Demands-Abilities Fit, Work Beliefs, Meaningful Work, and Work Engagement in nature-based jobs

Engela P de Crom

orcid.org/0000-0002-7274-3685

Mini-dissertation submitted in partial fulfillment of the requirements for the degree
Magister Artium in Positive Psychology
at the North-West University

Supervisor: Prof S Rothmann

Graduation: May 2018

http://www.nwu.ac.za/
ACKNOWLEDGEMENTS

I would like to thank the following people for their contributions and assistance in the completion of this study:

- My supervisor, Professor Ian Rothmann, for his assistance and immense patience and endurance with my ignorance of stats.
- Professor Chrizanne van Eeden who guided me through a rediscovery of thoughts by introducing me to Positive Psychology. You were a great inspiration with your knowledge, kindness and grace.
- All those who were willing to participate in this study. Your time is truly appreciated.
- Friends, family and colleagues for your encouragement in various ways.
- My husband, Piet, for your patience (again), your love and encouragement, always.
- My Creator, for nature, and the ability to think.
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CHAPTER 1

INTRODUCTION, PROBLEM STATEMENT, AND OBJECTIVES

This chapter aims to provide an orientation to the study on which this mini-dissertation is based. The main purpose of this study was to investigate the relationship between demands-abilities (D-A) fit, work beliefs, meaningful work, and work engagement in individuals in nature-based jobs. The research problem is discussed, which serves as a prelude to outlining the main research questions and objectives guiding the present study. The remainder of the chapter presents a discussion of the research methodology that was followed during the study, as well as an overview of ethical matters pertaining to this research. The chapter concludes with an outline of the chapter division of the mini-dissertation.

1.1 Problem statement

Much has been said and studied regarding the positive effect of nature on people’s well-being. Biologist E.O. Wilson (1984, p. 131) proposed that “humans are born with an inherent sense of connection to nature”. Wilson hypothesised that “biophilia is a genetically based affection for, and desire to affiliate with, nonhuman life forms, stemming from our ancestral past – a past in which humans evolved as part of the natural landscape, not as separate from it” (see also Kellert, 1997; Kellert & Wilson, 1993).

It has been suggested that people’s experiences with the natural environment can increase their well-being by helping to address existential anxieties such as those concerning happiness and meaning in life (Passmore & Howell, 2014). For example, involvement with nature may increase happiness by presenting opportunities to satisfy people’s basic psychological needs of competence, relatedness, and autonomy (Clayton, 2003; Kellert, 1997). By stimulating awe and feelings of transcendence, experiences in nature can help individuals change their perspectives and find meaning in life (Cohen, Gruber, & Keltner, 2010). Recent research (e.g. Howell & Passmore, 2013; Russell et al., 2013) supports these notions. Contact with nature and feelings of a connection to nature are associated with increased life satisfaction (Mayer & Frantz, 2004), positive affect (Herzog & Strevey, 2008), happiness (Zelenski & Nisbet, 2014), psychological, social, and emotional well-being.
(Cervinka, Roderer, & Hefler, 2012; Howell et al., 2011), meaning in life (Cervinka et al., 2012; Howell, Passmore, & Buro, 2013), and vitality (Zelenski & Nisbet, 2014).

Also, people who have access to natural areas have been found to be live healthier in all aspects of their lives than individuals without this privilege. In 1989 Kaplan and Kaplan found that the longer-term, indirect impacts (of “nearby nature”) also include increased levels of satisfaction with one’s home, one’s job, and with life in general. Research suggests that people who have access to nature in their workplace experience lower levels of perceived job stress and higher levels of job satisfaction, as explained, for example by Kaplan and Kaplan (1989). These authors found that people working in a space where they have a view of trees, experience their jobs as less stressful and that they were more satisfied with their jobs than those who could only see buildings from their windows. Also, employees with views of nature reported fewer illnesses and headaches (Kaplan & Kaplan, 1989). A similar study found that a view of natural elements (such as trees and other vegetation) “buffered the negative impact of job stress on intention to quit” (Leather et al., 1998, p. 739). Rohde and Kendle (1994) conducted a review of literature and found that the psychological response to nature involves feelings of pleasure, sustained attention or interest, relaxed wakefulness, and diminution of negative emotions such as anger and anxiety. These feelings (feelings of pleasure and reduction of negative emotions) are congruent with those of flourishing individuals, namely feeling good and functioning well as conceptualized within the field of positive psychology (Keyes, 2002).

Taking the abovementioned findings into consideration creates the impression that people who work in a natural environment should flourish in their jobs. However, empirical evidence of flourishing workers in a natural environment, especially in South Africa, is rare. The concepts of flourishing and languishing are used to describe opposite endpoints on a continuum of mental health, indicating the well-being of individuals in terms of three dimensions, namely emotional well-being (whether a person is “feeling good”) and psychological and social well-being (whether a person is “functioning well”) (Keyes, 2002; Keyes, 2007). Flourishing is associated with various benefits for society, including fewer workdays lost, fewer health problems, and fewer limitations (Harter, Schmidt, & Hayes, 2002). In a study of information technology (IT) professionals in South Africa, Diedericks and Rothmann (2014) found that flourishing affected, among others, job satisfaction.
Experiences in the work environment play a major role in the flourishing or languishing of workers (Deci & Ryan, 2011).

Important characteristics of flourishing (compared to languishing) employees are that they experience their work as meaningful and engaging (Rothmann, 2014). Individuals spend more than a third of their lives engaged in work-related activities (Wrzesniewski et al., 1997). Therefore, work is an important context to provide meaning for the individual (Cameron, Dutton, & Quinn, 2003). Furthermore, it is estimated that approximately 20% of employees in organizations worldwide are highly engaged in their work, while 20% are actively disengaged (Attridge, 2009). Similar tendencies were found in South Africa, although engagement levels in different occupations vary substantially (Rothmann, 2014).

Meaningful work and work engagement have recently become important research topics (Dik & Duffy, 2008; May, Gilson, & Harter, 2004; Olivier & Rothmann, 2007; Schaufeli & Bakker, 2004; Steger & Dik, 2010; Wrzesniewski, 2012; Wrzesniewski & Tosti, 2005). The current study builds on existing literature to explore meaningful work and engagement for individuals who work in nature-related jobs.

Meaningful work consists of three dimensions, namely psychological meaningfulness (positive meaning), meaning making, and greater good motivations (Steger, Dik & Duffy, 2012). Psychological meaningfulness in work is a subjective experience that what one is doing has personal significance. Meaning making through work involves the idea that work is a significant source of meaning in life (Michaelson, 2005; Steger & Dik, 2009, 2010). Greater good motivations reflect the desire to make a positive impact in life and hold the idea that work is most meaningful if it has a positive contribution and benefits others or society (Steger et al., 2012). Therefore, work has a purpose. The meaning attached to work leads to work engagement (Olivier & Rothmann, 2007; Rothmann & Rothmann, 2010).

Several factors contribute to meaningful work (Pratt & Ashforth, 2003). For the current study, two predictors of meaningful work are elucidated, namely D-A fit (a dimension of person-environment [P-E] fit) and work beliefs.

Various authors describe P-E fit as the degree to which individual and environmental characteristics match (Dawis, 1992; French, Caplan, & Harrison, 1982; Kristof-Brown,
P-E fit instils “an individual belief that the work environment is conducive to what the organization wants, and eventually leads to positive outcomes for the employee and the organisation” (Greguras & Diefendorff, 2009, p. 465). D-A fit (Edwards, 1996; Kristof-Brown et al., 2005) refers to the extent to which job requirements match the abilities of the employee. Abilities consist of skills, knowledge, and energies that employees possess to meet the demands of their jobs, whereas skills and knowledge increase and energies decrease with the use of abilities (Edwards, 1996). When employees perceive that they possess the required ability to meet the demands of their jobs, they tend to engage with their work (Basit & Arshad, 2016). However, some studies have failed to find empirical support for this relationship (Oh et al., 2014; Astakhova, 2016).

Work beliefs concern the function of work in life and can shape the meaning of one’s work (Wrzesniewski & Tosti, 2005). Work beliefs consist of three broad categories, namely work as a job, work as a career, and work as a calling (Bellah et al., 1985; Schwartz, 1994; Wrzesniewski et al., 1997). Individuals who view their work as a job are only interested in the material benefits from work and do not seek or receive any other type of reward from it. Individuals who view their work as a career have a deeper personal investment in their work and mark their achievements not only through monetary gain but also through advancement within the occupational structure (Parry, 2006; Peterson et al., 2009; Wrzesniewski et al., 1997). People viewing their work as a calling regard the fulfilment that doing the work brings (Peterson et al., 2009; Wrzesniewski et al., 1997; Wrzesniewski, Dutton, & Debede, 2003).

Nature-based jobs present an interesting and important context for studying D-A fit, work beliefs, meaningful work, and engagement. As many people desire a job that is meaningful, individuals working in and with nature are often regarded as primary role models for having a meaningful and fulfilling job. The three experiences of how people see the work they do were a focus of this study, as they are still largely unexplored in individuals who are employed in natural environments. It is assumed that people who work in nature would experience their work as a calling; meaningful and with a high level of work engagement because of the general (and social) responsibility accompanying conservation work (Cowling et al., 2004; Ehrlich, 2002; Eliason, 2014; Goodwin, 2011). However, there is limited literature available to reference how these individuals view their work.
Work engagement is a “positive and fulfilling work-related state of mind, characterized by vigor, dedication, and absorption” (Schaufeli & Bakker, 2004, p. 294). More research on work engagement and its associated factors is necessary. Not only do organizations expect employees to be engaged and committed to high-quality performance standards but also to take responsibility for their professional development. Due to the relatively low 20% of highly engaged employees worldwide (Attridge, 2009) and in South Africa (Rothmann, 2014), and the fact that no studies have been conducted regarding nature-based employees’ level of engagement and meaningfulness of the job they do, this study seemed necessary.

Given that meaningful work reflects “a sense of purpose or personal connection to work” (Spreitzer, 1995, p. 1443), it is expected that individuals with a calling orientation to work will find their work more meaningful than those with job or career orientations. Furthermore, May et al. (2004) and Olivier and Rothmann (2007) determined that employees who spend time on desired activities and who experience P-E (and specifically D-A) fit will experience more psychological meaningfulness, which will contribute to higher levels of work engagement.

To summarize, in South Africa, no studies have been conducted relating to nature-based employees’ experiences of meaningful work and engagement. Furthermore, little scientific information exists regarding the role of D-A fit and work beliefs in experiences of meaningful work and work engagement of individuals who work in natural environments. Scientific information about these issues can be of great value in the development of careers in nature-related jobs that strive towards flourishing employees. As facilitators between humans and nature, nature-based employees need to show and experience meaningfulness and engagement in order to ensure that it spills over to other employees, as well as external role players in the industry.

In light of the research problem discussed above and a review of the literature, the following primary research question was formulated to serve as basis for the study:

- To what extent, if at all, does a relationship exist between D-A fit, work beliefs, meaningful work, and engagement in individuals in nature-based jobs?

This primary research question gave rise to the following secondary research questions:
What direct relationships exist between D-A fit, work beliefs, meaningful work, and engagement in nature-based work?

What indirect relationships exist between D-A fit, work beliefs, meaningful work, and engagement in nature-based work?

1.2 Research objectives

The following general and specific research objectives were set for this study:

1.2.1 General research objective

Based on the research questions outlined above, the general research objective of this study was to establish whether, and to what extent, a relationship exists between D-A fit, work beliefs, meaningful work, and engagement in individuals in nature-based jobs.

1.2.2 Specific research objective

Two specific research objectives were set for the study: firstly, to investigate the direct relationships between D-A fit, work beliefs, meaningful work, and engagement in nature-based work; and secondly, to investigate the indirect relationships between D-A fit, work beliefs, meaningful work, and engagement in nature-based work.

1.3 Ontological, epistemological, and theoretical framework

This section provides a brief overview of the ontological, epistemological, and theoretical perspectives that framed this study.

1.3.1 Ontological and epistemological assumptions

Sarantakos (2013) noted that science is not a value-free endeavor and, as such, it is necessary that researchers be open and clear about their ontological and epistemological assumptions. The current study was conducted within the framework of an objectivist ontological position and a positivist epistemological orientation. “An objectivist ontology assumes that an absolute truth exists, which is deemed to be independent of the researcher. In this ontology,
it is assumed that reality is objective, to some extent fixed, and that certain patterned laws govern it. In turn, a positivist epistemology, which is derived from an objectivist ontology, holds that the way in which we come to know a certain phenomenon is via empirical and experiential routes. Evidence systematically observed via the senses or their extensions, and the controlled experiment, as reflected in the scientific method, are regarded as the only valid pathways to truth” (Sarantakos, 2013, p. 29). These assumptions give rise to a quantitative methodological position. Quantitative research involves designs that are carefully structured according to the dictates of the scientific method, which result in rigorous, replicable, precise, and systematic processes of participant selection, data gathering, and data analysis. While these represent ideal outcomes, they nevertheless served to guide the current study.

1.3.2 Theoretical framework: Meaning and purpose

Within the broader ontological and epistemological framework outlined in the previous section, the current study was also guided by more specific theoretical frameworks and their associated empirical constructs. The most significant of these was meaning and purpose. According to Frankl (1963), there is no single source of meaning and it is a dynamic process of continually finding meaning in different situations and from various sources. A sense of meaning could be derived from sources as diverse as one’s achievements, close relationships, self-acceptance, and one’s career and job, among others (Corey & Corey, 2014; Delle Fave et al., 2011; Lyubomirsky, 2007; Wong, 2011). Meaning is mostly found when adopting a life that is self-transcendent and committed to a cause bigger than the self. According to Steger, Oishi, and Kashdan (2009, p. 43), “the presence of meaning in life refers to the extent to which people comprehend, make sense of, or see significance in their lives, accompanied by the degree to which they see themselves to have a purpose, mission, or over-arching aim in life”.

Wong (2011) concurs with Frankl (1963) that meaning plays a central role in a person’s well-being. In this regard, Stillman et al. (2009) summarized a number of benefits of a sense of meaning; including increased life satisfaction, work enjoyment, happiness, physical health and well-being, as well as reduced stress. In addition, eudaimonic happiness is to be found in the sense of meaningfulness that often results when one engages in something worthwhile (such as a fulfilling job) (Martin, 2008).
A number of well-being theories propose that the experience of meaning/purpose and of positive relationships is at the core of well-being (see for example Keyes, 2007; Ryff, 1989; Ryff & Singer, 1998). Positive relationships are linked to well-being and meaning in theoretical perspectives, for example in the altruism model of Nathan and Delle Fave (2014).

1.4 Research method

The research method followed in this study consisted of an initial literature review, which was followed by an empirical study. This section provides an overview of these two research phases.

1.4.1 Phase 1: Literature review

A literature review was conducted to determine whether and where any gaps, limitations, or shortcomings might exist in relation to the current understanding of the topic of this study. The literature review also served to guide the researcher to formulate the research question, to clarify empirical constructs, to prepare and inform the researcher to decide on the most appropriate methodological approaches for studying the topic, and to provide a framework for interpreting the results of the study (Onwuegbuzie & Frels, 2011; Sarantakos, 2013). In the current study, the literature review focused on academic literature related to meaning in work, work beliefs, engagement, and P-E fit, with particular focus on D-A fit. Literature on meaning theories and prior research on meaningful work and the interrelationships between the constructs of meaning and meaningful work were consulted.

Relevant articles and other scholarly work published between 1963 and 2017 were identified using databases such as EBSCOHOST, Google Scholar, Science Direct, Jstor, SABINET, and SA ePublications. To guide the literature search, the following terms were used in various combinations: “meaningful work”, “meaning in life”, “work engagement”, “work beliefs”, “nature-based jobs”, “conservation”, “natural environment”, “purpose in work”, “person-environment fit”, and “humans and nature”. To focus these searches, the terms “Africa” and “South Africa” were sometimes added to further filter the results to identify locally relevant studies on these topics.

### 1.4.2 Phase 2: Empirical study

This section provides an overview of the empirical phase of the study, and outlines matters pertaining to the research design, participant selection, data collection, research procedures, and data analysis related to the study.

#### 1.4.2.1 Research design

According to Wagner, Botha, and Mentz (2012, p. 21), a research design is a “blueprint or plan that outlines how a researcher intends to conduct his or her research, and, as such, provides an outline of the type of study that is planned”. In social research, the design indicates which methodology is appropriate, and what type of sampling method, method of data collection, and techniques for data analysis will be employed during the study.

Considering the research aims, which involve measuring the relationships between specific variables, this study followed a quantitative research approach. More specifically, a cross-sectional survey design, which allows comparisons between groups measured at one point in time (Gravetter & Forzano, 2006), was used as the basis for this study. This approach, which is situated within a positivist ontology, allows researchers to draw multiple samples from a given target population at one point in time (Sarantakos, 2013).

#### 1.4.2.2 Participants and sampling

Current employees of protected areas in South Africa, including nature reserves, national parks, and privately owned reserves, as well as people in nature-related jobs, such as training facilities for nature-based careers, were included as participants in the study. These
employees consisted of management (including heads of department), conservationists, educationists, researchers, tour guides, and field staff. Data were gathered from these participant groups ($N = 300$) using a non-probability convenience sampling method (Sarantakos, 2013). This sampling method is more cost and time efficient than random sampling methods (Sarantakos, 2013), and these benefits were considered to outweigh the possible disadvantages of convenience sampling. It could, however, not be assumed that the sample would necessarily be representative of the wider target population from which it was drawn, as this was not a true probability sample and is regarded as a limitation of the study. As such, generalization of the results beyond the sample group should be done with great caution. In other words, the results obtained from this study may not necessarily be representative of all people who work in nature.

1.4.2.3 Measuring instruments

Data were collected using a structured online questionnaire (see Addendum A). Such questionnaires typically have a rigid structure with a high degree of standardization and represent the most commonly used method of data collection in the social sciences (Sarantakos, 2013).

The first section of the questionnaire obtained basic demographic information about participants’ age, gender, language, years working in the current position and in a nature-related industry, level of education, type of current employment, and citizenship. In the second section of the questionnaire, standardized surveys were used to measure participants’ D-A fit, their purpose and meaning in work, work beliefs, and work engagement.

D-A fit refers to the extent to which job requirements match the skills and abilities of the employee. Three items developed by Cable and DeRue (2002) from the Person-Environment Fit Scale (Greguras & Diefendorff, 2009) were used to measure how well employees perceived their abilities to fit with the demands of their jobs. These items included “The match is very good between the demands of my job and my personal skills”, “My abilities and training are a good fit with the requirements of my job”, and “My personal abilities and education provide a good match with the demands that my job places on me”. Each item required the respondent to answer on a scale which varied from 1 (strongly disagree) to 5
Greguras and Diefendorff (2009) reported the reliability of this scale as $\alpha = .82$.

The work beliefs of participants were measured by the Work-Life Questionnaire (WLQ) (Wrzesniewski et al., 1997). The WLQ is a self-report measure that aims to classify an individual’s orientation to work into three main categories, namely (1) work as a job, (2) work as a career, and (3) work as a calling (Wrzesniewski et al., 1997). The questionnaire was divided into two parts. The first part contained a set of three paragraphs representing the three main meanings of work, in which the respondent was encouraged to rate his or her level of association with each paragraph on a scale of 1 (very much like me) to 4 (not at all like me). The second part consisted of a set of 18 items to substantiate the respondent’s position on the first part of the questionnaire (e.g. “My primary reason for working is financial”). The items were also rated on a Likert scale varying from 1 (very much like me) to 4 (not at all like me). In previous research, Wrzesniewski et al. (1997) found the reliability of this instrument to be adequate. Van Zyl, Deacon, and Rothmann (2010) reported Cronbach’s alpha coefficients ranging between .80 and .87 for the WLQ in a South African study. The results of this questionnaire indicated where the respondent fell on the job-career-calling continuum.

The Work and Meaning Inventory (WAMI) (Steger et al., 2012) was used to measure meaningful work. Steger et al. (2012, p. 322) proposed a “multidimensional model of work as a subjectively meaningful experience consisting of experiencing positive meaning in work, sensing that work is an essential avenue for making meaning, and perceiving one’s work to benefit some greater good”. The WAMI consists of ten items that measure three subscales, namely positive meaning (four items, e.g. “I understand how my work contributes to my life’s meaning”), meaning making through work (three items, e.g. “I view my work as contributing to my personal growth”), and greater good motivations (three items, e.g. “The work I do serves a greater purpose”). The items were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The WAMI relates “positively to well-being (meaning in life and life satisfaction) and negatively to psychological distress (anxiety, hostility, and depression)” (Steger et al., 2012, p. 330). Studies showed that meaningful work scores correlate with work-related and general well-being indices, and account for unique variance beyond common predictors of job satisfaction, days reported absent from work, and life satisfaction (Steger et al., 2012). Overall findings demonstrated
that this scale has high validity and reliability scores and that it may be used as a valid and reliable instrument in order to measure individuals’ diverse ideas regarding meaningful work (Kline, 2000). Reliabilities varying from .82 to .89 were obtained for the subscales. Steger et al. (2012) found strong evidence for the construct validity and the inventory.

Work engagement was measured with an adapted version of the Work Engagement Scale (WES) (May et al., 2004). The WES has nine items. For all items, a Likert scale varying from 0 (never) to 6 (always) was used. Three components of Kahn’s (1990) conceptualisation of work engagement are reflected in the items, namely cognitive (e.g. “Time passes quickly when I perform my job”), emotional (e.g. “I really put my heart into my job”), and physical engagement (e.g. “I take work home to do”). Confirmatory factor analysis supported the hypothesized correlated three-factor structure. The internal consistencies (Cronbach’s alpha) of the WES varied from .81 to .85 for vigour, from .3 to .87 for dedication, and from .75 to .83 for absorption. Accordingly, work engagement seemed to be a highly stable indicator of occupational well-being. In a study among South African workers, Olivier and Rothmann (2007) obtained an alpha coefficient of .72, implying that the instrument is reliable in the South African context.

1.4.2.4 Research procedure

Ethical approval (No. NWU-HS-2016-0015) for the study was obtained from the Ethics Committee of the North-West University (NWU) where the research was undertaken prior to the commencement of the study (see Addendum B). A cover letter explaining the purpose of the study, which emphasized the confidentiality of the research project, accompanied the survey (see Addendum C). Participants were also clearly informed that their participation was voluntary, and they were assured of their right to withdraw from the research at any time without penalty. Fully informed and signed consent was obtained from all the participants before they could participate in the study. The survey was constructed by an independent contractor of online surveys. The approved online survey was emailed to the participants from the convenience sample group. By including as many as possible employment groups and individuals in each group, the “limitations that are usually inherent in convenience samples” (Wagner, Kawulich, & Garner, 2012, p. 92) were likely to be adequately addressed. Furthermore, this sampling strategy ensured that the sample was diverse in terms of demographic characteristics such as culture, language group, gender, and age. The
participants completed the online survey and responses were electronically captured by the independent contractor, who forwarded a daily update of responses to the researcher. The data were prepared for statistical analyses with the Statistical Package for the Social Sciences (SPSS).

1.4.2.5 Data analysis

The data from the questionnaires were captured in SPSS 22 (IBM Corp., 2013). Following this, the dataset was screened for errors and outliers, as per the procedure outlined in Field (2015). Once this process was completed, descriptive statistics were calculated for all items, scales, and subscales.

The structure of the four measuring instruments was investigated using exploratory factor analyses. Items with communalities higher than .40 were retained, given that communalities from .40 to .70 are often obtained in social sciences research (Field, 2013). There seems to be consensus that choosing a suitable factor extraction, such as principal axis factoring, and a rotation method such as a direct oblimin rotation, produces optimal results when factor structures of correlated measures are investigated. Three criteria were applied to decide how many factors should be extracted. Firstly, the Kaiser criterion holds that factors with eigenvalues higher than 1.0 should be retained for interpretation (Hair, et al., 2010, p. 364). Secondly, the percentage of the variance that was explained by the extracted factors was considered. The guideline is that the factor solution should account for a minimum of 60% of the total variance (Hair et al., 2010). Thirdly, the scree plot was considered to determine the number of factors suitable for extraction. A scree plot involves examining a graphic display of the eigenvalues and looking for the natural bend in the data where the curve flattens out (Field, 2013).

Principal component analyses were used to estimate the number of components in each measuring instrument (by considering the eigenvalues, percentage of variance explained, and the scree plots). The responses to each questionnaire were subjected to principal factor analyses with a direct oblimin rotation. According to Tabachnick and Fidell (2007), the following guidelines can be used to evaluate factor loadings: factor loadings higher than .71 are considered excellent, .63 very good, .55 good, .45 fair, and .32 poor. A cut-off point of .40 was set for cross-loadings.
Cronbach’s alpha coefficients were calculated to study the internal consistency of the measuring instruments. Descriptive statistics (means and standard deviations) were calculated to describe the data. Pearson’s correlation coefficients were used to specify the relationships between the variables. The level of statistical significance was set at \( p < .05 \). The practical significance of the findings was assessed through effect sizes (Steyn, 2000). A cut-off point of .30 (medium effect) (Cohen, 1988) was set for the practical significance of correlation coefficients.

The discriminant validity of the measures was assessed in this study following a procedure suggested by Farrell (2010). A sub-scale or scale will have discriminant validity if it accounts for more variance in the observed variables associated with it than other variables in a model. The validity of the indicators and the construct is questionable if this is not the case (Fornell & Larcker, 1981). The average variance extracted (AVE) for each construct was compared with the shared variance between the constructs. Discriminant validity is supported if the AVE for a construct is greater than its shared variance with any other construct.

Furthermore, regression analyses were used in this study to investigate the main effects of independent variables on dependent variables. The practical significance of the extracted variance was assessed using Cohen’s (1988) guidelines. Relative weight analysis (Tonidandel & LeBreton, 2015) was used to provide a partitioning of the variance among correlated predictors of meaningful work and engagement.

PROCESS was used to assess the indirect effects of antecedents of meaningful work on work engagement (via meaningful work). Using confidence intervals (CIs), this macro for SPSS estimates the indirect effects of X on Y through one or more mediator variable(s) (Hayes, 2013). Bias-corrected CIs (95% CI with 10 000 resamples) were used to assess whether indirect effects were different from zero (Hayes, 2013).

1.5 Chapter division of the mini-dissertation

The following is an outline of the chapter division of this mini-dissertation, which has been written in the article format in accordance with the NWU policy pertaining to this mode of presentation:
Chapter 1: Introduction, problem statement, and objectives
Chapter 2: Demands-abilities fit, work beliefs, meaningful work, and work engagement in nature-based jobs
Chapter 3: Summary and conclusions, recommendations, and limitations

1.6 Chapter summary

This chapter introduced the current study by providing contextual background and a review of existing literature in relation to the central research aim guiding the study, which involved an investigation of the direct and indirect relationships between D-A fit, work beliefs, meaningful work, and work engagement in individuals in nature-based jobs. In addition to providing an outline and objectives of the study, the research procedure that was followed in the study was explained, and the ontological, epistemological, and theoretical frameworks that guide the study were discussed. The aim of this chapter was to provide background for the presentation and discussion of the empirical findings that were made during the course of this study. Chapter 2 presents the majority of these findings in the form of a research article (which is in accordance with the article format as specified by the NWU). The third and final chapter is dedicated to an overview of the implications, limitations, and recommendations relating to the study.
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CHAPTER 2

RESEARCH ARTICLE
Demands-abilities fit, work beliefs, meaningful work and work engagement in nature-based jobs

Abstract

Orientation: Meaningful work and work engagement are important dimensions of flourishing of employees, especially when individuals work in challenging jobs.

Research purpose: This study aimed to investigate the relationship between demands-abilities fit, work beliefs, meaningful work, and engagement in individuals in nature-based jobs.

Motivation for the study: Individuals working in nature often work under challenging circumstances without the necessary resources. A research gap exists regarding the effects of demands-abilities fit and work beliefs on meaningful work. It is also not clear how these antecedents and meaningful work will impact the engagement of individuals working in nature.

Research approach, design and method: A cross-sectional survey was used with a convenience sample of 161 nature-based employees. Data were collected using a structured online questionnaire consisting of items from the Person-Environment Fit Scale, Work-Life Questionnaire, Work and Meaning Inventory, Work Engagement Scale and a biographical questionnaire.

Main findings: The scales which measured calling and orientations showed insufficient discriminant validity in relation to the scales which measured positive meaning and work engagement. Work beliefs (calling, career and job) and demands-abilities fit predicted a large percentage of the variance in meaning making. Work beliefs (calling and job) and demands-abilities fit also predicted a large percentage of the variance in greater good motivations. Demands-abilities fit and a calling work orientation indirectly affected work engagement via meaningful work.

Practical/Managerial implications: Managers should consider implementing interventions to affect the demand-ability fit (through human resource management interventions) and work beliefs of individuals working in nature (through job crafting). Promoting perceptions of meaningful work might contribute to higher work engagement.

Contribution/value-add: This study contributes to scientific knowledge regarding the effects of meaningful work and its antecedents on work engagement.

Keywords: Nature-based work, engagement, work beliefs, meaningful work, commitment, demands-ability fit
Introduction

Individuals spend more than a third of their lives engaged in work-related activities (Wrzesniewski, McCauly, Rozin, & Schwartz, 1997). Therefore, work is an important context to provide meaning and engagement for individuals (Cameron, Dutton, & Quinn, 2003). People experience meaningfulness when they feel useful, valuable and worthwhile (Kahn, 1990; Kahn & Heaphy, 2014). Approximately 20% of employees in organisations worldwide are highly engaged in their work, while 20% are actively disengaged (Attridge, 2009). Similar tendencies were found in South Africa (Rothmann, 2014). In a South African context, no studies have been found relating to nature-related employees’ experiences of meaningful work and work engagement. Van Zyl, Deacon, and Rothmann (2010) pointed out that experiences of meaningful work are subjective.

Person-environment fit, work beliefs, meaningful work and work engagement are important research topics that has been studied by various researchers (Dik & Duffy, 2008; May, Gilson, & Harter, 2004; Schaufeli & Bakker, 2004; Steger & Dik, 2010; Wrzesniewski, 2012; Wrzesniewski & Tosti, 2005). However, none of these studies focused on experiences and outcomes of meaningful work in nature. Empirical evidence of workers in a natural environment, who are engaged in their work and find their job meaningful, especially in South Africa, is scarce. Furthermore, very little scientific information exists regarding the role of demands-abilities fit (D-A fit), work beliefs, meaningful work, and engagement of individuals who work in natural environments. It is also unclear whether D-A fit and work beliefs will influence work engagement via the meaningfulness that individuals experience when they fit in a role. Specific theories and models provided some useful knowledge about well-being in the work context. This study focused on the relationship between demand-ability fit (D-A fit), work beliefs, meaningful work and work engagement.

Meaningful work

Meaningful work is defined “not simply as whatever work means to people, but as work that is both significant and positive in meaningfulness” (Steger, Dik, & Duffy, 2012, p. 323). Meaningful work can be explained in terms of three dimensions, namely psychological meaningfulness (positive meaning), meaning making and greater good motivations (Steger et al., 2012). Psychological meaningfulness in work is a subjective experience that what one is doing has personal significance. This captures the sense that people judge their work to matter and to be meaningful. Meaning making through work involves the idea that work is
an important source of meaning in life (Michaelson, 2005; Steger & Dik, 2009, 2010). Meaningful work may therefore help people deepen their understanding (comprehensibility) of their selves and the world around them, facilitating their personal growth. Thus, this facet helps capture the broader life context of people’s work. Greater good motivations reflect the desire to make a positive impact in life and embrace the idea that work is most meaningful if it makes a positive contribution and benefits others or society (Steger et al., 2012). Therefore, work has a purpose. Purpose refers to having a sense of desired end states to one’s work behaviour, while meaning refers to the perceived significance of individuals’ experiences at work (Barrick, Mount, & Li, 2013).

Meaning refers to the subjective evaluations of events in one’s life and work, the significance attributed to these events in relation to one’s goals, and the values, beliefs and personal identity created by them (Matuska & Christiansen, 2008). The meaning attached to work leads to employee engagement (Olivier & Rothmann, 2007; Rothmann & Rothmann, 2010).

**Predictors of meaningful work**
Several factors contribute to meaningful work (Pratt & Ashforth, 2003). Firstly, work is regarded as meaningful when there is a match between an individual and the organisation’s values and goals (Kristof-Brown, Zimmerman, & Johnson, 2005). The perceived fit between individuals’ self-concepts and their roles within the organisation results in the experience of meaningful work and engagement (May et al., 2004; Olivier & Rothmann, 2007). Secondly, the significance, purposefulness and comprehensibility of tasks contribute to meaningful work (Bellah, Madsen, Sullivan, Swidler, & Tipton, 1985). Thirdly, meaningful work is associated with work beliefs. Three broad categories exist, namely work as a job, work as a career, and work as a calling (Bellah et al., 1985; Schwartz, 1994; Wrzesniewski et al., 1997). People who view their work as a calling work for the fulfilment that performing the tasks brings to the individual (Wrzesniewski et al., 1997; Wrzesniewski, Dutton, & Debebe, 2003; Peterson, Park, Hall, & Seligman, 2009; Wrzesniewski, 2012). Fourthly, co-worker relationships affect meaningful work (Olivier & Rothmann, 2007).

This study focused on two predictors of meaningful work, namely demands-abilities fit and work beliefs.
Demands-abilities fit

Demands-abilities fit (D-A fit) (Edwards, 1996; Kristof-Brown et al., 2005) refers to the extent to which job requirements match the skills and abilities of the employee. Therefore, organisations make every effort to hire and retain employees with high D-A fit. Likewise, employees also strive for fit between their own perceived abilities and job demands. Although fit researchers agree that perceived D-A fit is associated with positive work outcomes, some fit studies have failed to find empirical support for this relationship (Astakhova, 2016; Oh et al., 2014).

D-A fit is a dimension of person-environment fit (P-E fit). P-E fit refers to the extent to which characteristics of individuals and their environments match (French, Caplan, & Harrison, 1982; Kristof-Brown et al., 2005). P-E fit instils an individual belief that the working environment is conducive to what the organisation wants, and eventually leads to positive outcomes for the employee and the organisation (Greguras & Diefendorff, 2009).

Work roles that are aligned with individuals’ self-concepts should be associated with more meaningful work experiences (Seligman, 2002). Fulfilling roles that are congruent with an individual’s signature strengths (Peterson & Seligman, 2004) contributes to the experience of meaningful work and engagement (May et al., 2004).

Work beliefs

Beliefs about the function of work in life can shape the meaning of one’s work (Wrzesniewski & Tosti, 2005). Meaning in work is also described as the level of general significance that the experience of working has in the life of people at a given time (Bellah et al., 1985). The subjective experience is classified into three broad categories, namely work as a job, work as a career, and work as a calling (Bellah et al., 1985; Schwartz, 1994; Wrzesniewski et al., 1997). Employees who view their work as a job are only interested in the material benefits from work. The work is seen as a means that allows individuals to acquire the resources needed to enjoy their time away from the job rather than an end in itself. The major interests and ambitions of these job holders are not expressed through their work (Parry, 2006; Wrzesniewski et al., 1997; Wrzesniewski, Dutton, & Debede, 2003).

Individuals who view their work as a career have invested in their work and mark their achievements not only through financial gains, but also through advancement in their careers.
(Parry, 2006; Wrzesniewski et al., 1997). In this case, meaning is derived from a perceived higher social standing and self-esteem, as well as increased power within the scope of one’s occupation (Bellah et al., 1985). Individuals who view their work as a career are happier than those who view their work as a job. However, they are less happy than those who view their work as a calling (Dik & Duffy, 2008; Peterson et al., 2009).

Individuals with a calling orientation regard their work is inseparable from their life. In this case, the work is not merely for financial gain or career advancement, but instead for the fulfilment that is possible by doing the work (Peterson et al., 2009; Wrzesniewski et al., 1997; Wrzesniewski et al., 2003). Work that employees feel called to do is usually seen as socially valuable – an end in itself – involving activities that may, but need not, be pleasurable. These individuals perceive their work and not (only) financial considerations to be important (Bellah et al., 1985). Viewing work as a calling has benefits for the individual, the group and the organisation, including energy, life satisfaction and organisational commitment (Cameron et al., 2003; Peterson et al., 2009; Wrzesniewski et al., 2003).

The three ways in which people view their work were a focus of this study, as they are still largely unexplored in individuals who have a job in natural environments. A qualitative study of Bunderson and Thompson (2009) pointed out that people who work with animals, specifically zookeepers, work for passion rather than for pay or advancement. They found that this sense of calling was grounded in a perceived connection between personal passion and endowments and particular domains of work for which these passions and endowments seem particularly well suited. Prior studies have touched on motivations for a career in nature (Forsyth, 1994; Palmer & Bryant, 1985) and found a high level of job satisfaction among game wardens in America. One of the factors mentioned in this regard was the match between the outdoor orientation of wardens and the outdoor nature of their work (Palmer & Bryant, 1985). Furthermore, the meaning of work is visible in occupations in which individuals are constantly interacting with others, since the need for socialisation, influence and affiliation largely contributes to the experience of meaning of work (Bellah et al., 1985; Van Zyl et al., 2010). Therefore, it is assumed that people working in nature would experience their work as a calling, meaningful and with a high level of work engagement because of the general (and social) responsibility accompanying conservation work – even though there is limited literature available to reference how these individuals view their work.
Work engagement

Work engagement is defined as a fulfilling and positive work-related state of mind (Schaufeli & Bakker, 2004). According to Kahn and Heaphy (2014), the individual (employee) is the core of engagement. Engagement is characterised by three dimensions, namely a physical, emotional and cognitive dimension (Kahn, 1990). May et al. (2004) describe work engagement as an attachment of individuals’ selves to a work role whereby they employ and express themselves cognitively, emotionally and physically during role performance.

Empirical research confirmed the relationship between engagement and organisational outcomes (e.g. commitment, turnover intention, productivity, motivation, job resources and burnout) (Bakker, Demerouti, & Schaufeli, 2005; Hakanen, Bakker, & Schaufeli, 2006; Schaufeli & Bakker, 2004). Engagement exists when one feels cognitively, emotionally and attached to a work role (May et al., 2004). Attachment to one’s work facilitates the opportunity to apply one’s signature strengths in the work situation (Peterson & Seligman, 2004). This opportunity to express one’s strengths while working leads to greater person-environment fit, which leads to work engagement (May et al., 2004).

Research Aims

The work of people working in nature presents an interesting and relevant context for studying demands-abilities fit, work beliefs, meaningful work and engagement, because working in a natural environment is often seen as a “calling”. As many people desire a work that is meaningful, individuals working in and with nature are often regarded as primary role models for having a meaningful and fulfilling job. Very little, if any, empirical information exists to confirm the meaningfulness of working in nature. Therefore, research about people’s work engagement and experiences of meaning in this line of work is needed, as this may have management implications for conservation and other nature-related industries.

Also, very little evidence exists regarding the effects of meaning of work on people working in nature’s experiences of meaningfulness in their work, and the effects thereof on their engagement. Scientific information about these issues can be of great value in the development of careers in nature-related jobs that strive towards flourishing employees. As facilitators between humans and nature, nature-based employees need to experience and show meaningfulness and engagement to ensure that these spill over to other employees and to external role players and contributors in the industry.
Given that meaningful work reflects a sense of purpose and personal connection to work (Spreitzer, 1995), it is expected that individuals with a calling orientation will experience work more meaningful than those with job or career orientations. Furthermore, employees who spend time on desired activities and who experience demands-abilities fit will experience more meaningful work, which will contribute to higher levels of work engagement (May et al., 2004; Olivier & Rothmann, 2007).

The aim of this study was to investigate the relationship between demands-abilities (D-A) fit, work beliefs, meaningful work, and work engagement in individuals in nature-based jobs. Based on a review of the literature, the following hypotheses were formulated:

Hypothesis 1: D-A fit is positively related to meaningful work
Hypothesis 2: D-A fit is positively related to work engagement
Hypothesis 3: A calling orientation is positively related to meaningful work
Hypothesis 4: A calling orientation is positively related to work engagement
Hypothesis 5: A job orientation is negatively related to meaningful work
Hypothesis 6: A job orientation is negatively related to work engagement
Hypothesis 7: Work engagement is positively related to meaningful work
Hypothesis 8: Work beliefs indirectly affect work engagement via meaningful work
Hypothesis 9: D-A fit indirectly affects work engagement via meaningful work

**Research design**

**Research approach**
Considering the research aims, which involve measurement of relationships between specific variables, this study followed a quantitative research approach. More specifically, a cross-sectional survey design, which allows comparisons between groups measured at one point in time (Gravetter & Forzano, 2006), was used in this study.

**Method**

**Participants and sampling**
Current employees of protected areas in South Africa, including nature reserves, national parks and privately-owned reserves, as well as people in nature-related jobs, such as training facilities for nature-based careers, were included as participants in the study. These employees consisted of management (including heads of departments), conservationists,
educationists, researchers, tour guides and field staff. Data were gathered from these participant groups \((N = 300)\) using a non-probability convenience sampling method (Sarantakos, 2013). A final number of 161 people completed the survey, resulting in a response rate of 53.67%. Table 1 describes the participants’ characteristics.

Table 1 shows that male participants comprised 42.90% and females 57.10% of the sample. Participants’ ages ranged from 19 to 75 (Mean = 38.89; \(SD = 12.92\)). The majority of participants (87.58%) had completed a qualification higher than matric, with 37.89% who held a master’s degree or higher qualification. The length of service in the current job position varied from one to more than 20 years, while the majority of participants (42.86%) had more than 10 years’ in a nature-related job. Most participants (64.60%) were permanently employed, and 86.96% were South African citizens. English and Afrikaans were the home languages of 38.51% and 34.78% participants respectively, while 26.72% participants spoke one of the African languages at home.
Table 1

*Characteristics of Participants (n = 161)*

<table>
<thead>
<tr>
<th>Item</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>92</td>
<td>57.10</td>
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</tr>
<tr>
<td>Male</td>
<td>69</td>
<td>42.90</td>
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<tr>
<td>Below 20</td>
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<td>0.62</td>
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</tr>
<tr>
<td>21-30</td>
<td>58</td>
<td>36.02</td>
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<tr>
<td>31-40</td>
<td>36</td>
<td>22.36</td>
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<tr>
<td>41-50</td>
<td>36</td>
<td>22.36</td>
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<tr>
<td>51-60</td>
<td>20</td>
<td>12.42</td>
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</tr>
<tr>
<td>Above 60</td>
<td>10</td>
<td>6.21</td>
<td></td>
</tr>
<tr>
<td>Matric</td>
<td>20</td>
<td>12.42</td>
<td></td>
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<tr>
<td>Diploma</td>
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<td>18.63</td>
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</tr>
<tr>
<td>Postgraduate diploma</td>
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<td>6.83</td>
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<tr>
<td>Bachelor’s degree</td>
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<td>8.70</td>
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<tr>
<td>Honours degree</td>
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<td>11.80</td>
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<tr>
<td>Master’s degree</td>
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<tr>
<td>Doctoral degree</td>
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<td>17.39</td>
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<td>3-5</td>
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<td>11-15</td>
<td>14</td>
<td>8.70</td>
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<tr>
<td>16-20</td>
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<td>5.59</td>
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<tr>
<td>More than 20 years</td>
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<td>9.94</td>
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<td>1-2</td>
<td>27</td>
<td>16.77</td>
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<td>3-5</td>
<td>24</td>
<td>14.91</td>
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<tr>
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<tr>
<td>More than 20 years</td>
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<tr>
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<td></td>
</tr>
<tr>
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<td>62</td>
<td>38.51</td>
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</tr>
<tr>
<td>Afrikaans</td>
<td>56</td>
<td>34.78</td>
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<tr>
<td>Sepedi</td>
<td>8</td>
<td>4.97</td>
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<tr>
<td>isiXhosa</td>
<td>6</td>
<td>3.73</td>
<td></td>
</tr>
<tr>
<td>Sesotho</td>
<td>5</td>
<td>3.11</td>
<td></td>
</tr>
<tr>
<td>Other SA languages</td>
<td>24</td>
<td>14.91</td>
<td></td>
</tr>
</tbody>
</table>

**Measuring instruments**

Data were collected using an online questionnaire. The first section of the questionnaire obtained demographic information about participants’ age, gender, language, years working in the current position in a nature-related industry, level of education, type of current employment and citizenship. In the second section of the questionnaire, standardised surveys were used to measure participants’ demands-abilities fit, their purpose and meaning in work, work beliefs, and work engagement.

D-A fit refers to the extent to which job requirements match the skills and abilities of the employee. Three items developed by Cable and DeRue (2002) from the *Person-Environment Fit Scales* (Greguras & Diefendorff, 2009) were used to measure how well employees perceived their abilities to fit with the demands of their jobs. These items included “The match is very good between the demands of my job and my personal skills”, “My abilities and training are a good fit with the requirements of my job”, and “My personal abilities and education provide a good match with the demands that my job places on me”. The items required the respondent to answer on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Greguras and Diefendorff (2009) reported the reliability of this scale as $\alpha = 0.82$.

The work beliefs of participants were measured by the *Work-Life Questionnaire* (WLQ) (Wrzesniewski et al., 1997). The WLQ is a self-report measure that classifies an individual’s
work orientation into three main categories, namely work as a job, career, or calling (Wrzesniewski et al., 1997). The WLQ is divided into two parts. The first part consists of three paragraphs representing the three meanings of work. The respondent has to rate his or her level of association with each paragraph on a scale of varying from 1 (very much like me) to 4 (not at all like me). The second part consists of 18 items formulated to substantiate the respondent’s answers on Part 1 of the questionnaire (e.g. ‘My primary reason for working is financial.’) The items are rated on a Likert scale ranging from 1 (very much like me) to 4 (not at all like me). In previous research, Wrzesniewski et al. (1997) found the reliability of this instrument to be adequate. Van Zyl et al. (2010) reported Cronbach alpha coefficients ranging between .80 and .87 for the WLQ in a South African study.

The Work and Meaning Inventory (WAMI) (Steger et al., 2012) was administered to measure experiences of meaningful work. According to Steger et al. (2012), meaningful work consists of three dimensions, namely sensing that work is a key avenue for making meaning, experiencing positive meaning in work, and perceiving one’s work to serve some greater good. The WAMI consists of 10 items measuring three subscales, namely meaning making through work (three items, e.g. “I view my work as contributing to my personal growth”), positive meaning (four items, e.g. “I understand how my work contributes to my life’s meaning”), and greater good motivations (three items, e.g. “The work I do serves a greater purpose”). The items are rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The WAMI relates positively to well-being (meaning in life and life satisfaction) and negatively to psychological distress (anxiety, hostility, and depression) (Steger et al., 2012). Studies showed that meaningful work scores correlate with work-related and general well-being indices (Steger et al., 2012). Reliabilities ranging from 0.82 to 0.89 were obtained for the subscales.

Work engagement was measured by an adapted version of the Work Engagement Scale (WES) (May et al., 2004). The WES has nine items. For all items, a Likert scale ranging from 0 (never) to 6 (always) was used. The WES assessed the three dimensions of Kahn’s (1990) conceptualisation of work engagement, namely cognitive engagement (e.g. “Time passes quickly when I perform my job”), emotional engagement (e.g. “I really put my heart into my job”) and physical engagement (e.g. “I take work home to do”). Confirmatory factor analysis supported the hypothesised correlated three-factor structure. The internal consistencies (Cronbach alpha) of the WES ranged from 0.81 to 0.85 (for physical
engagement), from 0.30 to 0.87 (for the emotional engagement), and from 0.75 to 0.83 (for cognitive engagement). Therefore work engagement seems to be a highly stable indicator of occupational well-being. In a South African study, Olivier and Rothmann (2007) obtained an alpha coefficient of 0.72, which supports the reliability of the total scale.

**Research procedure**

The Ethics Committee at the university where the research was done, provided ethical approval for the study. A cover letter explaining the purpose of the study and emphasising the confidentiality of the research project accompanied the survey. Participants were also clearly informed that their participation was voluntary, and assured of their right to withdraw from the study at any time without penalty. Informed and signed consent was obtained from all participants before they could participate in the study. The survey was constructed by an independent contractor for online surveys. The approved online survey was emailed to the participants from the convenience sample group. By including as many as possible employment groups and individuals in each group, the limitations that are usually inherent in convenience samples (Wagner, Kawulich, & Garner, 2012) were likely to be adequately addressed. Furthermore, this sampling strategy ensured that the sample was diverse in terms of demographic characteristics such as culture or language group, gender and age. Participants completed the online survey and responses were electronically captured by the independent contractor, who forwarded a daily update of responses to the researcher. The data were prepared for statistical analyses with SPSS.

**Data analysis**

Data from the questionnaires were captured in SPSS 22 (IBM Corp., 2013). Following this, the dataset was screened for errors and outliers following the procedure outlined in Field (2015). Once this process was completed, descriptive statistics were calculated for all items, scales and subscales.

The structure of the four measuring instruments was investigated using exploratory factor analyses. Items with communalities higher than .40 were retained, given that communalities from 0.40 to 0.70 are often obtained in social sciences research (Field, 2015). There seems to be consensus that choosing a suitable factor extraction, such as principal axis factoring, and a rotation method, such as a direct oblimin rotation, produces optimal results when factor structures of correlated measures are investigated. Three criteria were applied to decide how
many factors should be extracted. First, the Kaiser criterion holds that factors with eigenvalues higher than 1.0 should be retained for interpretation (Hair, Babin, Money, & Samouel, 2010, p. 364). Second, the percentage of the variance that was explained by the extracted factors was considered. The guideline is that the factor solution should account for a minimum of 60% of the total variance (Hair et al., 2010). Third, the scree plot was considered to determine the number of factors suitable for extraction (Field, 2015).

Principal component analyses were used to estimate the number of components in each measuring instrument (by considering the eigenvalues, percentage of variance explained and the scree plots). Responses to each questionnaire were subjected to principal factor analyses with a direct oblimin rotation. According to Tabachnick and Fidell (2007), the following guidelines can be used to evaluate factor loadings: factor loadings higher than .71 are considered excellent, 0.63 very good, 0.55 good, 0.45 fair, and 0.32 poor. A cut-off point of 0.40 was set for cross-loadings.

Cronbach alpha coefficients were computed to study the reliability of the measuring instruments. Descriptive statistics were computed to describe the data. Pearson correlation coefficients were used to specify the relations between the variables. The practical significance of findings was assessed through effect sizes (Steyn, 2000). The practical significance of correlation coefficients was studied using the guidelines of Cohen (1988).

The discriminant validity of the measures was assessed in this study following a procedure suggested by Farrell (2010). A subscale or scale will have discriminant validity if it accounts for more variance in the observed variables associated with it than other variables in a model. The validity of indicators and the construct is questionable if this is not the case (Fornell & Larcker, 1981). The average variance explained (AVE) for each construct was compared with the shared variance between the constructs. Discriminant validity is supported if the AVE for a construct is greater than its shared variance with any other construct.

Furthermore, regression analyses were used in this study. First, standard multiple regression analyses were used to investigate the main effects of demands-abilities fit and work beliefs on meaningful work. Second, standard multiple regression analyses were used to investigate the main effects of demands-abilities fit and work beliefs on meaningful work and employee engagement. The following guidelines of Cohen (1988) were used to assess the practical
significance of the explained variance: \( R^2 = 0.09 \) (medium effect) and \( R^2 = 0.25 \) (large effect).

Relative weight analysis (Tonidandel & LeBreton, 2015) was used to provide a partitioning of the variance among correlated predictors of meaningful work and engagement. Tonidandel and LeBreton (2015, p. 208) motivate the use of relative weight analysis as follows: “Relative weight addresses the problem caused by correlated predictors by using a variable transformation approach to create a set of new predictors that are maximally related to the original predictors, but are orthogonal to one another. Because these newly transformed predictors are uncorrelated to one another, the criterion variable can be regressed onto this new set of predictors, producing a series of standardised regression coefficients. Seeing as these coefficients are generated using the orthogonal transformations of the original predictors, they no longer suffer from problems associated with collinearity. These regression coefficients are then rescaled back to the original variables by combining them with the standardised regression coefficients obtained by regressing the original predictors on their orthogonal counterparts producing an estimate of relative importance for each predictor variable.”

PROCESS was used to assess indirect effects of antecedents of meaningful work on work engagement (via meaningful work). Using confidence intervals, this macro for SPSS estimates the indirect effects of X on Y through one or more mediator variable(s) (Hayes, 2013). Bias-corrected confidence intervals (95% CI with 10 000 resamples) were used to assess whether indirect effects were different from zero (Hayes, 2013).

**Results**

**Exploratory factor analyses**

**DAFS**

A principal component analysis was carried out on the 3 items of the DAFS. One factor (eigenvalue = 2.14) explaining 71.92% of the variance was extracted. The component loading and communalities \( (h^2) \) were as follows: item 1 = 0.76 \( (h^2 = .57) \), item 2 = 0.91 \( (h^2 = 0.83) \), and item 3 = 0.85 \( (h^2 = 0.74) \). This indicates that the 3 items of the DAFS are valid indicators of the construct.
**WLQ**

A principal component analysis was carried out on the 21 items of the WLQ. Five factors with eigenvalues larger than one were extracted. The eigenvalues of the five factors and percentages of variance extracted were as follows: Factor 1 = 5.56 (26.49%); Factor 2 = 2.19 (10.44%), Factor 3 = 1.80 (8.55%), Factor 4 = 1.50 (7.15%), and Factor 5 = 1.21 (5.74%). Given that a three-factor structure was expected for the WLQ, it was decided to specify three factors. Next, a principal factor analysis with a direct oblimin rotation specifying three factors was carried out. Five items (WLQ7, WLC10, WLC15, WLC18, WLQ20) did not load as expected and were removed. A principal factor analysis with a direct oblimin rotation was carried out again. Three factors were extracted, namely Calling, Career and Job orientations to work.

**WAMI**

A principal component analysis was carried out on the 10 items of the WAMI. The eigenvalues of the first three factors and percentages of variance extracted were as follows: Factor 1 = 5.22 (52.15%); Factor 2 = 1.13 (11.29%), and Factor 3 = 0.84 (8.36%). Given that a three-factor structure was expected for the WAMI, and because Factor 3 explained 8.36% of the total variance, it was decided to retain the three-factor structure. Next, a principal factor analysis with a direct oblimin rotation was carried out. The three factors that were extracted were labelled as Meaning making, Greater good motivations, and Positive meaning. The items that loaded on the three factors that constitute meaningful work are in line with the factors identified by Steger et al. (2012). However, one item, namely WAMI4 (“I understand how my work contributes to my life’s meaning”) loaded on Factor 1 (Meaning making) rather than Factor 3 (Positive meaning), where it is supposed to load. Given that the item concerns work as a form of meaning making, it was decided to retain it on Factor 1.

**WES**

A principal component analysis was carried out on the 9 items of the WES. Two factors had eigenvalues larger than one. Factor 1 had an eigenvalue of 4.90 and explained 54.47% of the total variance. Factor 2 had an eigenvalue of 1.05 and explained 11.63% of the variance. Given that one factor of work engagement has been reported consistently in South African studies (see Rothmann, 2017), it was decided to retain only one factor. The component
loadings ranged from 0.47 to 0.89, while communalities ranged from 0.70 to 0.86. The factor was labelled Work engagement.

**Descriptive statistics and correlations**

Table 2 shows the descriptive statistics, alpha coefficients, Pearson correlations, the AVE and the shared variance between constructs.

| Item                        | Mean | SD  | α     | 1    | 2      | 3    | 4    | 5    | 6    | 7    | 8    |
|-----------------------------|------|-----|-------|------|--------|------|------|------|------|------|------|------|
| 1. Demands-abilities fit   | 4.29 | 0.59| 0.80  | 0.20 | 0.00   | 0.08 | 0.11 | 0.11 | 0.11 | 0.18 | 0.11 |
| 2. Calling                 | 3.29 | 0.53| 0.79  | 0.31 | (0.00) | 0.04 | -0.18| (0.48)| 0.06 | 0.29 | 0.19 | 0.41 | 0.41 |
| 3. Career                  | 2.53 | 0.80| 0.74  | -0.04| -0.18  | 0.25 | (0.16)| 0.14 | 0.12 | 0.16 | 0.21 |
| 4. Job                     | 1.78 | 0.52| 0.65  | -0.29| -0.48  | 0.54 | (0.04)| -0.37| 0.27 | 0.48 | 0.27 |
| 5. Meaning making           | 4.32 | 0.60| 0.85  | 0.33 | 0.44   | 0.04 | (0.04)| 0.52 | (0.40)| 0.36 | 0.19 |
| 6. Greater good motivations | 4.36 | 0.66| 0.74  | 0.33 | 0.44   | -0.01| -0.34| 0.52 | (0.40)| 0.36 | 0.19 |
| 7. Positive meaning         | 4.35 | 0.65| 0.76  | 0.42 | 0.64   | -0.11| -0.40| 0.69 | 0.60 | (0.32)| 0.31 |
| 8. Work engagement          | 5.04 | 0.89| 0.89  | 0.33 | 0.64   | -0.16| -0.46| 0.52 | 0.43 | 0.56 | (0.55)|

Notes: * p < 0.05  ** p < 0.01

† r > 0.30 practically significant (medium effect); †† r > 0.50 practically significant (large effect)

The AVE values appear on the diagonal of the correlation matrix

The alpha coefficients of the scales, except for one, are acceptable compared with the cut-off point of 0.70 (Nunnally & Bernstein, 1994). The alpha coefficient of one of the scales, namely work as a job, was lower than 0.70 (α = 0.65).

Table 2 shows that demands-abilities fit is statistically and practically significantly related to meaning making, greater good motivations, positive meaning and work engagement (all medium effects). Calling as a work belief is statistically and practically significantly related to meaning making, positive meaning and work engagement (all large effects), and greater good motivations (medium effect). Job as a work belief is statistically and practically significantly negatively related to meaning making, greater good motivations, positive
meaning and work engagement (all medium effects). Work engagement is also statistically and practically significantly related to meaning making and positive meaning (both large effects), and greater good motivations (large effects).

**Testing for discriminant validity**

To test for discriminant validity, we compared the average variance explained by a specific construct with the squared correlation of this construct with every other construct. Table 2 shows the AVE for each construct and the shared variance between the constructs. Discriminant validity is partially supported, given that for most constructs the AVE for a specific construct is greater than its shared variance with any other construct.

Two observations can be made regarding the discriminant validity of the scales from Table 2. First, the average variance explained by a calling orientation (i.e. the average of the sum of squared factor loadings on the scale) is lower than the squared correlations between calling and positive meaning, as well as calling and work engagement. This finding raises questions regarding the discriminant validity of the measure of calling in relation to positive meaning and work engagement. Second, the average variance explained by a job orientation is lower than the squared correlation between job orientation and work engagement. This finding raises questions about the discriminant validity of the scale which measures job orientation as a work belief.

Table 3 shows the results of multiple regression analyses with demands-abilities fit (as measured by the DAFS) and work beliefs (as measured by the WLQ) as independent variables and the three dimensions of meaningful work (as measured by the WAMI) as dependent variables.
Table 3

**Regression Analyses of Demands-Abilities Fit and Work Beliefs on Meaningful Work**

<table>
<thead>
<tr>
<th>Model</th>
<th>Beta</th>
<th>SE</th>
<th>β</th>
<th>t</th>
<th>p</th>
<th>F</th>
<th>R</th>
<th>R²</th>
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<td><strong>Meaning making</strong></td>
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</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
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<td>0.41</td>
<td>5.94</td>
<td>0.00</td>
<td>26.34**</td>
<td>0.58</td>
<td>0.34</td>
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<tr>
<td></td>
<td>Calling</td>
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<td>0.08</td>
<td>0.48</td>
<td>6.46</td>
<td>0.00**</td>
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</tr>
<tr>
<td></td>
<td>Career</td>
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<td>0.07</td>
<td>0.17</td>
<td>2.56</td>
<td>0.01**</td>
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<td></td>
</tr>
<tr>
<td></td>
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<td>0.09</td>
<td>-0.19</td>
<td>-2.51</td>
<td>0.01**</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>(Constant)</td>
<td>1.90</td>
<td>0.48</td>
<td>3.94</td>
<td>0.00**</td>
<td>21.40**</td>
<td>0.60</td>
<td>0.35</td>
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<tr>
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<td>5.96</td>
<td>0.00**</td>
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<tr>
<td></td>
<td>Career</td>
<td>0.17</td>
<td>0.07</td>
<td>0.17</td>
<td>2.46</td>
<td>0.01**</td>
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<tr>
<td></td>
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<td>0.03*</td>
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<td>14.79**</td>
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<tr>
<td></td>
<td>Career</td>
<td>0.12</td>
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<td>0.10</td>
<td>1.40</td>
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<td>0.25</td>
</tr>
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<td>0.00**</td>
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<tr>
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<td>0.08</td>
<td>0.09</td>
<td>1.28</td>
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<td>-1.84</td>
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<td>0.19</td>
<td>2.57</td>
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<tr>
<td><strong>Positive meaning</strong></td>
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</tr>
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<tr>
<td></td>
<td>Career</td>
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<td>0.07</td>
<td>0.03</td>
<td>0.54</td>
<td>0.59</td>
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<tr>
<td></td>
<td>Job</td>
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<td>-0.13</td>
<td>-1.91</td>
<td>0.06</td>
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<tr>
<td>2</td>
<td>(Constant)</td>
<td>1.25</td>
<td>0.47</td>
<td>2.64</td>
<td>0.01</td>
<td>34.85**</td>
<td>0.69</td>
<td>0.47</td>
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<tr>
<td></td>
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<td>0.08</td>
<td>0.53</td>
<td>7.86</td>
<td>0.00**</td>
<td></td>
<td></td>
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<tr>
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<td>Career</td>
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<td>0.07</td>
<td>0.02</td>
<td>0.35</td>
<td>0.73</td>
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<tr>
<td></td>
<td>Job</td>
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<td>0.09</td>
<td>-0.09</td>
<td>-1.29</td>
<td>0.20</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Demands-abilities fit</td>
<td>0.25</td>
<td>0.07</td>
<td>0.23</td>
<td>3.71</td>
<td>0.00**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < 0.05  ** p < 0.01

Table 3 shows that work beliefs (Calling, Career and Job), as measured by the WLQ, explained 34% of the variance in Meaning making (as measured by the WAMI) in the first step of the multiple regression analysis ($F = 26.34, p < 0.01$). The standardised regression coefficients of the following predictors were statistically significant: Calling ($β = .48, p < .01$), Career ($β = 0.17, p < 0.01$) and Job ($β = -0.19, p < 0.01$). In the second step of the analysis, Demands-abilities fit (as measured by the DAFS) was entered with work beliefs.
(as measured by the WLQ) into the regression analysis. The results showed that an increase in the value of $R^2$ ($\Delta R^2 = 0.01, p > 0.05$) was recorded when Demands-abilities fit was included in the regression equation. The standardised beta coefficient of a Calling orientation was almost 2.5 times higher than the other standardised beta coefficients.

Table 3 shows that work beliefs (Calling, Career and Job), as measured by the WLQ, explained 22% of the variance in Greater good motivations (as measured by the WAMI) in the first step of the multiple regression analysis ($F = 14.79, p < 0.01$). The standardised regression coefficients of the following predictors were statistically significant: Calling ($\beta = 0.36, p < 0.01$) and Job ($\beta = -0.19, p < 0.01$). In the second step of the analysis, Demands-abilities fit (as measured by the DAFS) was entered with work beliefs (as measured by the WLQ) into the regression analysis. The results showed that an increase in the value of $R^2$ ($\Delta R^2 = 0.03, p > 0.05$) was recorded when Demands-abilities fit was included in the regression equation. The standardised regression coefficients of the following predictors were statistically significant: Calling ($\beta = 0.32, p < 0.01$) and Demands-abilities fit ($\beta = 0.19, p < 0.01$). The standardised beta coefficient of a Calling orientation was almost twice as high as the coefficient of Demands-abilities fit.

Table 3 shows that work beliefs (Calling, Career and Job), as measured by the WLQ, explained 43% of the variance in Positive meaning (as measured by the WAMI) in the first step of the multiple regression analysis ($F = 38.75, p < 0.01$). The standardised regression coefficient of the following predictor was statistically significant: Calling ($\beta = .58, p < 0.01$). In the second step of the analysis, Demands-abilities fit (as measured by the DAFS) was entered with work beliefs (as measured by the WLQ) into the regression analysis. The results showed that an increase in the value of $R^2$ ($\Delta R^2 = 0.04, p > 0.05$) was recorded when Demands-abilities fit was included in the regression equation. The standardised regression coefficients of the following predictors were statistically significant: Calling ($\beta = 0.53, p < 0.01$) and Demands-abilities fit ($\beta = 0.32, p < 0.01$). The standardised beta coefficient of a Calling orientation was more than twice as high as the coefficient of Demands-abilities fit.

Table 4 shows the results of multiple regression analyses with demands-abilities fit (as measured by the DAFS), work beliefs (as measured by the WLQ), and the three dimensions
of meaningful work (as measured by the WAMI) as independent variables work engagement (as measured by the WES) as dependent variable.

Table 4

*Regression Analyses of Meaningful Work and its Antecedents on Work Engagement*

<table>
<thead>
<tr>
<th>Work Engagement</th>
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<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2.07</td>
<td>1.29</td>
</tr>
<tr>
<td>Calling</td>
<td>0.91</td>
<td>0.86</td>
<td>0.63</td>
</tr>
<tr>
<td>Career</td>
<td>-0.01</td>
<td>-0.02</td>
<td>-0.07</td>
</tr>
<tr>
<td>Job</td>
<td>-0.35</td>
<td>-0.32</td>
<td>-0.24</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
<td>4.80</td>
<td>3.12</td>
<td>1.88</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
<td>7.89</td>
<td>7.40</td>
<td>4.66</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
<td>-0.08</td>
<td>-0.18</td>
<td>-0.70</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
<td>-2.99</td>
<td>-2.64</td>
<td>-2.05</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
<td>0.00**</td>
<td>0.00**</td>
<td>0.01**</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
<td>0.94</td>
<td>0.86</td>
<td>0.49</td>
</tr>
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<td>Demands-abilities fit</td>
<td>0.00**</td>
<td>0.00**</td>
<td>0.04**</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
<td>0.81</td>
<td>0.90</td>
<td>0.38</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
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<td>1.63</td>
<td>0.31</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
<td>1.03</td>
<td>1.03</td>
<td>0.31</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
<td>0.97</td>
<td>0.97</td>
<td>0.33</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
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<td>0.67</td>
<td>0.70</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
<td>0.44</td>
<td>0.45</td>
<td>0.49</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
<td>40.97**</td>
<td>31.98**</td>
<td>20.83**</td>
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<td>0.00**</td>
<td>0.01**</td>
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<td>Demands-abilities fit</td>
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<td>0.67</td>
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<td>Demands-abilities fit</td>
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<td>0.45</td>
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<tr>
<td>Demands-abilities fit</td>
<td>0.44</td>
<td>0.44</td>
<td>0.49</td>
</tr>
</tbody>
</table>

* * p < 0.05  ** p < 0.01

Table 4 shows that work beliefs (Calling, Career and Job) explained 44% of the variance in Work engagement (as measured by the WES) in the first step of the multiple regression analysis ($F = 40.97, p < 0.01$). The standardised regression coefficients of the following predictors were statistically significant: Calling ($\beta = 0.54, p < 0.01$) and Job ($\beta = -0.21, p < 0.01$). In the second step of the analysis, Demands-abilities fit (as measured by the DAFS) was entered with work beliefs (as measured by the WLQ) into the regression analysis. The results showed that an increase in the value of $R^2$ ($\Delta R^2 = 0.01, p > 0.05$) was recorded when Demands-abilities fit was included in the regression equation. The standardised regression coefficients of the following predictors were statistically significant: Calling ($\beta = 0.51, p < 0.01$).
0.01) and Job (β = -0.18, p < 0.01). In the third step of the analysis, meaningful work (as measured by the WAMI), Demands-abilities fit (as measured by the DAFS), and work beliefs (as measured by the WLQ) were included in the regression equation. The results showed that an increase in the value of \( R^2 (\Delta R^2 = 0.04, p > 0.05) \) was recorded when Meaningful work was included in the regression equation. The standardised regression coefficients of the following predictors were statistically significant: Calling (β = 0.38, p < 0.01) and Job (β = -0.14, p < 0.01).

Relative weights analyses

Relative weight analyses (Johnson, 2000) were conducted for each of the dependent variables separately using RWA-Web (Tonidandel & LeBreton, 2015). The scale scores were used as input.

The analyses showed that the independent variables had the following raw relative weights (RW), rescaled relative weights (RRW) and bias-corrected confidence intervals (BC-CI) in predicting Meaning making (34% of the variance explained): RW Demands-abilities fit = 0.06 [0.01, 0.15] (RRW = 16.68%); RW Calling = 0.21 [0.11, 0.33] (RRW 61.40%); RW Career = 0.01 [0.00, 0.02] (RRW = 2.11%), and RW Job = 0.07 [0.02, 0.13] (RRW = 19.80%). The independent variables had the following RW, RRW and BC-CI in predicting Greater good motivations (25% of the variance explained): RW Demands-abilities fit = 0.07 [0.01, 0.20] (RRW = 25.86%); RW Calling = 0.13 [0.05, 0.23] (RRW 50.41%); RW Career = 0.01 [0.00, 0.01] (RRW = 1.60%), and RW Job = 0.06 [0.02, 0.12] (RRW = 22.12%).

The independent variables had the following RW, RRW and BC-CI in predicting Positive meaning (47% of the variance explained): RW Demands-abilities fit = 0.10 [0.03, 0.19] (RRW = 21.43%); RW Calling = 0.28 [0.16, 0.40] (RRW 59.52%); RW Career = 0.01 [0.00, 0.06] (RRW = 4.28%), and RW Job = 0.07 [0.02, 0.12] (RRW = 14.77%).

Furthermore, the independent variables had the following RW, RRW and BC-CI in predicting Work engagement (49% of the variance explained): RW Demands-abilities fit = 0.03 [0.01, 0.07] (RRW = 5.73%); RW Calling = 0.17 [0.10, 0.24] (RRW 33.87%); RW Career = 0.01 [0.01, 0.04] (RRW = 2.25%); RW Job = 0.08 [0.02, 0.18] (RRW = 15.68%); RW Meaning making = 0.08 [0.04, 0.13] (RRW = 15.70%); [0.01, 0.10] RW Greater good
motivations = 0.05 (RRW = 10.11%); RW Positive meaning = 0.08 [0.04, 0.13] (RRW = 16.68%).

**Indirect effects**

To further investigate indirect effects of demands-abilities fit, work beliefs and meaningful work on employee engagement, the PROCESS v2.13 procedure developed by Hayes (2013) was used. To evaluate indirect effects, bootstrapping (with 10,000 samples) was used to construct bias-corrected 95% confidence intervals (CIs). Table 5 shows that indirect effects and the lower and upper CIs (see Table 5).

Table 5

*Confidence Intervals of Standardised Indirect Effects of Work Beliefs and Demands-abilities Fit on Work Engagement via Meaningful Work*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Indirect effect</th>
<th>SE</th>
<th>Est./SE</th>
<th>Two-tailed p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calling</td>
<td>0.19</td>
<td>0.08</td>
<td>2.48</td>
<td>0.01</td>
<td>[0.06, 0.37]</td>
</tr>
<tr>
<td>Career</td>
<td>0.01</td>
<td>0.03</td>
<td>0.55</td>
<td>0.58</td>
<td>[-0.02, 0.08]</td>
</tr>
<tr>
<td>Job</td>
<td>-0.04</td>
<td>0.03</td>
<td>-1.39</td>
<td>0.17</td>
<td>[-0.12, -0.00]</td>
</tr>
<tr>
<td>Demands-abilities fit</td>
<td>0.08</td>
<td>0.04</td>
<td>2.21</td>
<td>0.03</td>
<td>[0.03, 0.18]</td>
</tr>
</tbody>
</table>

* p < 0.01

Table 5 shows that the indirect effect of a Calling orientation on Work engagement was 0.19 (*p* < 0.01 [0.06, 0.37]). D-A fit had an indirect effect on Work engagement (*β* = 0.08, *p* < 0.05 [0.03, 0.18]). Therefore, a Calling orientation and D-A fit indirectly affected Work engagement via Meaningful work.
Discussion
The aim of this research was to investigate the relationship between demands-abilities (D-A) fit, work beliefs, meaningful work, and work engagement in individuals in nature-based jobs. The results supported the reliability and factorial validity of the scales used in the study.

The results confirmed that work beliefs (calling, career and job) and demands-abilities fit predicted a large percentage of the variance in meaning making. In fact, relative weight analysis showed that of the 34% of the total variance explained in meaning making, a calling work orientation contributed 61%, a low job orientation contributed almost 20% and demands-abilities fit almost 17%. Having a calling work orientation facilitates meaning making by deepening individuals’ understanding of their selves and the world around them (Steger et al., 2012). Wrzesniewski (2012) argued that individuals with a calling orientation connect with their inner selves through introspection, looking deep into the selves. Meaning making (as dimension of meaningful work) occurs less when individuals have a job orientation, i.e. when their major interests and ambitions are not expressed through their work (Wrzesniewski et al., 2003). Meaning making was also related to D-A fit, i.e. the extent to which job requirements match the skills and abilities of the employee (Edwards, 1996; Kristof-Brown et al., 2005).

Work beliefs (calling and job orientations to work) and demands-abilities fit also predicted a large percentage of the variance in greater good motivations. Relative weight analysis showed that of the total percentage of variance explained in greater good motivation, a calling work orientation contributed 50%, demands-abilities fit contributed 26% and a job orientation contributed 22%. Greater good motivations embrace the idea that work is most meaningful if it makes a positive contribution and benefits others or society as a whole (Steger et al., 2012).

Hirschi (2011) pointed out that a calling orientation involves a sense that the work one is doing makes the world a better place, which explains the strong effect of a calling work orientation on greater good motivations. However, greater good motivations were also associated with a good fit between the demands of the job and individuals’ abilities and skills.
A high calling orientation, low job orientation and demands-abilities fit predicted a large percentage of the variance in positive meaning at work. Relative weight analysis showed that of the 47% of variance explained in positive meaning, a calling orientation contributed 59%, while demands-abilities fit and a job orientation contributed 21% and 15% respectively. Positive meaning is a subjective experience that what one is doing has personal significance (Steger et al., 2012).

Work beliefs (and specifically a high calling orientation and a low job orientation) predicted a large percentage of the variance in work engagement. However, the effect of a calling orientation was twice as strong. Relative weight analysis showed that of the 49% variance explained in work engagement, the three dimensions of meaningful work contributed 49%, a calling orientation contributed a third (34%), while a low job orientation contributed 16%. These findings confirm the relational model of work engagement (Kahn & Heapy, 2014).

A calling orientation, a low job orientation and demands-abilities fit allow individuals to more often experience meaningful work and work engagement. The findings confirm the relationship between a calling and meaningful work (Hirschi, 2012; Wrzesniewski, 2012). It seems that a calling work orientation is a vital factor in understanding what makes work meaningful and engaging (Hirschi, 2012). Meaningful work is an important factor in understanding the relation between a calling work orientation and demands-abilities fit and work engagement of people working in nature-based jobs.

The results of this study should be interpreted with caution given that the discriminant validity of at least two scales was questionable. The scale which measured a calling orientation showed insufficient discriminant validity in relation to the scales which measured positive meaning and work engagement. Also, the scale which measures job orientation showed insufficient discriminant validity in relation to work engagement. More research is needed regarding the improvement of the validity of the two scales.

**Recommendations**

Gaining an understanding of what contributes to meaningful work and work engagement is particularly important at this point in time, as wildlife agencies have experienced tension and change in recent years due to restructuring, poaching, law enforcement factors and conflict over ownership and control of land and its natural
resources (see Harrison et al., 2015; Karanja, 2012). Moreover, this research contributes more generally to the understanding for motivation of nature-based jobs, helping to fulfil the need to blend leisure and conservation into developing research and policy protocols.

It is recommended to enhance the demands-abilities fit of individuals working in nature to enhance positive meaning at work, regardless of whether or not they report a calling. Human resource management initiatives (e.g. recruitment, selection, training and development) could be implemented to promote the demands-abilities fit of workers, which will result in meaningfulness in work and work engagement (Isaksen, 2000).

It would be useful to conduct longitudinal studies with individuals to track their calling as it develops in their careers in a nature-based environment. The role of meaningfulness and work engagement as pathways towards a meaningful life should be studied in future research. More research is needed to explore the “less positive” side of a calling orientation in nature-based jobs where individuals feel that they need to persist in difficult circumstances because of a sense of calling (Bunderson & Thompson, 2009).

Limitations of the study
This study had various limitations. First, a true probability sample was not used. Therefore, the sample did not represent the wider target population from which it was drawn. As such, generalization of the results beyond the sample group should be done with great caution. In other words, results obtained from this study may not necessarily be representative of all people working in nature. Second, the discriminant validity of the scales which measured job and calling orientations in this study was not ideal. This was evident from the finding that the average variances extracted in the factors were lower than the variance shared by these constructs and other variables included in this study, namely positive meaning and work engagement. Therefore, more research is needed to develop the scales which measure work orientations. A further limitation to this study is that the design is cross-sectional. A longitudinal study could provide further insight into activities, tasks, and experiences that result in meaningful work and engagement.
References


Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, 382-388.


CHAPTER 3

SUMMARY AND CONCLUSIONS, RECOMMENDATIONS, AND LIMITATIONS

This chapter serves as an overview of the conclusions, recommendations, and limitations that originated from the study. The most significant conclusions based on the findings are discussed. The factors which act as limitations in relation to the study’s findings are mentioned. Finally, recommendations for future research are made.

3.1 Summary and conclusions

The main aim of this study was to determine the relationship between D-A fit, work beliefs, meaningful work, and work engagement in individuals in nature-based jobs. Following from this main aim, two specific research objectives were set. The first objective was to investigate the direct relationships between D-A fit, work beliefs, meaningful work, and engagement in nature-based work; and the second was to investigate the indirect relationships between D-A fit, work beliefs, meaningful work, and engagement in nature-based work.

The structure of the four measuring instruments – D-A fit, WLQ, WAMI and WES – was investigated using exploratory factor analysis. Principal component analyses were used to estimate the number of components and reliability calculations were conducted to study the internal consistency of each instrument. Exploratory factor analysis and reliability coefficients indicated that the constructs used in this study were valid and reliable.

From literature it became clear that several factors contribute to meaningful work (Pratt & Ashforth, 2003). Firstly, work is regarded as meaningful when there is a match between an individual and the organization’s values and goals (Kristof-Brown, Zimmerman, & Johnson, 2005). The perceived fit between individuals’ self-concepts and their roles within the organization results in the experience of meaningfulness and engagement (May, Gilson, & Harter, 2004; Olivier & Rothmann, 2007). Secondly, the significance, purposefulness, and comprehensibility of tasks contribute to meaningful work (Bellah et al., 1985). Thirdly, meaningful work is associated with work beliefs. Three broad categories exist, namely work as a job, work as a career, and work as a calling (Bellah et al., 1985; Schwartz, 1994;
Wrzesniewski et al., 1997). People who view their work as a calling find that their work is not merely for financial gain or career advancement, but instead for the fulfilment that doing the work brings to the individual (Wrzesniewski et al., 1997; Wrzesniewski, Dutton, & Debebe, 2003; Peterson et al., 2009; Wrzesniewski, 2012).

Analyses of the correlation coefficients in the current study showed that calling as a work belief was positively related to meaningful work and work engagement, while job as a work belief was significantly and negatively related to meaningful work and work engagement. Work engagement was significantly and positively related to meaningful work.

The results confirmed that work beliefs (calling, career, and job) and D-A fit predicted a large percentage of the variance in meaning making. Although all four variables (i.e. high D-A fit and high calling, career, and low job orientations) contributed towards meaning making, a calling orientation played a much stronger role in the prediction model.

Work beliefs (calling and job) and D-A fit also predicted a large percentage of the variance in greater good motivations. Again, a calling orientation contributed stronger to greater good motivations than a low job orientation and high D-A fit.

Finally, work beliefs (and specifically a calling orientation) and D-A fit predicted a large percentage of the variance in positive meaning at work. A calling orientation had a stronger effect compared to D-A fit. Work beliefs (and specifically a high calling orientation and a low job orientation) predicted a large percentage of the variance in work engagement. However, the effect of a calling orientation was twice as strong. D-A fit and meaningful work did not statistically significantly predict work engagement when it was considered together with work orientation (and specifically a high calling orientation and a low job orientation). D-A fit and a calling work orientation indirectly affected work engagement via meaningful work.

Gaining an understanding of what contributes to work engagement and meaning in work in nature-based jobs is particularly important at this point in time, as wildlife agencies have experienced tension and change in recent years due to restructuring, poaching, law enforcement factors, and conflict over ownership and control of land and its natural
resources (see for example Harrison et al., 2015; Karanja, 2012). Moreover, this research contributes more generally to the understanding of motivation for nature-based jobs, helping to fulfil the need to blend leisure and conservation into developing research and policy protocols.

Based on the results of this study, it is evident that people who work in nature view their work as a calling. Managers of protected areas and nature-related organizations can assume that workers, on average, with a calling orientation as a work belief, would experience meaning in their work. In this regard, a number of recommendations can be made. These recommendations are discussed in the next section.

3.2 Recommendations

With the assumption that workers with nature-based jobs, on average, experience meaning in their work by seeing their work as a calling and not necessarily only as a means to earn a living, a number of recommendations can be made. It is important for management to implement initiatives to foster a calling orientation to work during recruitment, selection, training, and development. A calling orientation to work will contribute towards experiences of D-A fit, meaning in work, and work engagement (Van Zyl, Deacon, & Rothmann, 2010). It is also recommended to enhance the D-A fit of individuals who work in nature to enhance positive meaning at work, regardless of whether or not they report a calling. Human resource management initiatives (e.g. recruitment, selection, training, and development) could be implemented to promote the D-A fit of workers, which will result in meaningfulness in work and work engagement (Isaksen, 2000).

The results of this study offer a number of potential research studies to be explored. Firstly, if calling is indeed positively related to meaning making in nature-related jobs, more evidence is needed about what predicts levels of calling for workers in nature. Possible predictors may include spirituality, work values, ethics, and personal or educational attributes (Peterson et al., 2009; Steger et al., 2010). It would be useful to conduct longitudinal studies with individuals to track their calling as it develops in their careers in a nature-based environment. Secondly, a useful study exploring meaningful work in nature, mediated by variables such as commitment and meaning in life, would provide more evidence of why it is good to have a calling orientation in nature-based work. It is also
recommended that the role of meaningfulness and work engagement as pathways towards a meaningful life be considered in future studies. Thirdly, it would be interesting to see if and why a calling orientation in nature-based work might be related to life satisfaction and psychological well-being. Lastly, more research is needed to explore the “less positive” side of a calling orientation in nature-based jobs where individuals feel that they need to persist in difficult circumstances because of a sense of calling (Bunderson & Thompson, 2009).

3.3 Limitations of the study

This study had a number of limitations. Firstly, a true probability sample was not used. Therefore, the sample does not represent the wider target population from which it was drawn. As such, generalization of the results beyond the sample group should be done with great caution. In other words, the results obtained from this study may not necessarily be representative of all people who work in nature. Secondly, the discriminant validity of the scales that measured job and calling orientations in this study was not ideal. This was evident from the finding that the average variances extracted in the factors were lower than the variance shared by these constructs and other variables included in this study, namely positive meaning and work engagement. Therefore, more research is needed to develop the scales which measure work orientations.

A further limitation to this study is that the research design was cross-sectional. Longitudinal studies could provide deeper insight into which activities and experiences result in deeper meaning and engagement. Furthermore, if a cross-sectional design is used in future studies, a more ideal distribution method should be identified in order to address sample size issues.
References


Addendum A: Online questionnaire

**Demands-abilities fit, work beliefs, meaningfulness, and engagement of individuals working in nature**

The survey will take no longer than 15 minutes of your time. Your contribution to this study is extremely important and its success depends on the number of participants who complete the questionnaire. Full details on how to complete the survey are provided. It is expected, however, that the completion of the questionnaire will not interfere with your duties.

Permission and ethical clearance have been obtained to conduct the study [Ethic Clearance Certificate No: NWU-HS-2016-0015].

This study poses no intentional risks and no harm is anticipated as a result of your participation. However, should you experience any discomfort due to completing the questionnaire, a single counselling session could be arranged for you with a counsellor experienced in this regard.

Questions may be directed to any member of the research team:

- Dr Engela P de Crom (researcher) at 082 853 2454 or decromep@tut.ac.za
- Prof Ian Rothmann (supervisor) at (016) 910 3410 or Ian.Rothmann@nwu.ac.za

**Terms and Conditions**

By accepting these terms and conditions, I declare that I willingly participate in the survey titled "Demands-abilities fit, work beliefs, meaningfulness, and engagement of individuals working in nature" for the researcher Dr Engela P de Crom.

I understand that this survey is completely anonymous and my identity would thus not be available to the abovementioned researcher or anyone else.

I further understand that my information is stored in a controlled environment and access to this information is limited to the researcher and key system administrators at myresearchsurvey.com (bound by confidentiality agreements). Myresearchsurvey.com provides a platform for researchers to conduct surveys with, and takes no responsibility whatsoever for any content, copyright infringements or misconduct on the researcher's behalf.

I understand by not accepting the terms and conditions, I cannot complete this survey.

--------------------------------------------
Signature
Biographical information

1. Gender
   - Female
   - Male

2. Age

3. Marital status
   - Single
   - Widowed
   - Living with partner
   - Divorced
   - Married
   - Other

4. Highest qualification
   - Grade 10 or less
   - Matric
   - Diploma
   - Postgraduate diploma
   - Degree
   - Honours degree
   - Master’s degree
   - Doctoral degree
   - Post-doctoral degree
   - Other …………………………………..

5. Workplace: Please select the one where you spend most of your time
   - National and/or Provincial Parks
   - Private Game Reserves
   - Other ………………………………………………………………………………………………..

6. Please enter the number of years in your current position

7. Please specify the total number of years that you are employed in a nature-related job

8. Current appointment
   - Permanent appointment
   - Temporary appointment

9. Nationality
   - South-African
   - Non-South-African
10. Race

- African
- Indian
- White
- Asian
- Coloured

11. Home language

- Afrikaans
- Sesotho
- Tshivenda
- isiZulu
- English
- Setswana
- isiNdebele
- Xitsonga
- Sepedi
- siSwati
- isiXhosa
- Other
Demands-abilities fit

For the purpose of this study "Values" refers to those things that are important and valued. For the purpose of this study "Culture" refers to the ideas, customs and the way things are done (social behaviour). This questionnaire aims to obtain a picture of how you personally evaluate specific aspects of your work environment. “Work environment” refers to your work in a natural environment, irrespective of the organisation for which you work. Where the question refers to your “organisation”, please regard “organisation” as the general industry in which you are employed, i.e. conservation in general, tourism in general, etc. Please read each statement carefully and click on the answer that best describes how you feel.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>Slightly</td>
<td>Moderately</td>
<td>Mostly</td>
<td>Completely</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>My personal values match my organisation’s values and culture.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>My values match those of current employees in the organisation.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The values and ‘personality’ of this organisation reflect my own values and personality.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The things I value in life are similar to the things my co-workers value.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>My personal values match my co-workers’ values and culture.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>My co-workers’ values and culture provide a good fit with the things that I value in life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The match is very good between the demands of my job and my personal skills.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>My abilities and training are a good fit with the requirements of my job.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>My personal abilities and education provide a good match with the demands that my job places on me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Work-Life

For the following questions, think about how much you are like the person described. Then select one of the responses for each one.

1. Ms. A works primarily to earn enough money to support her life outside of her job. If she were financially secure, she would no longer continue with her current line of work, but would really rather do something else instead. Ms. A's job is basically a necessity of life, a lot like breathing or sleeping. She often wishes the time would pass more quickly at work. She greatly anticipates weekends and vacations. If Ms. A lived her life over again, she probably would not go into the same line of work. She would not encourage her friends and children to enter her line of work. Ms. A is very eager to retire.

<table>
<thead>
<tr>
<th>1</th>
<th>Very much like me</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Somewhat like me</td>
</tr>
<tr>
<td>3</td>
<td>Very little like me</td>
</tr>
<tr>
<td>4</td>
<td>Not at all like me</td>
</tr>
</tbody>
</table>

2. Ms. B basically enjoys her work, but does not expect to be in her current job five years from now. Instead, she plans to move on to a better, higher-level job. She has several goals for her future pertaining to the positions she would eventually like to hold. Sometimes her work seems like a waste of time, but she knows she must do sufficiently well in her current position in order to move on. Ms. B can't wait to get a promotion. For her, a promotion means recognition of her good work, and is a sign of her success in competition with her coworkers.

<table>
<thead>
<tr>
<th>1</th>
<th>Very much like me</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Somewhat like me</td>
</tr>
<tr>
<td>3</td>
<td>Very little like me</td>
</tr>
<tr>
<td>4</td>
<td>Not at all like me</td>
</tr>
</tbody>
</table>

3. Ms. C's work is one of the most important parts of her life. She is very pleased that she is in this line of work. Because what she does for a living is a vital part of who she is, it is one of the first things she tells people about herself. She tends to take her work home with her and on vacations, too. The majority of her friends are from her place of employment, and she belongs to several organizations and clubs pertaining to her work. Ms. C feels good about her work because she loves it, and because she thinks it makes the world a better place. She would encourage her friends and children to enter her line of work. Ms. C would be pretty upset if she were forced to stop working, and she is not particularly looking forward to retirement.

<table>
<thead>
<tr>
<th>1</th>
<th>Very much like me</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Somewhat like me</td>
</tr>
<tr>
<td>3</td>
<td>Very little like me</td>
</tr>
<tr>
<td>4</td>
<td>Not at all like me</td>
</tr>
</tbody>
</table>
For the following questions, select how much you see yourself in the statement made.

<table>
<thead>
<tr>
<th></th>
<th>Very much like me</th>
<th>Somewhat like me</th>
<th>Very little like me</th>
<th>Not at all like me</th>
</tr>
</thead>
<tbody>
<tr>
<td>I find my work rewarding.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I am eager to retire.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>My work makes the world a better place.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I am very conscious of what day of the work week it is and I greatly anticipate weekends. I say “Thank goodness it’s Friday!”</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I tend to take my work with me on vacations.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I expect to be in a higher level job in 5 years.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I would choose my current work life again if I had the opportunity.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I feel in control of my work life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I enjoy talking about my work to others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I view my job primarily as a stepping stone to other jobs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>My primary reason for working is financial – to support my family and lifestyle.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I expect to be doing the same work in 5 years.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>If I was financially secure, I would continue with my current line of work even if I was no longer paid.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>When I am not at work, I do not think much about my work.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I view my job as just a necessity of life, much like breathing or sleeping.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I never take work home with me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>My work is one of the most important things in my life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I would not encourage young people to pursue my kind of work.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Work and Meaning

Work can mean a lot of different things to different people. The following items ask about how you see the role of work in your own life. Please honestly indicate how true each statement is for you and your work.

<table>
<thead>
<tr>
<th>Absolutely untrue</th>
<th>Mostly untrue</th>
<th>Neither true nor untrue</th>
<th>Mostly true</th>
<th>Absolutely true</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

- I have found a meaningful career
- I view my work as contributing to my personal growth
- My work really makes no difference to the world
- I understand how my work contributes to my life’s meaning
- I have a good sense of what makes my job meaningful
- I know my work makes a positive difference in the world
- My work helps me better understand myself
- I have discovered work that has a satisfying purpose
- My work helps me make sense of the world around me
- The work I do serves a greater purpose
# Work & Well-being Survey (WES)

The following 9 statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you never had this feeling, cross the “0” (zero) in the space after the statement. If you have had these feelings, indicate how often you feel it by crossing the number (from 1 to 6) that best describes how frequently you feel that way.

<table>
<thead>
<tr>
<th>0 Never</th>
<th>Almost never 1 A few times a year of less</th>
<th>Rarely 2 Once a month or less</th>
<th>Sometimes 3 A few times a month</th>
<th>Often 4 Once a week</th>
<th>Very often 5 A few times a week</th>
<th>Always 6 Every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>At my work, I feel bursting with energy</td>
<td>0 1 2 3 4 5 6</td>
<td>At my job, I feel strong and vigorous</td>
<td>0 1 2 3 4 5 6</td>
<td>I am enthusiastic about my job</td>
<td>0 1 2 3 4 5 6</td>
<td>My job inspires me</td>
</tr>
<tr>
<td>When I get up in the morning, I feel like going to work</td>
<td>0 1 2 3 4 5 6</td>
<td>I feel happy when I am working intensely</td>
<td>0 1 2 3 4 5 6</td>
<td>I am proud of the work that I do</td>
<td>0 1 2 3 4 5 6</td>
<td>I am immersed in my work</td>
</tr>
<tr>
<td>I get carried away when I’m working</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- The End -

Thank you for participating in this study.
Addendum B: Ethics approval certificate

2016-06-14

ETHICS APPROVAL CERTIFICATE OF PROJECT

Private Bag X6001, Potchefstroom, South Africa, 2520
Tel: (018) 299-4900 Faks: (018) 299-4910
Web: http://www.nwu.ac.za

Institutional Research Ethics Regulatory Committee
Tel: +27 18 299 4849
Email: Ethics@nwu.ac.za

Based on approval by the Humanities and Health Research Ethics Committee (HHREC) at the meeting held on 10/02/2016, the North-West University Institutional Research Ethics Regulatory Committee (NWU-IRERC) hereby approves your project as indicated below. This implies that the NWU-IRERC grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the project may be initiated, using the ethics number below.

<table>
<thead>
<tr>
<th>Project title: Person-environment fit, work beliefs, meaningfulness, and engagement of individuals working in nature.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Leader/Supervisor: Prof S Rothmann Student: N de Crom</td>
</tr>
<tr>
<td>Ethics number: N W U - HS - 2 0 1 6 - 0 0 1 5</td>
</tr>
<tr>
<td>Institution: NW</td>
</tr>
</tbody>
</table>

Commencement date: 2016-06-08 Expiry date: 2019-06-08 Risk: Minimal

**Special conditions of the approval (if applicable):**

- Translation of the informed consent document to the languages applicable to the study participants should be submitted to the HHREC (if applicable).
- Any research at governmental or private institutions, permission must still be obtained from relevant authorities and provided to the HHREC. Ethics approval is required BEFORE approval can be obtained from these authorities.
- The IRERC would like to remain at your service as scientist and researcher, and wishes you well with your project. Please do not hesitate to contact the IRERC or HHREC for any further enquiries or requests for assistance.

**General conditions:**

While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, please note the following:

- The project leader (principle investigator) must report in the prescribed format to the NWU-IRERC via HHREC:
  - annually (or as otherwise requested) on the progress of the project, and upon completion of the project
  - without any delay in case of any adverse event (or any matter that interrupts sound ethical principles) during the course of the project.
- Annually a number of projects may be randomly selected for an external audit.
- The approval applies strictly to the protocol as stipulated in the application form. Would any changes to the protocol be deemed necessary during the course of the protocol, the project leader must apply for approval of these changes at the HHREC. Would there be deviations from the project protocol without the necessary approval of such changes, the ethics approval is immediately and automatically forfeited.
- The date of approval indicates the first date that the project may be started. Would the project have to continue after the expiry date, a new application must be made to the NWU-IRERC via HHREC and new approval received before or on the expiry date.
- In the interest of ethical responsibility the NWU-IRERC and HHREC retains the right to:
  - request access to any information or data at any time during the course or after completion of the project;
  - to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process.
  - withdraw or postpone approval if:
· any unethical principles or practices of the project are revealed or suspected,
· it becomes apparent that any relevant information was withheld from the HHREC or that information has been false or misrepresented, · the required annual report and reporting of adverse events was not done timely and accurately, · new institutional rules, national legislation or international conventions deem it necessary.

* HHREC can be contacted for further information via Daleen.Claasens@nwu.ac.za or 018 210 3441

Yours sincerely

Linda du Plessis

email=linda.duplessis@nwu.ac.za, Date: 2016.06.15 08:18:13 +02'00'

Prof Linda du Plessis
Chair NWU Institutional Research Ethics Regulatory Committee (IRERC)
Digitally signed by Linda du Plessis
DN: cn=Linda du Plessis, ou=NWU, ou=Vaal Triangle Campus,
PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM FOR PARTICIPATION IN RESEARCH

TITLE OF THE RESEARCH PROJECT: Person-environment fit, work beliefs, meaningfulness, and engagement of individuals working in nature

REFERENCE NUMBERS: NWU-HS-2016-0015

PRINCIPAL INVESTIGATOR: Engela P de Crom

ADDRESS: Department of Nature Conservation, Tshwane University of Technology, Private Bag X680, Pretoria, 0001

CONTACT NUMBER: 082 853 2454

You are being invited to take part in a research project that forms part of my Master’s degree in Applied Positive Psychology at the North West University, Vaal Triangle Campus in the Optentia Research Focus Area, under the supervision of Prof Ian Rothmann. Please take some time to read the information presented here, which will explain the details of this project. Please ask the researcher any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research is about and how you could be involved. Also, your participation is entirely voluntary and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the Humanities and Health Research Ethics Committee (HHREC) of the Faculty of Humanities of the North-West University (NWU-HS-2016-0015).

This document is an adapted version of the one used by HREC, Potchefstroom Campus (HREC General WICF Version 2, August 2014).
and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki and the ethical guidelines of the National Health Research Ethics Council. It might be necessary for the research ethics committee members or relevant authorities to inspect the research records to make sure that we (the researchers) are conducting research in an ethical manner.

**What is this research study all about?**

- This study will be conducted in the Oppenheimer & Son Properties and will involve the completion of a single online questionnaire with 63 short questions, divided into five sections. The researcher has been trained to use the methods mentioned in the previous sentence.
- Approximately 400 participants will be included in this study.
- The objectives of this research are to determine to what extent, if at all, is there a relationship between person-environment fit, work beliefs, meaningfulness (meaning of work and psychological meaningfulness), and work engagement with individuals in nature-related jobs, and how might these relationships differ across job categories in the same general environment (in this case, the Oppenheimer & Son Properties).

**Why have you been invited to participate?**

- You have been invited to participate because you are employed at the Oppenheimer & Son Properties.

**What will your responsibilities be?**

- You will be expected to complete the online anonymous survey requiring only your opinion on the matters researched, in your own time. It will take you approximately 30 minutes to complete the survey. The questions only require a single tick from a number of options to indicate your opinion.

**Will you benefit from taking part in this research?**

Your participation will hold no direct benefits for you. However, very little, if any, empirical information exists to confirm the meaningfulness of working in nature. Therefore, research about people’s work engagement and experiences of meaning in this line of work is needed, as this may have management implications in the conservation and other nature-related industries. Your indirect benefits will therefore include a contribution to scientific information about these issues that can be of great value in the development of careers in nature related jobs that strive towards flourishing employees. As facilitators between humans and nature, nature-based employees need to show and experience meaningfulness and engagement in order to encourage other employees as well as external role-players in the industry.
There are no foreseen risks involved in your taking part in this research, however, should you experience any discomfort due to completing the questionnaire, a single counselling session could be arranged for you with a counsellor experienced in this regard. Should you need this service, you may contact the counsellor directly via email at dfj@mtnloaded.co.za briefly stating your need, after which you will be contacted confidentially.

Who will have access to the data?

- Anonymity and confidentiality are guaranteed. The data from this study will be reported in the following ways: generalised results as part of my Master’s dissertation and one or more research articles in scientific journals. It will also be presented as a scientific paper at national conferences. In all of this reporting, the identity of respondents will not be available to anyone. This means that the reporting will not include your name or any details that will help others to know that you participated. Copies of these published research articles will be provided to the management of the Oppenheimer & Son Properties and under no circumstances will your responses on the survey be made available to them. On the contrary, your responses will only be identified by a number allocated to your completed questionnaire and the results will be calculated using aggregates of all scores.
- Only the researchers will have access to the data. Data will be kept safe and secure by locking all hard copies in locked cupboards in the researcher’s office and for electronic data it will be password protected.
- Data will be stored for 5 years after which it will be destroyed.

How will you know about the findings?

- The general findings of the research will be shared with you by supplying you with a link to the published journal article(s).
- In addition a summary of the final results will be made available to the Manager: Research & Conservation (E Oppenheimer & Son (Pty) Ltd.) within 6 months after data collection. These summarised results will be available to interested employees.
- General findings of the research will also be presented at the annual Oppenheimer De Beers Group Research Conference held in October every year.

Is there anything else that you should know or do?

- You can contact the researcher (Engela P de Crom) at decromep@tut.ac.za or 082 853 2454 or the supervisor, Prof Ian Rothmann at ian.rothmann@nwu.ac.za, if you have any further queries or encounter any problems.
- You can contact the chair of the Humanities and Health Research Ethics Committee (Prof Tumi Khumalo) at 016 910 3397 or Tumi.khumalo@nwu.ac.za if you have any concerns or complaints that have not been adequately addressed by the researcher. You can also contact, the co-chair, Prof Werner Nell (016 910 3427 or Werner.Nell@nwu.ac.za). You can leave a message for either Linda or Tumi with Ms Daleen Claesens (016 910 30441)
- You will receive (or may print) a copy of this information and consent form for your own records.

This document is an adapted version of the one used by HREC, Potchefstroom Campus (HREC General WICF Version 2, August 2014).
Declaration by Participant

By signing below, I ............................................ agree to take part in a research study entitled: Person-environment fit, work beliefs, meaningfulness, and engagement of individuals working in nature

I declare that:

- I have read and understood this information and consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions to both the person obtaining consent, as well as the researcher (if this is a different person), and all my questions have been adequately answered.
- I understand that taking part in this study is voluntary and I have not been pressurised to take part.
- I understand that what I contribute (what I report/say/write/draw/produce visually) could be reproduced publically and/or quoted, but without reference to my personal identity.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (place) ............................................. on (date) ............................. 20...

........................................................................................................ Signature of participant

........................................................................................................ Signature of witness

Declaration by person obtaining consent

I (name) ................................................................. declare that:

- I explained the information in this document to .............................................
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did/did not use an interpreter.

Signed at (place) ....................................................... on (date) ............................. 20...

........................................................................................................

This document is an adapted version of the one used by HREC, Potchefstroom Campus (HREC General WICF Version 2, August 2014).
Declaration by researcher

I (name) .............................................................. declare that:

- I explained the information in this document to ........................................
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did/did not use a interpreter.

Signed at (place) ................................................ on (date) ...................... 20...

..............................................................................................................
Signature of researcher

..............................................................................................................
Signature of witness