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In the author list of this article initially published, Nellie de Crom's affiliation was incorrectly listed as the 'Faculty of Agricultural Sciences, Tshwane University of Technology, South Africa'. The correct affiliation is as follows: 'Department of Nature Conservation, Faculty of Science, Tshwane University of Technology, South Africa'. The author sincerely apologises for any inconvenience caused.

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

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Orientation: Meaningful work and personal 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 demands–abilities fit scale, work–life questionnaire, work and meaning Inventory, work engagement scale and a biographical questionnaire.

Main findings: 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. The scales which measured calling and job orientations showed insufficient discriminant validity in relation to the scales which measured positive meaning and work engagement.

Practical and managerial implications: Managers should consider implementing interventions to affect the demands–abilities 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 personal engagement.

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

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 opportunities for self-expression, meaningfulness and engagement for individuals (Cameron, Dutton, & Quinn, 2003). People experience meaningfulness when they feel useful, valuable and worthwhile (Kahn, 1990; Kahn & Heaphy, 2014). Meaningful work, in turn, results in personal engagement. Research showed that approximately 20% of employees in organisations worldwide are highly engaged in their work, whereas 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.

Person–environment fit, work beliefs, meaningful work and work engagement are important research topics that have been studied by various researchers (Dik & Duffy, 2008; May, Gilson, & Harter, 2004; Schaufeli & Bakker, 2004; Steger & Dik, 2010; Wrzesniewski, 2012; Wrzesniewski & Tosti, 2005). Except for a study by Bunderson and Thompson (2009), no studies were found that focus on experiences and outcomes of meaningful work in nature. Furthermore, little scientific information exists regarding demands–abilities fit (D–A fit), work beliefs, meaningful work and engagement of individuals who work in natural environments. It is further unclear whether D–A

fit and work beliefs will affect personal engagement via meaningful work. This study focused on the relationship between D–A fit, work beliefs, meaningful work and personal engagement.

Personal engagement at work

Work engagement has been defined in terms of the extent to which individuals think about their work and become absorbed in their roles (Rothbard & Patil, 2012), energy and involvement (Maslach, Schaufeli, & Leiter, 2001), and vigour and dedication (Schaufeli & Bakker, 2004). According to Kahn and Heaphy (2014), the individual as a person rather than the employee is the core of engagement. Engagement is characterised by three dimensions, namely, a cognitive, emotional and physical dimension (Kahn, 1990). May et al. (2004) describe engagement as an attachment of individuals' selves to a work role whereby they employ and express themselves cognitively, emotionally and physically during role performance. According to Kahn and Heaphy (2014), personal engagement entails that the individual drives personal energies into role behaviours (self-employment) and displays the self within the role (self-expression). While some conceptualisations emphasise self-employment at the expense of self-expression (Macey & Schneider, 2008), a renewed focus on personal engagement attends to self-expression and to the relational contexts that shape self-expression (Kahn & Heaphy, 2014).

Theories and research focused on job-level variables, such as job demands and resources (Bakker, Demerouti, & Schaufeli, 2005; Hakanen, Bakker, & Schaufeli, 2006), and supportive environments and organisation climates (Meyer, Gagne, & Parfyanova, 2010) to explain work engagement. This study focuses on how expressions of the self in a work role facilitate engagement at work (May et al., 2004).

Meaningful work

Meaningfulness 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 that they create (Matuska & Christiansen, 2008). Psychological meaningfulness refers to the sense that one's physical, cognitive or emotional energies matter (Kahn & Heaphy, 2014). As a psychological condition, meaningfulness shapes individuals' engagement in work roles (Olivier & Rothmann, 2007; Rothmann & Rothmann, 2010). Individuals who lack meaningfulness feel that little is asked or expected of one's self and that there is little to give or receive regarding work role performances.

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 consists 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 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 and/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).

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 (i.e. person–environment fit) 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, work beliefs affect meaningful work. 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 (Peterson, Park, Hall, & Seligman, 2009; Wrzesniewski et al., 1997; Wrzesniewski, Dutton, & Debebe, 2003; Wrzesniewski, 2012). Fourthly, co-worker relationships affect meaningful work (Olivier & Rothmann, 2007) by heightening people's sense of belongingness at work (Kahn & Heaphy, 2014).

This study focused on two predictors of meaningful work, namely, D–A fit (a facet of person–environment fit) and work beliefs.

Demands–abilities fit

Demands–abilities fit (Edwards, 1996; Kristof-Brown et al., 2005) refers to the extent to which job requirements match the skills and abilities of the employee. The Theory of Work Adjustment (Bretz & Judge, 1994) emphasises that individuals will contribute longer in their jobs when there is D–A fit, and the job environment facilitates the use of their skills and abilities. 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, job demands and job resources (Greguras &

Diefendorff, 2009). 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).

Demands–abilities fit as a dimension of person–environment fit contributes to a belief that the working environment is conducive to what the organisation wants (Greguras & Diefendorff, 2009). Work roles that are aligned with individuals' abilities and self-concepts should be associated with more meaningful work experiences (May et al., 2004). Fulfilling roles that are congruent with an individual's 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 of working 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. They see their work as a means to acquire the resources needed to enjoy their time away from the job rather than an end in itself. These job holders do not express their significant interests and ambitions 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 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 see their work as a job. However, they are less happy than those who regard their work as a calling (Dik & Duffy, 2008; Peterson et al., 2009).

Individuals with a *calling* orientation regard their work as inseparable from their life. In this case, work is not merely for financial gain or career advancement, but instead for the fulfilment that is possible by doing it (Peterson et al., 2009; Wrzesniewski et al., 1997, 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 and financially worthwhile (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).

Individuals have some control over the extent to which they experience their work as meaningful (Kahn & Heaphy, 2014). They might craft their jobs (i.e. to view their work as a calling) by changing the quality and amount of interaction with others or by seeing themselves as helpers of vulnerable others (including organisms). In this way, job crafters seek out audiences who can help them sustain desirable identities. Meaningful work results from the relations with those who benefit from their work and those who confirm its importance (Kahn & Heaphy, 2014).

The three ways in which people view their work are still largely unexplored in individuals who have a job in nature conservation. A qualitative study by Bunderson and Thompson (2009) showed that people who work with animals work for passion rather than for pay or advancement. They found that a sense of calling was grounded in a perceived connection between personal passion and capabilities and domains of work for which they are well-suited. Forsyth (1994) and Palmer and Bryant (1985) 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 nature of their work (Palmer & Bryant, 1985). If the work that people do allows them to express themselves in work roles that are socially valuable, they will develop a heightened sense of meaningfulness and personal engagement. A sense of calling may offer the 'strongest' (Bellah et al., 1985, p. 66) path to meaningful work.

Research aims

The work of people in nature presents an interesting context for studying the relations among D–A fit, work beliefs, meaningful work and personal engagement because working in a natural environment is often seen as a 'calling' (Bunderson & Thompson, 2009). Individuals working in and with nature are often regarded as primary role models for having a meaningful and fulfilling job (Bunderson & Thompson, 2009). Little evidence exists regarding the effects of work beliefs on people working in nature's experiences of meaningfulness in their work and the effects thereof on their engagement. 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 to be more meaningful than those with job or career orientations. Furthermore, employees who spend time on desired activities and who experience D–A fit will experience more meaningful work, which will contribute to higher levels of personal engagement (May et al., 2004; Olivier & Rothmann, 2007).

This study aimed to investigate the relationship between demands–abilities (D–A) fit, work beliefs, meaningful work and 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: Characteristics of participants (N = 161).

Item	Category	Frequency	%
Gender	Female	92	57.10
	Male	69	42.90
Age	Below 20	1	0.62
	21–30	58	36.02
	31–40	36	22.36
	41–50	36	22.36
	51–60	20	12.42
	Above 60	10	6.21
Qualification	Matric	20	12.42
	Diploma	30	18.63
	Postgraduate diploma	11	6.83
	Bachelor's degree	14	8.70
	Honours degree	19	11.80
	Master's degree	33	20.50
	Doctoral degree	28	17.39
	Missing	6	3.73
Years in current position	1–2	61	37.89
	3–5	29	18.01
	6–10	32	19.88
	11–15	14	8.70
	16–20	9	5.59
	More than 20 years	16	9.94
Years in a nature-related job	1–2	27	16.77
	3–5	24	14.91
	6–10	41	25.47
	11–15	20	12.42
	16–20	17	10.56
	More than 20 years	32	19.88
Appointment	Permanent	104	64.60
	Temporary	57	35.40
Nationality	South African citizen	140	86.96
	Non-South African citizen	21	13.04
Home language	English	62	38.51
	Afrikaans	56	34.78
	Sepedi	8	4.97
	isiXhosa	6	3.73
	Sesotho	5	3.11
	Other South African languages	24	14.91

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). Most participants (87.58%) had completed a qualification higher than matric, with 37.89% having a master's degree or higher qualification. The length of service in the current job position varied from 1 to more than 20 years, whereas most 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, whereas 26.72% participants spoke one of the African languages at home.

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' D–A fit, their purpose and meaning in work, work beliefs and work engagement.

The *Demands–Abilities Fit Scale* (DAFS; Greguras & Diefendorff, 2009) was used to measure the extent to which job requirements matched 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. An example item is 'The match is very good between the demands of my job and my personal skills'. 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 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, Deacon and Rothmann (2010) reported Cronbach's alpha coefficients to be ranging between 0.80 and 0.87 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*). 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. 'I am immersed in my work'), emotional engagement (e.g. 'I am enthusiastic about my job') and physical engagement (e.g. 'At my work, I feel bursting with energy'). 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 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 sampling (Wagner, Kawulich, & Garner, 2012) were likely to be adequately addressed. 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.

Given the relatively limited sample size, the structure of the four measuring instruments was investigated using exploratory factor analyses. 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 (Field, 2015). Responses to each questionnaire were subjected to principal factor analysis 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 0.71 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 (Hair, Babin, Money, & Samouel, 2010, p. 364).

Cronbach's alpha coefficients were computed to study the reliability of the measuring instruments. Descriptive statistics were computed to describe the data. Pearson's correlation coefficients were used to specify the relationship 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 D–A fit and work beliefs on meaningful work. Second, standard multiple regression analyses were used to investigate the main effects of D–A 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. PROCESS (version 2; Hayes, 2013) was used to assess 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). Bias-corrected CIs (95% CI with 10 000 resamples) were used to assess whether indirect effects were different from zero (Hayes, 2013).

Ethical consideration

The Ethics Committee at the university where the research was conducted 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 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.

Results

Exploratory factor analyses

Demands–abilities fit scale

A principal component analysis was carried out on the three 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 = 0.57), Item 2 = 0.91 (h^2 = 0.83) and Item 3 = 0.85 (h^2 = 0.74). This indicates that the three items of the DAFS are valid indicators of the construct.

Work–life questionnaire

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 and 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.

Work and meaning inventory

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.

Work engagement scale

A principal component analysis was carried out on the nine 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, whereas 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's correlations, the AVE and the shared variance between constructs.

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 D–A fit is statistically and practically significantly and positively 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 and positively 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 and positively 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 AVE by the items of a specific factor with the squared correlation of this factor with every other factor. Table 2 shows the AVE for each factor and the shared variance between the factors.

TABLE 2: Descriptive statistics, alpha coefficients, Pearson's correlations, average variance explained and shared variance.

Item	Mean	*SD*	α	1	2	3	4	5	6	7	8
1. Demands–abilities fit	4.29	0.59	0.80	(0.71)	0.20	0.00	0.08	0.11	0.11	0.18	0.11
2. Calling	3.29	0.53	0.79	00.31**[a]	(0.34)	0.03	0.23	0.29	0.19	0.41	0.41
3. Career	2.53	0.80	0.74	-00.04	-0.18*	(0.48)	0.06	0.00	0.00	0.00	0.03
4. Job	1.78	0.52	0.65	-00.29**	-0.48**[a]	0.25**	(0.16)	0.14	0.12	0.16	0.21
5. Meaning making	4.32	0.60	0.85	00.33**[a]	0.54**[b]	0.04	-0.37**[a]	(0.50)	0.27	0.48	0.27
6. Greater good motivations	4.36	0.66	0.74	00.33**[a]	0.44**[a]	-0.01	-0.34**[a]	0.52**[b]	(0.40)	0.36	0.19
7. Positive meaning	4.35	0.65	0.76	00.42**[a]	0.64**[b]	-0.11	-0.40**[a]	0.69**[b]	0.60**[b]	(0.32)	0.31
8. Work engagement	5.04	0.89	0.89	00.33**[a]	0.64**[b]	-0.16*	-0.46**[a]	0.52**[b]	0.43**[a]	0.56*[b]*	(0.55)

Note: The AVE values appear on the diagonal of the correlation matrix. The squared correlations (indicating shared variance) appear above the diagonal.

*, $p < 0.05$; **, $p < 0.01$.

[a], $r > 0.30$ practically significant (medium effect); [b], $r > 0.50$ practically significant (large effect).

TABLE 3: Regression analyses of demands–abilities fit and work beliefs on meaningful work.

Dependent variable	Model	Variable	Beta	SE	β	*t*	*p*	*F*	*R*	R^2
Meaning making	1	(Constant)	2.45	0.41		5.94	0.00	26.34**	0.58	0.34
		Calling	0.54	0.08	0.48	6.46	0.00**	-	-	-
		Career	0.18	0.07	0.17	2.56	0.01**	-	-	-
		Job	-0.22	0.09	-0.19	-2.51	0.01**	-	-	-
	2	(Constant)	1.90	0.48		3.94	0.00**	21.40**	0.60	0.35
		Calling	0.51	0.09	0.45	5.96	0.00**	-	-	-
		Career	0.17	0.07	0.17	2.46	0.01**	-	-	-
		Job	-0.18	0.09	-0.16	-2.11	0.04*	-	-	-
		Demands–abilities fit	0.15	0.07	0.15	2.14	0.03*	-	-	-
Greater good motivations	1	(Constant)	2.97	0.50		5.99	0.00	14.79**	0.47	0.22
		Calling	0.46	0.10	0.36	4.53	0.00**	-	-	-
		Career	0.12	0.08	0.10	1.40	0.16	-	-	-
		Job	-0.24	0.10	-0.19	-2.30	0.02*	-	-	-
	2	(Constant)	2.18	0.58		3.78	0.00	13.13**	0.50	0.25
		Calling	0.41	0.10	0.32	3.99	0.00**	-	-	-
		Career	0.11	0.08	0.09	1.28	0.20	-	-	-
		Job	-0.19	0.10	-0.15	-1.84	0.07	-	-	-
		Demands–abilities fit	0.21	0.08	0.19	2.57	0.01**	-	-	-
Positive meaning	1	(Constant)	2.18	0.42		5.25	0.00	38.75**	0.65	0.43
		Calling	0.72	0.09	0.58	8.47	0.00**	-	-	-
		Career	0.04	0.07	0.03	0.54	0.59	-	-	-
		Job	-0.17	0.09	-0.13	-1.91	0.06	-	-	-
	2	(Constant)	1.25	0.47		2.64	0.01	34.85**	0.69	0.47
		Calling	0.65	0.08	0.53	7.86	0.00**	-	-	-
		Career	0.02	0.07	0.02	0.35	0.73	-	-	-
		Job	-0.11	0.09	-0.09	-1.29	0.20	-	-	-
		Demands–abilities fit	0.25	0.07	0.23	3.71	0.00**	-	-	-

*, $p < 0.05$; **, $p < 0.01$.

Discriminant validity is partially supported, given that for most factors the AVE for a specific factor is greater than its shared variance with any other factor.

Two observations can be made regarding the discriminant validity of the scales from Table 2. Firstly, the AVE 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. Secondly, the AVE 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. It was decided to utilise the two scales, which shows some discriminant validity issues. However, more research is needed regarding the validity of these scales.

Multiple regression analyses

Table 3 shows the results of multiple regression analyses with D–A 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 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, D–A 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 D–A 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 (β = 0.36, $p < 0.01$) and job (β = -0.19, $p < 0.01$). In the second step of the analysis, D–A 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 D–A fit was included in the regression equation. The standardised regression coefficients of the following predictors were statistically significant: calling (β = 0.32, $p < 0.01$) and D–A fit (β = 0.19, $p < 0.01$). The standardised beta coefficient of a calling orientation was almost twice as high as the coefficient of D–A 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 (β = 0.58, $p < 0.01$). In the second step of the analysis, D–A 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 D–A fit was included in the regression equation. The standardised regression coefficients of the following predictors were statistically significant: calling (β = 0.53, $p < 0.01$) and D–A fit (β = 0.32, $p < 0.01$). The standardised beta coefficient of a calling orientation was more than twice as high as the coefficient of D–A fit.

Table 4 shows the results of multiple regression analyses with D–A 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 and work engagement (as measured by the WES) as the dependent variable.

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 (β = 0.54, $p < 0.01$) and job (β = -0.21, $p < 0.01$). In the second step of the analysis, D–A 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 D–A fit was included in the regression equation. The standardised regression coefficients of the following predictors were statistically significant: calling (β = 0.51, $p < 0.01$) and job (β = -0.18, $p < 0.01$). In the third step of the analysis, meaningful work (as measured by the WAMI), D–A 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

TABLE 4: Regression analyses of meaningful work and its antecedents on work engagement.

Model	Variable	Beta	SE	β	*t*	*p*	*F*	*R*	R^2
1	(Constant)	2.70	0.56		4.80	0.00	40.97**	0.66	0.44
	Calling	0.91	0.12	0.54	7.89	0.00**	-	-	-
	Career	-0.01	0.10	-0.01	-0.08	0.94	-	-	-
	Job	-0.35	0.12	-0.21	-2.99	0.00**	-	-	-
2	(Constant)	2.07	0.66		3.12	0.00**	31.98**	0.67	0.45
	Calling	0.86	0.12	0.51	7.40	0.00**	-	-	-
	Career	-0.02	0.10	-0.01	-0.18	0.86	-	-	-
	Job	-0.32	0.12	-0.18	-2.64	0.01**	-	-	-
	Demands–abilities fit	0.20	0.10	0.11	1.80	0.07	-	-	-
3	(Constant)	1.29	0.70		1.88	0.06	20.83**	0.70	0.49
	Calling	0.63	0.14	0.38	4.66	0.00**	-	-	-
	Career	-0.07	0.10	-0.04	-0.70	0.49	-	-	-
	Job	-0.24	0.12	-0.14	-2.05	0.04**	-	-	-
	Demands–abilities fit	0.09	0.10	0.06	0.90	0.38	-	-	-
	Meaning making	0.21	0.13	0.14	1.63	0.11	-	-	-
	Greater good motivations	0.10	0.10	0.08	1.03	0.31	-	-	-
	Positive meaning	0.13	0.13	0.09	0.97	0.33	-	-	-

*, $p < 0.05$; **, $p < 0.01$.

TABLE 5: Regression coefficients and relative weights analysis.

Dependent variable	Predictor	RW	RS–RW (%)	RW 95% CI
Meaning making (R^2 = 0.34)	Demands–abilities fit	0.06	16.68	[0.01, 0.15]
	Calling	0.21	61.40	[0.11, 0.33]
	Career	0.01	2.11	[0.00, 0.02]
	Job	0.07	19.80	[0.02, 0.13]
Greater good motivations (R^2 = 0.25)	Demands–abilities fit	0.07	25.86	[0.01, 0.20]
	Calling	0.13	50.41	[0.05, 0.23]
	Career	0.01	1.60	[0.00, 0.01]
	Job	0.06	22.12	[0.02, 0.12]
Positive meaning (R^2 = 0.47)	Demands–abilities fit	0.10	21.43	[0.03, 0.19]
	Calling	0.28	59.52	[0.16, 0.40]
	Career	0.01	4.28	[0.00, 0.06]
	Job	0.07	14.77	[0.02, 0.12]
Work engagement (R^2 = 0.47)	Demands–abilities fit	0.03	5.73	[0.01, 0.07]
	Calling	0.17	33.87	[0.10, 0.24]
	Career	0.01	2.25	[0.01, 0.04]
	Job	0.08	15.68	[0.02, 0.18]
	Meaning making	0.08	15.70	[0.04, 0.13]
	Greater good motivations	0.05	10.11	[0.02, 0.11]
	Positive meaning	0.08	16.68	[0.04, 0.13]

R^2 = 0.40.

RW, raw relative weight; RRW, rescaled relative weights; CI, confidence intervals.

TABLE 6: Confidence intervals of standardised indirect effects of work beliefs and demands–abilities fit on engagement via meaningful work.

Variable	Indirect effect				
	Estimate	SE	Est./SE	Two-tailed *p*-value	95% CI
Calling	0.19	0.08	2.48	0.01	[0.06, 0.37]
Career	0.01	0.03	0.55	0.58	[-0.02, 0.08]
Job	-0.04	0.03	-1.39	0.17	[-0.12, -0.00]
Demands–abilities fit	0.08	0.04	2.21	0.03	[0.03, 0.18]

$p < 0.01$.

SE, standard error; Est./SE, estimate/standard error.

the value of R^2 (ΔR^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 (RWA; Johnson, 2000) were conducted for each of the dependent variables separately using RWA-Web (Tonidandel & LeBreton, 2015). The scale scores were used as input. Table 5 shows the results of the relative weight analyses.

Concerning the 34% of the variance explained in meaning making, a calling orientation contributed most (61.40%), followed by a low job orientation (19.80%) and D–A fit (16.68%). Furthermore, a calling orientation made the largest relative contribution (50.41%) to greater good motivations, followed by D–A fit (25.86%) and a low job orientation (22.12%). Concerning positive meaning, a calling orientation also made the largest relative contribution (59.52%) followed by D–A fit (21.43%) and a low job orientation (14.77%). Finally, a calling orientation made the largest relative contribution to the variance explained in work engagement (33.87%), followed by positive meaning (16.68%), meaning making (15.70%) and a low job orientation (15.58%).

Indirect effects

To further investigate indirect effects of D–A 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% CIs. Table 5 shows the indirect effects and the lower and upper CIs (see Table 6).

Table 6 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

This study aimed to investigate the relationship between D–A fit, work beliefs, meaningful work and personal engagement in individuals in nature-based jobs. The results confirmed that having a calling orientation to work (and not being interested in the material benefits of a job only), as well as fit between demands of the job and the abilities of an individual predicted a large percentage of the variance in meaningful work and personal engagement. Mediation analyses showed that a calling orientation and D–A fit impacted personal engagement of individuals working in nature conservation via experiences of meaningful work (i.e. meaning making, greater good motivations and positive meaning). Believing that work is socially valuable, even if it might not be pleasurable and financially worthwhile (Bellah et al., 1985), and perceiving fit between one's abilities, job demands and job resources (Greguras & Diefendorff, 2009) both contribute to people expressing themselves in their work roles (Kahn & Heaphy, 2014).

A calling work orientation (and not having a job orientation) was by far the strongest predictor of meaning making. However, while having a calling orientation to work (and less of a job orientation) had the strongest effect on meaning making, individuals' perceptions of fit between the demands (and the availability of resources) they face and their abilities and skills were also important when it comes to expression of the self in a role (Edwards, 1996; Kristof-Brown et al., 2005). 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, that is, when their interests and ambitions are not expressed through their work (Wrzesniewski et al., 2003).

Having a calling orientation to work, not having a job orientation, and fit between the demands of the job and abilities of the individual also predicted a large percentage of the variance in greater good motivations. Relative weight analysis showed that a calling work orientation contributed most to greater good motivations, but that perceived fit between job demands (and the availability of resources) also played a significant role. Greater good motivations embrace the idea that work is most meaningful if it makes a positive contribution and benefits others or society (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. Making a positive contribution to others and society was also evident in Bunderson and Thompson's (2009) findings with zookeepers.

A high calling orientation, low job orientation and perceived fit between job demands (and job resources), as well as abilities predicted a large percentage of the variance in positive meaning at work. Again, having a calling orientation was the strongest predictor of positive meaning. Positive meaning is a subjective experience that what one is doing has personal significance (Steger et al., 2012).

In line with work orientation theory (Wrzesniewski, 2012), person–environment fit theory (Greguras & Diefendorff, 2009), the theory of meaningful work (Steger & Dik, 2010), the relational model of work engagement (Kahn & Heaphy, 2014), work beliefs, perceived fit between demands of jobs and abilities of individuals and the three dimensions of meaningful work predicted a large percentage of the variance in personal engagement in work roles in this study. While meaningful work had the largest effect on personal engagement in work roles, mediation analyses suggested that the effects of a calling orientation and perceived fit between demands and abilities on personal engagement occurred through meaningful work. It seems that a calling orientation is a vital factor in understanding what makes work meaningful and engaging (Hirschi, 2012). Meaningful work is an essential factor in understanding the relationship between a calling orientation, D–A fit and personal engagement of individuals in nature-based jobs.

A calling orientation provides a compelling basis for identification with work in nature conservation, meaningful work and self-expression (Bunderson & Thompson, 2009). Such work has proved to be positively associated with identification with a job (Bellah et al., 1985). Through identification with their jobs, individuals who work in nature conservation derive a conviction of the significance of their work in society (Bunderson & Thompson, 2009). By identifying with the nature conservation community, employees come to embrace the beliefs and ideologies of that community as their own and can, therefore, draw on these beliefs and ideologies to assign personal meaning to their work. Given the vital role of conservation in society, individuals working in such contexts have opportunities to work for greater good and to experience positive meaning because of the importance of their work (Bunderson & Thompson, 2009). Therefore, meaningful work indeed seems to result from individuals' relations with those who benefit from their work and those who confirm its importance (Kahn & Heaphy, 2014).

Conclusion

Limitations of the study

This study had various limitations. Firstly, a probability sample was not used. As such, a generalisation of the results beyond the sample group should be done with great caution. Secondly, 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 scale which measures work orientations. For example, new items should be developed for the calling and job subscales and subjected to validity analyses. A further limitation of this study was that the design was cross-sectional. A longitudinal study could provide further insight into possible causal relationships.

Recommendations

Gaining an understanding of what contributes to meaningful work and personal engagement is particularly important at this point in time, as wildlife agencies have experienced tension and change in recent years because of restructuring, poaching, law enforcement factors and conflict over ownership and control of land and its natural resources (see Harrison et al., 2015; Karanja, 2012). The results of this study contribute 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. Interventions should be implemented to enhance the D–A fit of individuals working in nature. Human resource management initiatives (e.g. recruitment, selection, training and development) could be implemented to promote the D–A fit of and job crafting by employees, which will contribute to meaningful work and personal 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).

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Competing interests

The author declares that she has no financial or personal relationships that may have inappropriately influenced her in writing this article.

Authors' contributions

N.D.C. conducted the literature review while S.I.R. conducted the analyses and wrote the results section.

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