in a recent study by Schaufeli and Van Rhenen, 2006). Due to their positive attitude and activity level, engaged employees create their own positive feedback or appraisals, in terms of appreciation, recognitions and success (Bakker & Demerouti, 2008). Evidence of this relationship between *state engagement* and *job satisfaction* is further supported by more recent studies (Huang, Lee, McFadden, Murphy, Robertson, Cheung & Zohar, 2016; Karatepe & Karadas, 2015).

The current study found support for the hypothesis that *state engagement* positively influences *organisational commitment* when controlling for the effect of *job satisfaction*. Chapter 2 highlighted that both empirical studies (Demerouti et al., 2002; Hakanen et al., 2006) and qualitative studies (Schaufeli et al., 2001) have found that engaged employees are more committed to their jobs. More recently, Jung and Yoon (2016) and Abu-Shamaa, Al-Rabayah and Khasawneh (2015) demonstrated that employees' *state engagement* positively influences *organisational* commitment. Huhtala and Feldt (2016) found that work engagement was associated with higher affective commitment and lower turnover intentions.

The current study found support for the hypothesis that *job satisfaction* positively influences *organisational commitment* when controlling for the effect of *state engagement*. It is argued that employees who are satisfied with their job, in that they have a positive affective response to their job, are more likely to commit to their organisation. This commitment would enable them to remain in the organisation to continue performing the job they enjoy. Moreover, employees as a result the satisfying emotional state gained from the appraisal of one's job experience would develop a more positive emotional attachment (affective commitment) to the organisation. Abu-Shamaa et al. (2015) and Colquitt et al. (2010) found that *job satisfaction* has a strong positive effect on *organisational commitment*. Gunlu, Aksarayli, and Perçin (2010) indicated that extrinsic, intrinsic, and general job satisfaction significantly impacted normative and affective commitment. In the South African context,

Lumley, Coetzee, Tladinyane and Ferreira (2011) found evidence to suggest significant relationships between *job satisfaction* as well as affective and normative commitment.

The current study found support for the hypothesis that *organisational commitment* negatively affects *intention to quit* when controlling for the effect of *job satisfaction*. This echo's the recent findings of Haque, Fernando, and Caputi (2019) who demonstrated that affective commitment negatively influenced *intention to quit*. Similarly, Avanzi, Fraccaroli, Sarchielli, Ullrich and Dick (2014) as well as Mathieu, Fabi, Lacoursière and Raymond (2016) found that employees with a higher level of *organisational commitment* exhibited a lower level of turnover intention. Natarajan (2011) argues that *organisational commitment* results in lower turnover intention as well as other outcome variables such as improved performance, work quality, innovation, job satisfaction and lower absenteeism. In a South African study among retail employees in the Western Cape (Zhou, 2017) found a negative relationship between *organisational commitment* and *intention to quit*.

The current study found support for the hypothesis that *state engagement* positively influences *organisational citizenship behaviour* when controlling for the effect of *organisational commitment*. Numerous researchers have found empirical evidence to support that engagement leads to higher levels of OCB (Babcock-Roberson & Strickland, 2010; Christian et al., 2011; Rich et al., 2010; Saks, 2006; Shantz et al., 2013; Sonnentag, 2013). According to Kahn (1990), engagement impacts performance to the extent that engaged employees develop new knowledge, size opportunities and engage in OCBs such as mentoring and volunteering. Engagement can be seen as a two-way street. Organisations put forth extra effort to promote engagement among employees which in turn, results in highly engaged employees be actively willing to put forth extra effort which promotes both organisational success and at the same time enhances their own wellbeing (Gupta & Sharma, 2016). More recently, Bailey, Madden, Alfes and Fletcher (2017) found support that employee engagement positively influences OCB.

Lastly, despite not initially theorised in this study and therefore not initially part of the path-specific substantive hypotheses, the study found support to suggest a relationship between *organisational commitment* and *OCB* when controlling for the effect of *state engagement*. The highest modification index value was for a path from *organisational commitment* to *OCB*, the standardised expected change was positive and reasonably substantial and adding the path significantly improved model fit. This also made strong theoretical sense in that it seems plausible to expect that individuals who possess a strong sense of commitment towards their organisation are indeed probably more inclined to exhibit discretionary behaviours that go beyond that which is formally required of them when performing their job. Mitonga-Monga and Cilliers (2016) as well as Chang, Nguyen, Cheng, Kuo and Lee (2016) both found support for a positive relationship between *organisational commitment* and *OCB*. The results of Wombacher and Felfe's (2017) survey study (n=1362) confirmed the hypothesis that *organisational*

commitment positive influences *OCB*. Notably, a South African study (Mahembe, Engerbrecht & Dannhauser, 2016) also involving teachers from the Western Cape showed evidence of positive relationships between affective (team) commitment and *OCB*. Since this path-specific hypothesis was derived from feedback attained from the current data the empirical results obtained in the current study cannot be interpreted as strong evidence in support of such a path. Rather it should be seen as a data-driven recommendation for future research.

In light of the research results, future research recommendations will be presented, as well as practical recommendations for how managers and organisations can leverage employee engagement as a driver of job performance. However, prior to this it's necessary to acknowledge, as with any research initiative, the limitations relevant to this study.

5.3   STUDY LIMITATIONS

There is no denying that even though the hypotheses in this study are causal in their reasoning, the results thereof are not sufficient to prove these causations. An experimental design (via manipulation) is the only way one can begin to substantiate that a change in one variable results in a change in another variable. The current study utilised an *ex post facto* correlation design and as such, the results only indicated covariate paths between latent variables. Significant relationships thus only prove there is a correlational relationship between variables and by no means justifies that one variables causally impacts another.

Another limitation that fell beyond the control of the study and that hinders many research initiatives, was the sample size obtained. This regrettably led to testing only a portion of the proposed expanded structural model. Limitations exist due to reducing the original expanded employee engagement model (Figure 2.4) to form the final reduced model that was tested as part of this study (Figure 4.1). A degree of meaning was lost when evaluating the reduced model, compared to the larger more complex model as a whole, since the overall complexity of the various interrelations were not fully uncovered. The hope is that future research will manage to obtain a larger response rate to ensure more accurate and reliable parameter estimates for the entire complex expanded employee engagement model.

The small sample size in addition affected the statistical power of the test of the exact and close fit null hypotheses associated with the reduced engagement measurement model and the (modified) reduced engagement comprehensive LISREL model. The Preacher and Coffman (2006) software calculated the statistical power of the test of exact fit of the modified reduced engagement comprehensive LISREL model as .3275054 and the statistical power of the test of close fit of the modified reduced engagement comprehensive LISREL model as .430271. The fact that the probability of rejecting the close fit null hypothesis, given that the model fitted mediocre in the parameter (RMSEA=.08), was relatively small erodes the persuasiveness of the finding that exact fit in the parameter was plausible.

Moreover, the low statistical power associated with the tests of exact and close fit of the second-order and bi-factor models that were fitted as part of the dimensionality analyses in the case of findings of factor fission needs to be confessed as a limitation. This shortcoming is first and foremost due to the small degrees of freedom of the fitted models. This in turn is primarily due to the small number of items in the subscales that were analysed. The small sample size further aggravated the problem.

A further limitation, related to the sampling, was the use of convenience sampling in the form of an email to participant teachers. It's likely that this sample lacked the diversity necessary to adequately represent teachers in the Western Cape area. As such, any generalisations made to the overall target population should be done so with caution. Moreover, in light of the change of sampling method to that of snowball sampling during the data gathering process to try boost the number of data points, caution should also be taken in considering the data gathered before and after as fully comparable.

Lastly, and worth noting, the opportunity provided to participants to enter a lucky draw (to win a tablet device) might have posed potential limitations on the study. Participants (in the event of completing the online survey) could voluntarily decide to follow a link to a separate survey that required them to provide their email address or cell phone number. A winner was then randomly selected and awarded the prize. It is acknowledged that this opportunity might be considered a limitation to the extent that it influenced the motivation of participants to partake in the study and thus could have influenced the quality of the data.

Despite the above limitations, the current study advocates that the results of the research indeed still contribute to a deeper understanding of the mechanisms underlying employee engagement.

5.4 RECOMMENDATIONS FOR FUTURE RESEARCH

The following section outlines the recommendations for future research. First and foremost, it is recommended that future studies attempt obtaining a larger, more representative sample to empirically test the theorised model, particularly the original model in Figure 4.2. The remaining recommendations consist of data-driven suggestions derived from the current data, as well as, theory-driven recommendations derived from the literature.

5.4.1 Data-driven recommendations for future research

The modification indices and completely standardised expected change calculated for Γ and $\mathbf{B}$ were used to derive theoretically admissible suggestions for additional paths that ought to be considered for inclusion in future expanded versions of the current model.

Table 4.78 shows that the largest modification index value calculated for the modified reduced engagement comprehensive LISREL model suggests that *OCB* should be allowed to affect *job*

satisfaction when controlling for the effect of *state engagement*[79]. The current study is of the opinion that this relationship makes strong theoretical sense. It is plausible to argue that individuals who display *OCB* towards colleagues and their organisation experience enhanced *job satisfaction*, due to the positive emotions that arise from such discretionary, citizenship behaviours. A number of studies have found that *job satisfaction* consistently emerges with a high correlation to teachers' OCB (Bragger, Rodriquez-Srednicki, Kutcher, Indovino & Rosner, 2005; Garg & Rastogi, 2006; Ngunia, Sleegers & Denessen, 2006; Oplatka, 2006). Agustiningsih, Thoyib, Djumilah and Noermijati (2017) found support for a relationship between employees' level of satisfaction with their jobs and the likelihood of exhibiting OCBs. Moreover, Jung and Yoon (2015) found that individuals who were more satisfied with their jobs tended to help other co-workers or supervisors and also showed a higher tendency of doing devotional action for the organisation. On the other hand, Sawitri, Suswati and Huda (2016) were unable, in their study, to find a significant relationship between these two variables.

When allowing for a path from *OCB* to *job satisfaction* when controlling for the effect of *state engagement* in the modified reduced engagement structural model the RMSEA improved to .042 (from .0588) the path coefficient estimate β_{24} associated with the newly inserted path was positive and statistically significant (p<.05). None of the modification indices calculated for the modified reduced engagement comprehensive LISREL model for **B** and Γ were statistically significant (p<.05).

The modification indices calculated for **B** unfortunately suggested not feedback loop to *state engagement*. Moreover, the fact that *personal engagement* was modelled as an exogenous latent variable prevented any data driven recommendations regarding feedback loops from latent outcome variables to *personal engagement*.

5.4.2   Theory-driven recommendations for future research

As previously mentioned, due to practical considerations, it was with great regret and sorrow that the initially proposed expanded employee engagement structural model (Figure 2.4.) had to be reduced (Figure 4.1). The greatest concern was that the reduced model failed to fully recognise and account for the complexity underlying employee engagement. As such, the current study strongly urges that future researcher empirically evaluate the expanded model shown in Figure 2.4. including all the hypothesised relationships outlined in Chapter 2's literature review.

Given that the modified reduced model obtained close fit, the current study recommends that future research should incorporate additional latent variables in the *endeavour to further expand the employee*

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[79] The modification indices calculated for B also suggest that allowing *job satisfaction* to affect *OCB* in the current model (i.e. without any other paths added) would bring about a statistically significant (p<.01) improvement in model fit. The improvement in model fit associated with the path from *OCB* to *job satisfaction* was, however, marginally larger than the path from *job satisfaction* to *OCB*.

engagement structural model and thereby approximate an even better representation of the complex nomological network of variables influencing the engagement of an individual.

One possible latent variable that could be considered for inclusion into the elaborated model is *supervisor-employee trust*. It was argued in section 2.3.2.1 that increased uncertainty as to whether the supervisor might at any given moment act in a manner that is to the detriment of the employees, due to a poor relationship (characterised by mistrust and lack of support, control and flexibility given to employees) between supervisor and employee, could negatively impact the psychological safety experienced by the employee. This line of reasoning raises the question to future researchers whether trust between supervisor and employee or trust in the supervisor should possibly act as a mediator in the relationship between s*upervisor relations* and *psychological safety*.

Future elaborations of the employee engagement structural model could also formally include the latent variable *inter-colleague/co-worker trust*. May et al. (2004) were interested in investigating how supportive and *affective trust-building* co-worker relations could positively impact psychological safety and engagement at work. This line of reasoning suggests to future researchers that *inter-colleague/co-worker trust* could be a mediator in the relationship between *co-worker relations* and *psychological safety*.

Psychological empowerment is a motivational construct that is manifested in four cognitions, namely meaning, competence, self-determination and impact (Spreitzer, 1995). Empowered employees believe in themselves and what they do, and they perceive that they exercise some control over their work lives. Engage employees experience feelings of choice and control as well as positive emotions towards work. They consider their workload to be manageable and themselves as able to deal completely with the demands of their jobs, believe their work to be personally meaningful, and they have hope about the future of their employment (Maslach et al., 2001; Ram & Prabhakar, 2011; Shaufeli et al., 2002). From this reasoning it seems logical to recommend to future researchers to investigate how *psychological empowerment* could be embedded in the proposed employee engagement structural model, more specifically its relationship with *psychological meaningfulness*.

The possibility of including *psychological ownership* (Pierce & Jussila, 2011; Pierce, Kostova, & Dirks, 2001;2003) in an elaborated version of the current engagement structural model should also be considered. It could be argued that investing the self in a job, provided that the prerequisites set out by Kahn (1990) have been met, (i.e. *personal engagement*) would not directly translate into *state engagement* but that the effect of *personal engagement* on *state engagement* would be mediated by *psychological ownership*.

In addition, the question should be asked whether the level of *performance* that employees achieve in their jobs should not also form part of the psychological mechanism that regulates engagement. It seems

reasonable to argue that *state engagement* will have an (indirect) positive impact of *performance* through the effect it would have on *motivation to perform* through its effect on the *valence of high performance*. OCB is in fact a dimension of contextual performance (Myburgh & Theron, 2014). Task performance should, however, also be included in the model. At the same time, however, *performance* could be expected to exert a feedback effect on *personal engagement* through its effect on *psychological availability.*

5.5   MANAGERIAL PRACTICAL RECOMMENDATIONS

The final recommendations involve a more practical standpoint on the usefulness of the results of this current study. The study was motivated by the argument that employee engagement is both an important and relevant construct in South Africa's current work environment that HR needs to take into consideration when developing interventions aimed at improving employee performance and employee wellbeing. The level of *state engagement* achieved by employees is also not a random event but rather systematically determined by a complex nomological network of malleable and/or non-malleable person-centred and situational latent variables, characterising the individual and his/her learning environment. Moreover, resources available for HR interventions are scarce and as such need to be utilised optimally to ensure the highest possible level of engagement is achieved by every individual involved in the intervention. Because the level of *state engagement* is determined HR interventions are in principle possible provided the determinants of state engagement, and the manner in which they structurally combine, are validly understood.

In light of this argument, the modified reduced employee engagement structural model provides evidence on the identity of some of the latent variables that determine employee *state engagement* and the manner in which they amalgamate to determine the level *of state engagement* that will result, albeit to a much more limited extent than would have been the case if the initially proposed engagement structural model could have been empirically tested.

Milkovich, Boudreau and Milkovich (2008) distinguish between two broad categories of human resource interventions. Flow interventions represent interventions that aim to positively affect some (desirable) latent criterion variable (like job performance or *state engagement*) by regulation the flow of employees into the organisation, up the organisation and out of the organisation. Examples of flow interventions are selection, promotion and down-sizing. Flow interventions restrict the flow of employees to those that meet minimum standards of latent employee characteristics that directly or indirectly determine the level of the to-be-affected latent criterion variable. Flow interventions typically (but not exclusively) target non-malleable determinants of the latent criterion variable [80]. Flow

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[80] Both malleable and non-malleable constructs can be measured. However, only malleable constructs can be manipulated.

interventions therefore require the development and validation of (preferably) actuarial prediction models and the measurement of these non-malleable determinants of the to-be-affected latent criterion variable.

Stock interventions in contrast represent interventions that aim to positively affect some (desirable) latent criterion variable (like job performance or *state engagement*) by reducing or enhancing the level of direct and/or indirect determinants of the latent criterion variable. Examples of stock interventions are job enrichment, development, incentive schemes and counselling. Stock interventions have to target malleable determinants of the latent criterion variable. Stock interventions are in effect manipulations of the malleable determinants of the to-be-affected latent criterion variable.

The denotative meaning of latent variables (or constructs) lie in their denotations. The denotations of a (malleable or non-malleable) construct are the observable behaviours, feelings, thoughts and sensations in which the construct visibly expresses or manifests itself. It could possibly be argued that the denotations also are the specific situations or events that affect the level of a malleable construct. Alternatively it could, however, be argued that these specific situations or events that affect the level of a malleable construct are in fact denotations, in the first sense referred to above, of constructs that characterise the actor or his/her environment and that directly (or indirectly) determine the to-be-affected criterion construct. The criterion construct is therefore malleable because its denotations are malleable or because the denotations of its (direct or indirect) determinants are malleable. The criterion construct is non-malleable because its denotations are non-malleable and because the denotations of its (direct or indirect) determinants are non-malleable (or practically and/or ethically difficult to manipulate).

The denotations are used to operationally define malleable and non-malleable constructs in terms of measured and experimental operational definitions[81]. Flow interventions use psychological tests as measured operational definitions to measure the direct and/or indirect determinants of the to-be-affected latent criterion variable (like state engagement), to insert these into a clinical or mechanical prediction model, to derive estimates of the latent criterion variable and to base flow decisions on these criterion estimates. Stock interventions in turn manipulate the denotations of the criterion construct or the denotations of the direct (or indirect) determinants of the to-be-affected criterion construct.

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[81] Stress expresses itself in the denotation of being unable to sleep at night. Stress is affected by role overload. Road overload denotes itself in the extent to which one simultaneously has to play numerous conflicting roles. Stress can therefore be measured via effect indicators that fathom how well one sleeps manifest themselves or via formative indicators that fathom the extent to which one needs to simultaneously play conflicting roles (Babbie & Mouton, 2001). Stress can, however, also be (experimentally) manipulated by manipulating role overload by manipulating the denotations of role overload by creating and placing a person in a condition of role overload.

The fruitfulness of the modified reduced engagement structural model in assisting[82] practitioners in deriving flow and stock interventions aimed at enhancing *state engagement* is limited. This limitation stems from the fact that the reduced model only contains a single direct determinant of *state engagement* (namely *personal engagement*) and no indirect determinants (i.e. the downstream latent outcomes do not as yet feed back onto *personal engagement* and the (upstream) direct and indirect determinants of *personal engagement* are not modelled). Although it is therefore clear that interventions are required that would facilitate *personal engagement* the modified reduced engagement structural model does not assist in formulating more specific experimental operational definitions. The originally hypothesised engagement structural model shown in Figure 2.4 does explicate the latent variable that are posited to directly and indirectly determine *personal engagement,* but this model was not empirically tested.

This study had the potential to be extremely useful to any organisation in providing an understanding as to what will allow an employee to achieve higher work state engagement as well as the positive outcomes such engagement will reap for the organisation. The study was unfortunately prevented from fully realising this potential because of the problems encountered in collecting a sufficiently large sample to permit the testing of the structural model that was developed through theorising. Given the malleable nature of the determinants of *personal engagement* embedded in the model shown in Figure 2.4, the model can be extremely helpful in assisting organisations (HR managers and industrial psychologists) in developing interventions aimed at developing and cultivating these malleable, state-like constructs if future research could obtain empirical support for the model.

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[82] Theory (or structural models that were empirically corroborated) do not dictate practical interventions. Practical interventions have to be inferred via theorising from theory and from the (denotative) meaning of the constructs comprising the theory. The claim such intervention should affect the to-be-affected criterion construct is an experimental hypothesis (similar to a measurement hypothesis) that should be subjected to empirical testing.

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APPENDIX A:

EMPLOYEE ENGAGEMENT RESEARCH SURVEY

Employee Engagement Survey

You are asked to participate in a research study conducted by Kendra Joubert [Masters student] and Professor Callie Theron from the Department of Industrial Psychology at Stellenbosch University. The results of this study will contribute to the thesis of Kendra Joubert.

Purpose of the study

This study is part of a research initiative that aims to investigate why differences in employee engagement exist i.e. why some employees experience engagement at work while others do not.

Procedures

If you volunteer to participate in this study, you will be asked to complete the following online survey that will take you about 30 minutes to complete. There is, however, no time limit placed on completion and there are no right or wrong answers. Once you have completed the survey, the electronic system being used will automatically record the data. This is the full extent of your participation.

Potential risks and discomforts

There exist no foreseeable risks or major discomforts associated with participation in this study. The only inconvenience will be the time and effort required by you to complete the questionnaire.

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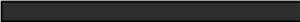
Potential benefits to subjects and/or to society

There exist no direct benefits to the participants in this study. However, the development of this employee engagement structural model will potentially assist in the development of interventions aimed at promoting employee engagement among teachers. Therefore, this research will be highly valuable to your organisation, your community and society as a whole, since teachers constitute the very profession that moulds the minds of future generations, making all other professions possible.

Payment for participation

Neither you nor your organisation will receive any payment for participating in the research of this study. However, should you volunteer to participate in the study and complete the online questionnaire, you can **enter a lucky draw and stand a chance to win a LENOVO A7-30 Tablet** [7" MULTI-TOUCH; 2-megapixel camera; 1.3GHz; 1GB 16B; 3G; WIFI]

- **How will the lucky draw work**

At the end of the online survey there is a link you can click on and follow, where you will have the opportunity to provide your email address or cell phone number, should you wish to take part in the lucky draw. Contact details will be used only for the purposes of randomly selecting a winning participant, and will not in any way be linked to your responses on the main research survey. The winner will then be contacted and informed of where and when they can collect their prize.

Confidentiality

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Once you have completed the questionnaire the researchers will receive the results, but, the survey system used for the study cleans the source from which the results are sent. In other words, all information is collected anonymously and cannot be traced back to any participant. Thereafter, confidentiality will be maintained by restricting access to the results/data to the researchers [Kendra Joubert and Professor Callie Theron], by storing the data on a password protected computer, and by only reporting aggregate statistics of the sample.

Back   Save And Exit   Next

Participation and withdrawal/rights of participants

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, please contact Ms Maléne Fouché [021 808 4622 or mfouche@sun.ac.za] at the Division for Research Development at Stellenbosch University.

Identification of researchers

If you have any questions or concerns about the research, please feel free to contact Kendra Joubert [082 458 1113 or 15709388@sun.ac.za] or Prof Callie Theron [021 808 3009 or 084 273 4139 or ccth@sun.ac.za].

*Do you understand what your participation entails and are you willing to participate?

○ Yes

○ No

*Do you understand that you can withdraw your participation in this study at any time?

○ Yes

○ No

Back   Save And Exit   Next

Biographical information

Please complete the biographical information below. The information is required for research purposes to gain a description of the nature of the research sample. Questions with a "*" are compulsory.

Gender

○ Male

○ Female

Age

[   ]

Race

○ Black ○ Coloured ○ Indian ○ White ○ Other

Home language

[   ]

*Time spent working in your current position

○ 6 months - 1 year and 11 months

○ 2 years - 3 years and 11 months

○ 4 - 5 years and 11 months

○ > 5 years

[████████████████████]

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Instructions

- This survey consists of 18 sections - **please complete all 18 sections.**
- The entire survey should take about 20-30 minutes to complete, though it is possible to pause and resume participation.
- Please read the instructions **carefully** and answer all questions as **honestly and truthfully** as possible.There are **no right or wrong answers.**

Section 1

This part of the survey asks you to describe your job, as objectively as you can, on a scale from 1 to 7. Please do not use this part of the survey to show how much much you like or dislike your job. Instead, try make your description as accurate and objective as you possibly can.

*1. How much autonomy is there in your job? That is, to what extent does your job permit you to decide on your own how to go about doing the work?

| Very little; the job gives me almost no personal "say" about how and when the work is done | | Moderate autonomy; many things are standardised and not under my control, but I can make some decisions about the work | | Very much; the job gives me almost complete responsibility for deciding how and when the work is done | |

○	○	○	○	○	○	○
1	2	3	4	5	6	7

[████████████████████]

[Back] [Save And Exit] [Next]

239

*2. To what extent does your job involve doing a "whole" and identifiable piece of work? That is, is the job a complete piece of work that has an obvious beginning and end? Or is it only a small part of the overall piece of work, which is finished by other people or by automatic machines?

My job is only a tiny part of the overall piece of work; the results of my activities cannot be seen in the final product or service			My job is a moderate-sized "chunk" of the overall piece of work; my own contribution can be seen in the final outcome			My job involves doing the whole piece of work, from start to finish; the results of my activities are easily seen in the final product or service
○	○	○	○	○	○	○
1	2	3	4	5	6	7

*3. How much variety is there in your job? That is, to what extent does the job require you to do many different things at work, using a variety of your skills and talents?

Very little; the job requires me to do the same routine things over and over again			Moderate variety			Very much; the job requires me to do many things, using a number of different skills and talents
○	○	○	○	○	○	○
1	2	3	4	5	6	7

Back   Save And Exit   Next

*4. In general, how significant or important is your job? That is, are the results of your work likely to significantly affect the lives or well-being of other people?

Not very significant: the outcomes of my work are not likely to have important effects on other people			Moderately significant			Highly significant: the outcomes of my work can affect other people in very important ways
○	○	○	○	○	○	○
1	2	3	4	5	6	7

*5. To what extent does doing the job itself provide you with information about your work performance? That is, does the actual work itself provide clues about how well you are doing aside from any "feedback" co-workers or supervisors provide?

Very little: the job itself is set up so I could work forever without finding out how well I am doing			Moderately: sometimes doing the job provides "feedback" to me; sometimes it does not			Very much: the job is set up so that I get almost constant "feedback" as I work about how well I am doing
○	○	○	○	○	○	○
1	2	3	4	5	6	7

Back   Save And Exit   Next

Section 2

For the following statements, please indicate whether the statement is an <u>accurate or an inaccurate description of your job</u>. Please indicate <u>all</u> statements.

	1. Very inaccurate	2. Mostly inaccurate	3. Slightly inaccurate	4. Uncertain	5. Slightly accurate	6. Mostly accurate	7. Very accurate
1. The job requires me to use a number of complex or high-level skills.	○	○	○	○	○	○	○
2. The job is arranged so that I do not have the chance to do an entire piece of work from beginning to end.	○	○	○	○	○	○	○
3. Just doing the work required by the job provides many chances for me to figure out how well I am doing.	○	○	○	○	○	○	○
4. The job is quite simple and repetitive.	○	○	○	○	○	○	○
5. This job is one where a lot of other people can be affected by how well the work gets done.	○	○	○	○	○	○	○
6. The job denies me any chance to use my personal initiative or judgement in carrying out the work.	○	○	○	○	○	○	○
7. The job provides me the chance to completely finish the pieces of work I begin.	○	○	○	○	○	○	○
8. The job itself provides very few clues about whether or not I am performing well.	○	○	○	○	○	○	○
9. The job gives me considerable opportunity for independence and freedom in how I do the work.	○	○	○	○	○	○	○
10. The job itself is not very significant or important in the broader scheme of things.	○	○	○	○	○	○	○

Back   Save And Exit   Next

Section 3

For the following statements, please indicate your level of <u>agreement or disagreement</u> with the statement. Please indicate <u>all</u> of the statements.

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Undecided	5. Slightly agree	6. Agree	7. Strongly agree
1. My job 'fits' how I see myself.	○	○	○	○	○	○	○
2. I like the identity my job gives me.	○	○	○	○	○	○	○
3. The work I do on this job helps me satisfy who I am.	○	○	○	○	○	○	○
4. My job 'fits' how I see myself in the future.	○	○	○	○	○	○	○

Back   Save And Exit   Next

Section 4

For the following statements, please indicate your level of <u>agreement or disagreement</u> with the statement. Please indicate <u>all</u> of the statements.

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Undecided	5. Slightly agree	6. Agree	7. Strongly agree
1. My interactions with my co-workers are rewarding.	○	○	○	○	○	○	○
2. My co-workers value my input.	○	○	○	○	○	○	○
3. My co-workers listen to what I have to say.	○	○	○	○	○	○	○
4. My co-workers really know who I am.	○	○	○	○	○	○	○
5. I believe that my co-workers appreciate who I am.	○	○	○	○	○	○	○
6. I sense a real connection with my co- workers.	○	○	○	○	○	○	○
7. My co-workers and I have mutual respect for one another.	○	○	○	○	○	○	○
8. I feel a real 'kinship' with my co-workers.	○	○	○	○	○	○	○
9. I feel worthwhile when I am around my co-workers.	○	○	○	○	○	○	○
10. I trust my co-workers.	○	○	○	○	○	○	○

[Back] [Save And Exit] [Next]

Section 5

For the following statements, please indicate your level of <u>agreement or disagreement</u> with the statement. Please indicate <u>all</u> of the statements.

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Undecided	5. Slightly agree	6. Agree	7. Strongly agree
1. My supervisor helps me solve work-related problems.	○	○	○	○	○	○	○
2. My supervisor encourages me to develop new skills.	○	○	○	○	○	○	○
3. My supervisor keeps informed about how employees think and feel about things.	○	○	○	○	○	○	○
4. My supervisor encourages employees to participate in important decisions.	○	○	○	○	○	○	○
5. My supervisor praises good work.	○	○	○	○	○	○	○
6. My supervisor encourages employees to speak up when they disagree with a decision.	○	○	○	○	○	○	○
7. Employees are treated fairly by my supervisor.	○	○	○	○	○	○	○
8. My supervisor is committed to protecting my interests.	○	○	○	○	○	○	○
9. My supervisor does what he/she says he/she will do.	○	○	○	○	○	○	○
10. I trust my supervisor.	○	○	○	○	○	○	○

[Back] [Save And Exit] [Next]

Section 6

For the following statements, please indicate your level of <u>agreement or disagreement</u> with the statement. Please indicate <u>all</u> of the statements.

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Undecided	5. Slightly agree	6. Agree	7. Strongly agree
1. I go along with the norms in my group of co-workers.	○	○	○	○	○	○	○
2. I don't 'rock the boat' with my co-workers.	○	○	○	○	○	○	○
3. I do what is expected of me by my co- workers.	○	○	○	○	○	○	○
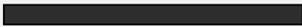
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Section 7

For the following statements, please indicate your level of <u>agreement or disagreement</u> with the statement. Please indicate <u>all</u> of the statements.

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Undecided	5. Slightly agree	6. Agree	7. Strongly agree
1. I worry about how others perceive me at work.	○	○	○	○	○	○	○
2. I am afraid my failings will be noticed by others.	○	○	○	○	○	○	○
3. I don't worry about being judged by others at work.	○	○	○	○	○	○	○
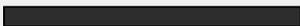
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Section 8

For the following statements, please indicate your level of <u>agreement or disagreement</u> with the statement. Please indicate <u>all</u> of the statements.

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Undecided	5. Slightly agree	6. Agree	7. Strongly agree
1. I feel mentally sharp at the end of the work day.	○	○	○	○	○	○	○
2. I can't think straight by the end of my work day.	○	○	○	○	○	○	○
3. I feel overwhelmed by the things going on at work.	○	○	○	○	○	○	○
4. I feel emotionally healthy at the end of the work day.	○	○	○	○	○	○	○
5. I feel like I'm at the end of my rope emotionally.	○	○	○	○	○	○	○
6. I feel emotionally drained from my work.	○	○	○	○	○	○	○
7. I feel tired before my workday is over.	○	○	○	○	○	○	○
8. I feel physically used up at the end of the work day.	○	○	○	○	○	○	○
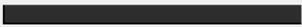
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Section 9.1

For the following statement, please indicate the most accurate answer.

*How many hours per week do you participate in organisations other than your permanent teaching job [i.e. other jobs, church, school, volunteering etc.]?

○ 1 - 5 hours ○ 6 - 10 hours ○ 11 - 15 hours ○ 16 - 20 hours ○ 21+ hours

Section 9.2

For the following statements, please indicate your level of agreement or disagreement with the statement. Please indicate all of the statements.

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Undecided	5. Slightly agree	6. Agree	7. Strongly agree
1. Activities outside my job distract my attention so that I am unable to focus on my job tasks.	○	○	○	○	○	○	○
2. Time spent on activities outside my organisation draw away my energies from my job.	○	○	○	○	○	○	○
3. I cannot easily cope with the demands of my activities outside my job.	○	○	○	○	○	○	○
4. I feel overwhelmed by my obligations to activities outside my organisation.	○	○	○	○	○	○	○
5. Activities outside my job leave me feeling tired at work.	○	○	○	○	○	○	○
6. Time spent on activities outside my organisation interferes with my job performance.	○	○	○	○	○	○	○

Back   Save And Exit   Next

Section 10

For the following statements, please indicate your level of agreement or disagreement with the statement. Please indicate all of the statements.

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Undecided	5. Slightly agree	6. Agree	7. Strongly agree
1. The work I do on this job is very important to me.	○	○	○	○	○	○	○
2. My job activities are personally meaningful to me.	○	○	○	○	○	○	○
3. The work I do on this job is worthwhile.	○	○	○	○	○	○	○
4. My job activities are significant to me.	○	○	○	○	○	○	○
5. The work I do on this job is meaningful to me.	○	○	○	○	○	○	○
6. I feel that the work I do on my job is valuable.	○	○	○	○	○	○	○

Back   Save And Exit   Next

Section 11

For the following statements, please indicate your level of <u>agreement or disagreement</u> with the statement. Please indicate <u>all</u> of the statements.

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Undecided	5. Slightly agree	6. Agree	7. Strongly agree
1. I'm not afraid to be myself at work.	○	○	○	○	○	○	○
2. I am afraid to express my opinions at work.	○	○	○	○	○	○	○
3. There is a threatening environment at work.	○	○	○	○	○	○	○

[Back] [Save And Exit] [Next]

Section 12

For the following statements, please indicate your level of <u>agreement or disagreement</u> with the statement. Please indicate <u>all</u> of the statements.

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Undecided	5. Slightly agree	6. Agree	7. Strongly agree
1. I am confident in my ability to handle competing demands at work.	○	○	○	○	○	○	○
2. I am confident in my ability to deal with problems that come up at work.	○	○	○	○	○	○	○
3. I am confident in my ability to think clearly at work.	○	○	○	○	○	○	○
4. I am confident in my ability to display the appropriate emotions at work.	○	○	○	○	○	○	○
5. I am confident that I can handle the physical demands at work.	○	○	○	○	○	○	○

[Back] [Save And Exit] [Next]

Section 13

For the following statements, please indicate your level of <u>agreement or disagreement</u> with the statement. Please indicate <u>all</u> of the statements.

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Undecided	5. Slightly agree	6. Agree	7. Strongly agree
1. Performing my job is so absorbing that I forget about everything else.	○	○	○	○	○	○	○
2. I often think about other things when performing my job.	○	○	○	○	○	○	○
3. I am rarely distracted when performing my job.	○	○	○	○	○	○	○
4. Time passes quickly when I perform my job.	○	○	○	○	○	○	○
5. I really put my heart into my job.	○	○	○	○	○	○	○
6. I get excited when I perform well on my job.	○	○	○	○	○	○	○
7. I often feel emotionally detached from my job.	○	○	○	○	○	○	○
8. My own feelings are affected by how well I perform my job.	○	○	○	○	○	○	○
9. I exert a lot of energy performing my job.	○	○	○	○	○	○	○
10. I stay until the job is done.	○	○	○	○	○	○	○
11. I avoid working overtime whenever possible.	○	○	○	○	○	○	○
12. I take work home to do.	○	○	○	○	○	○	○
13. I avoid working too hard.	○	○	○	○	○	○	○

Back Save And Exit Next

Section 14

For the following statements, please indicate <u>how often</u> you experience these <u>feelings</u> about your job. Please indicate <u>all</u> of the statements.

	0. Never	1. Almost never [a few times a year or less]	2. Rarely [once a month or less]	3. Sometimes [a few times a month]	4. Often [once a week]	5. Very often [a few times a week]	6. Always [everyday]
1. At my work, I feel that I am bursting with energy.	○	○	○	○	○	○	○
2. I find the work that I do full of meaning and purpose.	○	○	○	○	○	○	○
3. Time flies when I'm working.	○	○	○	○	○	○	○
4. At my job, I feel strong and vigorous.	○	○	○	○	○	○	○
5. I am enthusiastic about my job.	○	○	○	○	○	○	○
6. When I am working, I forget everything else around me.	○	○	○	○	○	○	○
7. My job inspires me.	○	○	○	○	○	○	○
8. When I get up in the morning, I feel like going to work.	○	○	○	○	○	○	○
9. I feel happy when I am working intensely.	○	○	○	○	○	○	○
10. I am proud of the work that I do.	○	○	○	○	○	○	○
11. I am immersed in my work.	○	○	○	○	○	○	○
12. I can continue working for very long periods at a time.	○	○	○	○	○	○	○
13. To me, my job is challenging.	○	○	○	○	○	○	○
14. I get carried away when I'm working.	○	○	○	○	○	○	○
15. At my job, I am very resilient, mentally.	○	○	○	○	○	○	○
16. It is difficult to detach myself from my job.	○	○	○	○	○	○	○
17. At my work I always persevere, even when things do not go well.	○	○	○	○	○	○	○

Back Save And Exit Next

Section 15

For all the following statements, please indicate how satisfied you presently feel about the aspect of your job described by the statement. Keeping the statement in mind:

- if you feel that your job gives you **more than you expected**, indicate **"Very satisfied"**;
- if you feel that your job gives you **what you expected**, indicate **"Satisfied"**;
- if you **cannot make up your mind** whether or not the job gives you what you expected, indicate "**Neutral**";
- if you feel that your job gives you **less than you expected**, indicate "**Dissatisfied**";
- if you feel that your job gives you **much less than you expected**, indicate "**Very dissatisfied**".

	1. Very dissatisfied	2. Dissatisfied	3. Neutral	4. Satisfied	5. Very satisfied
On my present job, this is how I feel about...					
1. Being able to keep busy all the time.	○	○	○	○	○
2. The chance to work alone on the job.	○	○	○	○	○
3. The chance to do different things from time to time.	○	○	○	○	○
4. The chance to be "somebody" in the community.	○	○	○	○	○
5. The way my boss handles his/her workers.	○	○	○	○	○
6. The competence of my supervisor in making decisions.	○	○	○	○	○
7. Being able to do things that don't go against my conscience.	○	○	○	○	○
8. The way my job provides for steady employment.	○	○	○	○	○
9. The chance to do things for other people.	○	○	○	○	○
10. The chance to tell people what to do.	○	○	○	○	○
11. The chance to do something that makes use of my abilities.	○	○	○	○	○
12. The way company policies are put into practice.	○	○	○	○	○
13. My pay and the amount of work that I do.	○	○	○	○	○
14. The chances for advancement on this job.	○	○	○	○	○
15. The freedom to use my own judgement.	○	○	○	○	○
16. The chance to try my own methods of doing the job.	○	○	○	○	○
17. The working conditions.	○	○	○	○	○
18. The way my co-workers get along with each other.	○	○	○	○	○
19. The praise I get for doing a good job.	○	○	○	○	○
20. The feeling of accomplishment I get from the job.	○	○	○	○	○

Back   Save And Exit   Next

Section 16

For the following statements, please indicate your level of agreement or disagreement with the statement. Please indicate all of the statements. Note: "organisation" here refers to the school where you currently work.

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Uncertain	5. Slightly agree	6. Agree	7. Strongly agree
1. I would be very happy to spend the rest of my career with this organisation.	○	○	○	○	○	○	○
2. I enjoy discussing my organisation with people outside it.	○	○	○	○	○	○	○
3. I really feel as if this organisation's problems are my own.	○	○	○	○	○	○	○
4. I think that I could easily become as attached to another organisation as I am to this one.	○	○	○	○	○	○	○
5. I do not feel like 'part of the family' at my organisation.	○	○	○	○	○	○	○
6. I do not feel 'emotionally attached' to this organisation.	○	○	○	○	○	○	○
7. This organisation has a great deal of personal meaning for me.	○	○	○	○	○	○	○
8. I do not feel a strong sense of belonging to my organisation.	○	○	○	○	○	○	○

Back   Save And Exit   Next

Section 17

For the following statements, please indicate how frequently you consider the following. Please indicate all of the statements. Note: "organisation" here refers to the school where you currently work.

	1. Never	2. Rarely	3. Sometimes	4. Often	5. Always
1. Wanting to leave this organisation.	○	○	○	○	○
2. Searching for another position.	○	○	○	○	○
3. Planning to leave this organisation.	○	○	○	○	○
4. Actually leaving this organisation within the next year.	○	○	○	○	○

Back   Save And Exit   Next
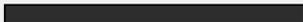
Section 18

For the following statements, please indicate how frequently you consider the following. Please indicate all of the statements.

	1. Never	2. Rarely	3. Sometimes	4. Often	5. Always
1. Help others who have been absent.	○	○	○	○	○
2. Willingly give your time to help others who have work-related problems.	○	○	○	○	○
3. Adjust your work schedule to accommodate other employees' requests for time off.	○	○	○	○	○
4. Go out of the way to make newer employees feel welcome in the work group.	○	○	○	○	○
5. Show genuine concern and courtesy toward co-workers, even under the most trying business or personal situations.	○	○	○	○	○
6. Give up time to help others who have work or non-work problems.	○	○	○	○	○
7. Assist others with their duties.	○	○	○	○	○
8. Share personal property with others to help their work.	○	○	○	○	○
9. Attend functions that are not required but that help the organisational image.	○	○	○	○	○
10. Keep up with developments in the organisation.	○	○	○	○	○
11. Defend the organisation when other employees criticise it.	○	○	○	○	○
12. Show pride when representing the organisation in public.	○	○	○	○	○
13. Offer ideas to improve the functioning of the organisation.	○	○	○	○	○
14. Express loyalty toward the organisation.	○	○	○	○	○
15. Take action to protect the organisation from potential problems.	○	○	○	○	○
16. Demonstrate concern about the image of the organisation.	○	○	○	○	○

Back   Save And Exit   Finish

APPENDIX B:

ETHICAL CLEARANCE CERIFICATE

UNIVERSITEIT·STELLENBOSCH·UNIVERSITY
Jou kennisvennoot · your knowledge partner

Approval Notice
New Application

06-Jul-2016
Joubert, Kendra KL

Proposal #: SU-HSD-002586

Title: AN ELABORATION AND MODIFICATION OF THE MAY, GILSON, AND HARTER [2004] EMPLOYEE ENGAGEMENT STRUCTURAL MODEL

Dear Miss Kendra Joubert,

Your **New Application** received on **07-Jun-2016**, was reviewed
Please note the following information about your approved research proposal:

Proposal Approval Period: **27-Jun-2016 -26-Jun-2017**

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

Please remember to use your **proposal number** (SU-HSD-002586) on any documents or correspondence with the REC concerning your research proposal.

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.

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

This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki and the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health). Annually a number of projects may be selected randomly for an external audit.

National Health Research Ethics Committee (NHREC) registration number REC-050411-032.

We wish you the best as you conduct your research.

If you have any questions or need further help, please contact the REC office at .

APPENDIX C:

INSTITUTIONAL PERMISSION

Western Cape Government

Education

Directorate: Research

Audrey.wyngaard@westerncape.gov.za
tel: +27 021 467 9272
Fax: 0865902282
Private Bag x9114, Cape Town, 8000
wced.wcape.gov.za

REFERENCE: 20160526- 808
ENQUIRIES: Dr A T Wyngaard

Ms Kendra Joubert
5 Prenton Street
Kalkbay
7975

Dear Ms Kendra Joubert

RESEARCH PROPOSAL: AN ELABORATION AND MODIFICATION OF THE MAY, GILSON, AND HARTER [2004] EMPLOYEE ENGAGEMENT STRUCTURAL MODEL

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:
1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **01 August 2016 till 30 September 2016**
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number?
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:
    The Director: Research Services
    Western Cape Education Department
    Private Bag X9114
    CAPE TOWN
    8000

We wish you success in your research.

Kind regards.
Signed: Dr Audrey T Wyngaard
Directorate: Research
DATE: 26 May 2016

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tel: +27 21 467 9272   fax: 0865902282
Safe Schools: 0800 45 46 47

Private Bag X9114, Cape Town, 8000
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