

## ResearchSpace@Auckland

### Version

This is the Accepted Manuscript version. This version is defined in the NISO recommended practice RP-8-2008 <http://www.niso.org/publications/rp/>

### Suggested Reference

Viljevac, A., Cooper Thomas, H. D., & Anderson, N. (2012). An investigation into the validity of two measures of work engagement. *International Journal of Human Resource Management*, 23(17), 3692-3709. doi:10.1080/09585192.2011.639542

### Copyright

Items in ResearchSpace are protected by copyright, with all rights reserved, unless otherwise indicated. Previously published items are made available in accordance with the copyright policy of the publisher.

This is an Accepted Manuscript of an article published in *International Journal of Human Resource Management* on 10 Jan 2012, available online:

<http://www.tandfonline.com/doi/abs/10.1080/09585192.2011.639542>

<http://www.sherpa.ac.uk/romeo/issn/0958-5192/>

<https://researchspace.auckland.ac.nz/docs/uoa-docs/rights.htm>

## **An Investigation into the Validity of Two Measures of Work Engagement**

### **Abstract**

This study investigated the validity of two measures of work engagement (the Utrecht Work Engagement Scale and the May, Gilson, and Harter (2004) scale) that have emerged in the academic literature. Data were collected using surveys with 139 employees in the Auckland-based call centers of two finance organizations, to assess the validity of the two measures. Some evidence for convergent, discriminant, and predictive validity was found for both scales, although neither showed discriminant validity with regard to job satisfaction. Overall, the three factors of the UWES (vigor, dedication, and absorption) performed slightly better across analyses than the three factors from the May et al. (2004) measure (cognitive, emotional, and physical). There are some important differences between the two scales, raising questions about how we should be measuring work engagement. The current use of different descriptions and measures means that findings will be specific to each of these. This limits generalizability across studies, which will both slow theoretical progress and reduce the ability of science to contribute to practice.

**Keywords:** work engagement, UWES, vigor, dedication, and absorption

### **An Investigation into the Validity of Two Measures of Work Engagement**

Employees who are more engaged with their work take less time off, stay with the organization for longer, and are happier, more proactive, and more productive (Harter Schmidt and Hayes 2002; Schaufeli and Salanova 2008). At the organizational level, having an engaged workforce is positively associated with better use of resources, including fewer quality errors, superior customer service, greater sales growth, and higher earnings per employee (Bates 2004; Baumruk 2004; Harter et al. 2002; Moliner Martínez-Tur Ramos Peiró and Cropanzano 2008; Richman 2006; Xanthopoulou Bakker Demerouti and Schaufeli 2009). However, some authors report that employee engagement is on the decline, and that there is a deepening disengagement among employees today (Bates 2004; Richman 2006), with an “engagement gap” costing U.S. businesses \$300 billion a year in lost productivity (Bates 2004; Johnson 2004; Kowalski 2003).

Given the importance of work engagement, it is not surprising that there are numerous measures available. However, the majority of measures are commercial (Macey and Schneider 2008), with only four measures published in the scholarly literature. Of these, the Utrecht Work Engagement Scale (UWES) (Schaufeli Salanova Gonzalez-Roma and Bakker 2002) is the most frequently used (Sonnetag 2003; 2011; Salanova and Schaufeli 2008; Xanthopoulou et al. 2009). However, there is a risk that continuing to choose the most commonly used scale ignores issues of scale reliability and validity (Ryan and Ployhart 2000). The purpose of this study was to investigate the validity and psychometric properties of the UWES and the engagement scale developed by May, Gilson and Harter (2004; the “May” scale), which is theoretically grounded in

the seminal engagement work of Kahn (1990, 1992)<sup>1</sup>. Our hope is to be able to make practical recommendations for future work engagement research. The accurate measurement of work engagement is important for understanding its antecedents, correlations, and consequences, as well as the impact of human resource strategies aiming to improve engagement (Cooper-Thomas Leighton Xu and Knight-Turvey 2010; Halberg and Schaufeli 2006). Indeed, Sonnentag (2011, p. 31) recently called for research to investigate the domains of vigor, dedication, and absorption against the conceptualization from Kahn (1990), and to systematically compare outcomes from these different concepts.

In the following pages, we describe two definitions based on different conceptual models of engagement and the resulting two measures of work engagement that have appeared in the literature. We then present a study in which we investigate the convergent, discriminant, and predictive validity of these two measures of work engagement.

### ***Definitions of Work Engagement***

As yet, there is no agreement on a single definition of work engagement. Hence commercial and academic measures are each developed from overlapping but not identical starting points (Macey and Schneider 2008). Turning to the two measures investigated here, for the UWES, engagement is defined as the opposite or positive antithesis of burnout (Maslach and Leiter 1997; Maslach Schaufeli and Leiter 2001). However, the two are proposed to differ in respect of one of their three dimensions (Schaufeli Salanova Gonzalez-Roma and Bakker 2002). Schaufeli et al. (2002) define engagement “as a positive, fulfilling, work-related state of mind that is characterized by

vigor, dedication, and absorption” (p.74). *Vigor* involves high levels of energy and mental resilience while working; *dedication* refers to being strongly involved in one’s work and experiencing a sense of significance, enthusiasm, and challenge; and *absorption* refers to being fully concentrated and engrossed in one’s work. It is this third dimension – absorption – which distinguishes engagement from burnout. This approach views engagement not as a momentary and specific state, but rather, as “a more persistent and pervasive affective-cognitive state that is not focused on any particular object, event, individual, or behavior” (Schaufeli et al. 2002, p.74).

The May et al. (2004) scale draws on the work of Kahn (1990, 1992), who defines engagement as “the harnessing of organization members’ selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances” (p.694, 1990). Disengagement refers to “the uncoupling of selves from work roles; in disengagement, people withdraw and defend themselves physically, cognitively, or emotionally during role performances” (p.694, 1990). Kahn (1990) also proposed a hierarchy with engagement increasing with physical, then cognitive, and last emotional dimensions reflecting relatively deeper levels of engagement. When all three are present, an individual is fully psychologically present (Kahn 1990, 1992).

### ***The Measurement of Work Engagement***

Two scales have been developed based on the definitions of work engagement described in the previous section. First, Schaufeli et al. (2002) developed the Utrecht Work Engagement Scale (UWES) which measures the three dimensions included in their definition of work engagement (i.e., vigor, dedication, and absorption). This scale has

received the most attention in terms of development and research and it has been validated in several countries. As well, the three factor structure has been found to be superior than alternative structures (Bakker and Demerouti 2008). However, it is worth noting that some studies have failed to find support for the three factor structure (e.g., Halberg and Schaufeli 2006; Sonnentag 2003).

May et al. (2004) developed a measure of engagement to reflect the three components of Kahn's (1990) definition of engagement (cognitive, emotional, and physical). However, an exploratory principal components factor analysis conducted on the initial 24 items did not result in three separate and reliable scales for these three dimensions. As a result, they used an overall measure of engagement made up of the average of 13 items that demonstrated good reliability (4 cognitive items, 4 emotional items, and 5 physical items;  $\alpha = .77$ ). We know of only one other published study that has used this scale. Avey, Wernsing, and Luthans (2008) used only the emotional engagement dimension ( $\alpha = .80$ ) in a study on employees' psychological capital and positive emotions. In the present study, we decided to use the measure according to the three components originally proposed, as this greater discrimination among the components of engagement is more useful for research (e.g., Avey et al. 2008).

*Convergent and Discriminant Validity.* The correspondence between the two measures investigated here has been noted by the UWES authors (Bakker and Demerouti 2008; Bakker Hakanen Demerouti and Xanathopoulou 2007). Specifically, the physical, emotional, and cognitive dimensions of the May et al. (2004) scale each correspond closely with the vigor, dedication, and absorption dimensions respectively, of the UWES. Both the vigor and physical dimensions refer to being full of energy and working until

the job is done; the dedication and emotional scales refer to being enthusiastic and excited about one's job; and the absorption and cognitive scales have to do with losing oneself in one's job and forgetting about everything else. Given the conceptual overlap between pairs of dimensions across the scales, data supporting this overlap would provide convergent validity evidence. Therefore, our first hypothesis is the following:

Hypothesis 1a) the relationship between the UWES vigor and May et al. physical dimensions will be stronger than their relationships with the other engagement dimensions.

Hypothesis 1b) the relationship between the UWES absorption and May et al. cognitive dimensions will be stronger than their relationships with the other engagement dimensions.

Hypothesis 1c) the relationship between the UWES dedication and May et al. emotional dimensions will be stronger than their relationships with other engagement dimensions.

The boundaries of work engagement are unclear, with some authors proposing that it includes one or more other constructs such as job satisfaction, job involvement, organizational commitment, desire to continue with the organization, and both proactive and citizenship behaviors (Bhatnagar 2007; Frank Finnegan and Taylor 2004; Heger, 2007; Macey and Schneider, 2008; Robinson et al. 2004). However, others propose that including this combination of other constructs within engagement only muddies the conceptualisation of engagement (Newman and Harrison 2008), and that engagement is related to – but distinct from – such constructs (Halberg and Schaufeli 2006; Schaufeli et al. 2008). Hence, an important question is whether engagement is measuring something

novel and distinct from these other related constructs. If the components of the two scales each have stronger relationships with their own scale components than with these other related constructs, this provide a simultaneous test of both convergent and discriminant validity. Therefore, we tested the following hypotheses:

Hypothesis 2. The components of the UWES scale will be more strongly related to each other than to a) job involvement, b) organizational commitment, c) job satisfaction, and d) intention to stay.

Hypothesis 3. The components of the May et al. scale will be more strongly related to each other than to a) job involvement, b) organizational commitment, c) job satisfaction, and d) intention to stay.

*Predictive and Discriminant Validity.* According to Kahn (1990), individuals who are more sure of their fit with a social system are more likely to derive greater meaning from it and to become more engaged. Conversely, individuals are likely to feel insecure and less psychologically available when they are unsure of their fit with an organization. As stated by Kahn (1990), “it is difficult for people to engage personally in fulfilling work processes when organizational ends do not fit their own values...” (p.716). Thus, individuals are more likely to become engaged in their work and role when they perceive a good fit between themselves and their job, colleagues, and organization. Similarly, the values dimension of the Maslach et al. (2001) burnout-engagement model suggests that a conflict or mismatch between an individual’s values and the organization’s values can result in burnout. On the other hand, when a good match exists between an individual’s values and those of the organization, that individual is more likely to be engaged.



Research on fit and work engagement has found some support for a relationship. May et al. (2004) found that work role fit (person-job fit) was significantly correlated to work engagement, and Saks and Gruman (2011) found that both person-job and person-organization fit perceptions were positively correlated to work engagement (see also Avery McKay and Wilson 2007). Theoretically, then, person-job and person-organization fit are antecedents of engagement; confirming their ability to predict engagement supports this theoretical link, providing evidence of predictive validity.

In order to establish discriminant validity, it is important to specify variables that should not be related to work engagement, such as demographic variables. In a study across 10 countries, Schaufeli et al. (2006) found no practically significant correlations of engagement with gender or age, with similar findings in other studies (Avery et al. 2007; Sonnentag, 2003). Hence, age and gender should have weak relationships, at most, with the components of employee engagement. Hence, we tested the following hypothesis:

Hypothesis 4. Person-job and person-organization fit will be more strongly related to work engagement than age and gender.

## **Method**

### ***Participants***

Participants were employees in the Auckland-based call centers of two finance organizations. For each, 200 participants were asked to complete surveys, resulting in 139 respondents overall.

*Organization A.* Of 200 staff asked to participate, 78 completed questionnaires were returned, for a response rate of 39%. The majority of responses came from employees who were full-time (81%), female ( $n = 53$ ; 68%), and had no direct reports (86%). The

main ethnicities represented were NZ European (19%), Indian (14%), and European (13%). Median organization tenure was 24 months.

*Organization B.* Of 200 staff invited to participate, 61 completed questionnaires were returned, for a response rate of 31%. Similar to Organization A, employees were mainly full-time (95%), female (32, 52%), with no direct reports (79%). The majority of respondents identified themselves as Indian (34%), followed by NZ European (12%), Maori (12%), and Pacific (12%). Median organization tenure was 17 months.

### ***Procedure***

The research was approved through the two organizations' Human Resources departments. Human Resources personnel briefed team leaders about the research, and asked team leaders to encourage their teams to participate. Posters were also displayed around each organization. The team leaders distributed questionnaires and envelopes to their teams. The first page of each questionnaire comprised an information sheet detailing the research and its university ethical approval, and emphasizing that participation was voluntary and anonymous. Sealed collection boxes were placed within each department for the completed questionnaires, with a two week return date requested and indicated on each box. A jar of candies was placed by each sealed box to thank participants.

### ***Measures***

*Work engagement.* Two measures of work engagement were used, namely the Utrecht Work Engagement Scale (UWES; Schaufeli Salanova Gonzalez-Roma and Bakker 2002) and the May et al. (2004) engagement scale. The UWES scale comprises 17 items that measure vigor, absorption, and dedication. Example items are: Vigor "When I get up in

the morning, I feel like going to work”; dedication “I am proud of the work I do”; and absorption “Time flies when I am working”. We note that one item in the dedication subscale of the original UWES is double-barrelled - “I find the work that I do full of meaning and purpose”. Since the aim of this study was to assess and, potentially, suggest improvements for future research using these measures, this item was split, resulting in 6 items per dimension. Respondents were asked to rate the frequency with which they experienced each of the actions or emotions described in the questions using a 7-point Likert scale ranging from Never (1) to Always (7).

The May et al. (2004) scale comprises 13 items covering cognitive, emotional, and physical engagement. Example items are: Cognitive engagement “I am often distracted when doing my job” (reverse scored); emotional engagement “I really put my heart into my job”; and physical engagement “I exert a lot of energy when performing my job”. Respondents were asked to indicate how often they experienced each of the actions or emotions described in the questions using a 7-point Likert scale ranging from Never (1) to Always (7).

Note that we adapted the Likert scales for both measures so that they were identical. The UWES is traditionally measured on a 0 to 6 scale and the May et al. (2004) scale was originally measured on a 1 to 5 scale. We removed the 0 and increased the scale to 7 points (1 to 7) to ensure that it was broad enough to accurately capture variance.

Questionnaire piloting showed that respondents were confused by the similarity of four items. Respondents identified overlaps for the May et al. (2004) cognitive item “Doing my job is so absorbing that I forget about everything else” with the UWES

absorption item “When I am working, I forget everything else around me”; and for the May et al. (2004) cognitive item “Time passes quickly when I am doing my job” with the UWES absorption item “Time flies when I am working”. Pilot respondents either deleted or left blank one of the perceived duplicate items. The issue of repeated similar items causing problems for responding is not new (Schreisheim and DeNisi, 1980). Leaving the overlapping items risked causing missing data for one or both scales; however deleting items which are clearly related across the scales is likely to reduce the relationship of these two factors. On balance, we decided to leave the UWES intact as the most commonly used measure of engagement, and removed the two items from the May et al. (2004) cognitive scale, leaving this as a 2-item scale, and noting that this may reduce the relationship between UWES absorption factor and May et al. (2004) cognitive factor. Coefficient alphas were good for the UWES scales (.81, .85, and .89 for vigor, absorption, and dedication respectively) but more variable for the May et al. (2004) scales (.77<sup>2</sup>, .66, and .49 for the cognitive, emotional, and physical scales respectively).

*Person-job and person-organization fit.* PO and PJ fit were measured using the two four-item scales developed by Saks and Ashforth (2002). An example item for PO fit is “To what extent does the organization fulfill your needs”, and for PJ fit is “To what extent is the job a good match for you”. Responses were on a 7-point Likert scale ranging from Not at all (1) to Completely (7). Coefficient alphas were .90 and .80 for PO fit for PJ fit respectively.

*Job involvement.* A ten-item scale developed by Kanungo (1982) was used to measure job involvement. A sample item is “The most important things that happen to me involve

my present job”. Responses were on a 7-point Likert scale from strongly disagree (1) to strongly agree (7); the coefficient alpha was .83.

*Affective commitment.* Allen and Meyer’s (1990) eight-item affective commitment measure was used. An example item is “I would be very happy to spend the rest of my career with this organization”. Responses were on a 7-point Likert scale from strongly disagree (1) to strongly agree (7), with a coefficient alpha of .80.

*Job satisfaction.* Following Judge, Bono and Locke (2000), a shortened five-item version of the Brayfield and Rothe (1951) scale was used. An example item is “I find real enjoyment at work”. Responses were on a 7-point Likert scale from strongly disagree (1) to strongly agree (7), with a coefficient alpha of .74.

*Intention to stay.* Cook, Hepworth, Wall, and Warr’s (1981) three-item scale was used to measure intention to stay. The items measure staying and leaving intentions, with an example item being “I rarely think about quitting”. Responses were on a 5-point Likert scale, from agree to disagree. Coefficient alpha was .73.

*Demographics.* Information was collected on organizational tenure, position (four levels of senior manager (1), middle manager (2), team leader/ supervisor (3), through to staff member without direct reports (4)), employment status (full-time or part-time), gender, age (five levels from under 20 through to over 50), and ethnicity (open-ended).

### ***Analysis Strategy***

Confirmatory factor analysis and structural equation modeling were used to test the hypotheses, using Amos 7.0. Covariance matrices were used as the input, and maximum likelihood estimation methods were used. Goodness of fit for models was assessed using: Chi-square ( $X^2$ ), Normed Chi-square ( $X^2/df$ ), Comparative Fit Index (CFI), Tucker-Lewis

Index (TLI), and the Root Mean Square Error of Approximation (RMSEA). For acceptable fit, ideally these indices should be as follows:  $\chi^2$  non-significant,  $\chi^2/df$  less than 2; CFI and TLI of .95 or greater, and RMSEA of .06 or less (Byrne 2001; Hu and Bentler 1999). The CFI has shown good reliability with small samples, and therefore the result for this statistic are likely to be the most reliable for the current data (Hu and Bentler 1999). For model comparisons, we present the chi-square change ( $\Delta\chi^2$ ); and changes in CFI ( $\Delta CFI$ ). Invariance is supported if the chi-square change is not significant, and change in CFI is no more than .01 (Cheung and Rensvold, 2002), with the latter test being particularly useful since it is not affected by sample size. Since our purpose was to assess the two measures as they stand, we used a confirmatory approach and did not modify the items or their inter-relationships to improve model fit (Byrne 2001). We note that our sample size of 139 exceeds the recommended minimum of 100 for confirmatory factor analysis models (Loehlin 1992) but does not meet the more ideal 200 (Loehlin; Hoelter 1983). Hence, we have kept each analysis to the minimum number of latent factors in each case, to reduce the number of parameter estimates, and hence increase the stability of the results.

## Results

Table 1 presents the means, standard deviations, and intercorrelations of the study variables. As expected, the six engagement dimensions were positively correlated, ranging from .23 to .68. Interestingly, the correlations among the three dimensions of the UWES were strong (.51 to .68) while those among the three dimensions of the May et al. (2004) scale were weak to moderate (.23 to .37). As expected, most of the six

engagement dimensions were positively correlated with job involvement, organizational commitment, job satisfaction, and intention to stay. In addition, person-job and person-organization fit were positively correlated with the six engagement dimensions. Gender and age showed some significant relationships to the work engagement scales for the UWES but not the May et al. measures.

---

Insert Table 1 about here

---

### ***Confirmatory Factor Analysis***

We conducted confirmatory factor analysis on each of the two engagement measures, for each specifying three factors<sup>3</sup>. As shown in Table 1, the model fit for the UWES (Model 1) was marginal, with  $X^2/df$  showing an acceptable model fit, but with a significant chi-square, high RMSEA, and low CFI and TLI suggesting poor fit. For the May et al. (2004) measure, Model 2 yielded slightly poorer fit statistics, with only  $X^2/df$  showing sufficient fit. In Model 3, we included all three components of each measure to evaluate the fit of a six-factor model. While  $X^2/df$  suggests acceptable fit, RMSEA, CFI and TLI show inadequate fit. The six-factor model shows positive correlations between all engagement factors, ranging from .45 to .87.

---

Insert Table 2 about here

---

### ***Hypothesis Testing***

Hypotheses 1a), b), and c) proposed that similar engagement dimensions across the measures would show stronger relationships with each other than with other dimensions. Specifically, vigor and physical, absorption and cognitive, and dedication and emotional scales were expected to be more strongly related. These hypotheses were tested using a series of nested models, with each compared to Model 3 which allowed free estimation of

covariances. For each of Models 4, 5, and 6, the two constructs under scrutiny were constrained to have equal covariances to each other, and to the other four engagement constructs. Only covariances among the remaining four engagement constructs were allowed to covary. Thus for each model, of a total of 15 covariances, 9 were constrained to be equal. Model 4 (vigor-physical) differed significantly from Model 3 ( $\Delta X^2(8) = 29.658, p = .013; \Delta CFI = .012$ ), whereas Model 5 (absorption-cognitive) showed no significant difference from Model 3 ( $\Delta X^2(8) = 8.797, p = .360; \Delta CFI = .001$ ). The evidence for Model 6 is less clear, with a significant chi-square change ( $\Delta X^2(8) = 18.114, p = .020$ ) but the change in CFI is smaller than the .01 criterion ( $\Delta CFI = .006$ ). These results provide support for Hypothesis 1b) only, that UWES absorption dimension and the May et al. cognitive are more strongly related to each other than to the other engagement scales. There is weak support for Hypothesis 1c), that dedication and emotional scales are more strongly related to each other than to the other scales.

Hypotheses 2 and 3 relate to the discriminant validity of each engagement measure against established constructs of job involvement, organizational commitment, job satisfaction, and intention to stay. These were investigated with a series of models in which the established construct was included with either the three scales of the UWES or the May et al. (2004) three scales. For each analysis, the covariances between the three engagement scales and the established construct were first allowed to be freely estimated, and second were constrained to be equal. A significant worsening in the fit of the constrained model would show that the relationships among the engagement scales and the established construct are dissimilar.



The results in Table 3 show the constrained model results. For both UWES and May et al. (2004) scale, only the model fit for organizational commitment was worsened by constraining covariances (UWES Model 8:  $\Delta X^2(5) = 23.446, p = .000; \Delta CFI = .011$ ; May Model 12:  $\Delta X^2(5) = 14.474, p = .013; \Delta CFI = .015$ ). For the UWES, both job involvement and intention to stay show significant chi-square change but the change in CFI was less than .01, and hence these only partially support a worsening model fit (UWES Model 7:  $\Delta X^2(5) = 21.181, p = .001; \Delta CFI = .008$ ; UWES Model 10:  $\Delta X^2(5) = 14.022, p = .015; \Delta CFI = .005$ ). For the remaining models, constraining the covariances did not significantly worsen model fit (UWES Model 9:  $\Delta X^2(5) = 6.840, ns, \Delta CFI = .001$ ; May et al. Model 11:  $\Delta X^2(5) = 3.213, ns, \Delta CFI = .002$ ; May et al. Model 13:  $\Delta X^2(5) = 6.427, ns, \Delta CFI = .003$ ; May et al. Model 14:  $\Delta X^2(5) = 4.805, ns, \Delta CFI = .001$ ). Overall, the results support Hypotheses 2b) and 3b), and partially support Hypotheses 2a) and 2d). Thus, the UWES engagement scales can be clearly distinguished from organizational commitment, and somewhat from job involvement and intention to stay. The May et al. engagement scales can only be clearly distinguished from organizational commitment. The non-significant results for job satisfaction show that it cannot be clearly distinguished from either the UWES or May et al. engagement scales.

---

Insert Table 3 about here

Insert Table 4 about here

---

Hypothesis 4 proposed that person-job and person-organization fit will explain more variance in work engagement than age and gender. This was tested by developing a baseline model including both sets of variables, and then comparing models with

regression paths constrained to zero, first for age and gender and then for person-job and person-organization fit.

The baseline model for the UWES is Model 15, shown in Table 4, with only person-job and person-organization fit examined in Model 16, and only the demographic variables in Model 17. The fit of Model 16 to the data is significantly worse than that of Model 15 ( $\Delta X^2(6) = 27.993, p = .001; \Delta CFI = .010$ ), with the same true of Model 17 ( $\Delta X^2(6) = 245.354, p = .000; \Delta CFI = .109$ ). However, the reduction in model fit is clearly greater for Model 17. Looking at the  $R^2$  values, these are much larger for Model 16 than Model 17, with between 38 and 74% of variance in the UWES scales predicted by person-job and person-organization fit, compared with 7 to 16% predicted by age and gender. Overall, these results support Hypothesis 4 for the UWES.

The results are similar for the May et al. (2004) scale. Model 18 provides the baseline model (Table 4). Compared with this, using only the person-job and person-organization fit (Model 19) reduces the fit of the model ( $\Delta X^2(6) = 20.487, p = .002; \Delta CFI = .015$ ). Similarly, using just age and gender (Model 20) shows a clear reduction in model fit ( $\Delta X^2(6) = 59.794, p = .000; \Delta CFI = .056$ ). The  $R^2$  values show that person-job and person-organization fit predict between 18 and 33% of variance in the May et al. scales, compared with between 1 and 5% for age and gender. These results support Hypothesis 4 for the May et al. scale. Thus, person-job and person-organization fit were more strongly related to both the UWES and May et al. scales than were age and gender as predicted. Moreover, person-job and person-organization fit were more strongly related to the UWES measure than the May et al. measure.

## Discussion

Work engagement is regarded by many organizations as a critical issue, with engagement promoting the well being and productivity of employees, and improving business results (Baumruk 2005; Harter et al. 2002; Schaufeli et al. 2002). Although an increasing number of work engagement studies have been published in recent years, relatively little attention has been devoted to the measurement of work engagement. Two definitions of engagement have emerged in the academic literature (Kahn 1990, 1992; Maslach and Leiter 1997; Maslach et al. 2001), each with an associated measure (May et al. 2004; Schaufeli et al. 2002). This study assessed the psychometric properties of these two measures, in terms of their convergent, discriminant, and predictive validity.

Both measures performed tolerably across the various analyses. Evidence for convergent validity was found for the UWES absorption and May et al. (2004) cognitive scales (Hypothesis 1b), with weaker evidence found for the UWES dedication with the May et al. emotion scales (Hypothesis 1c). Both measures could be clearly distinguished from affective organizational commitment (Hypotheses 2b) and 3b)), with the UWES scale also showing some discriminability from job involvement and intent to stay (Hypotheses 2a) and 2d)). Yet neither measure could be distinguished from job satisfaction. Person-job and person-organization fit were more strongly related to the UWES and May et al. measures than were age and gender (Hypothesis 4), providing further evidence of predictive and discriminant validity.

However, our findings raise a number of concerns about the measurement of work engagement. For starters, even though comparing one, two, and three factor solutions for both the UWES and May et al. (2004) measures confirmed that three dimensions

provided the best fit, the results of confirmatory factor analysis provide only weak support for a three-dimensional scale for each. Hence more attention to scale construction is required if work engagement research is to pursue a multi-dimensional construct.

Looking at the various types of validity, first for convergent validity, while all six dimensions were positively correlated for the two measures, patterns of predictions did not wholly support the hypotheses. While the UWES absorption and May et al. (2004) cognitive dimensions were strongly related, there was only weak evidence for a relationship between the UWES dedication and May et al. emotional dimensions, and no support for a relation between the UWES vigor and May et al. physical dimensions. Given the proposed conceptual overlap of the dimensions (Bakker and Demerouti 2008; Bakker et al. 2007), the relative lack of relationships found in this study may indicate that the items in some of the measures are not adequately or uniquely covering the constructs as intended. We come back to this issue below in the section “Implications for research and measurement”. For now, it would seem that the absorption and cognitive dimensions show the greatest degree of convergent validity.

Predictive validity was examined by using person-job and person-organization fit as predictors of engagement. These were confirmed as significant predictors of all the UWES and May et al. (2004) dimensions, although they explained more variance in the UWES than the May et al. measures (38-74% versus 18-32%). Thus, overall, the UWES measure showed better predictive validity with fit perceptions.

Analysis of both engagement measures provided some evidence of discriminant validity. While both measures showed evidence of differentiation from affective organizational commitment, the UWES also showed some evidence of differentiation

from job involvement and intention to stay. Perhaps of most concern here is that neither measure showed weaker relationships with job satisfaction than between their three scales. Previous research has criticized engagement measures for conceptual overlap with job satisfaction (Macey and Schneider 2008; Harter et al. 2002), as well as with these other constructs (Newman and Harrison 2008). The current results suggest that these concerns are justified for job satisfaction in particular for both measures, and to some extent for job involvement and intention to stay.

With regard to evidence of discriminant validity in respect of demographic variables, age and gender had weak relationships with the UWES and May et al. (2004) scales, but with slightly more variance explained for the UWES dimensions (7-16% versus 1-5%). Consistent with the correlations in Table 1, the SEM results show that older workers report more engagement when responding to the UWES measure. Given past research that suggests age is not consistently related to engagement, using the UWES measure (Avery et al. 2007; Schaufeli et al. 2006), this may be sample specific. However, the relationship of age with engagement has overlaps with the association found for age with job satisfaction (Birdi, Warr and Oswald 1995). While Schaufeli et al. (2006) suggest that the relationships they found for age and engagement were weak at most, and “lacked practical significance” (p. 711), this relationship may be of interest to employers. This also suggests that age may not be a good marker for discriminant validity, and hence we do not view these results as undermining the discriminant validity of the UWES.

### ***Implications for Research and Measurement***

The partial pattern of convergent relationships between the various dimensions of the UWES (Schaufeli et al. 2002) and May et al. (2004) measures suggests that they are measuring overlapping but not identical constructs. This is not wholly surprising, given that their underlying definitions are different, even though their proposed specific content coincides (e.g., both absorption and cognitive domains refer to losing oneself in the job and forgetting everything else). This difference in the engagement domains mapped by both measures reflects a larger risk that engagement provides an opportunity for different authors – both scholars and professionals – to stake out varying terrains for the construct, which may partially or even minimally overlap. The problem with this is that findings for any study will be limited to a specific conceptualization and measurement of engagement, limiting generalizability across studies, and slowing theoretical progress. Further, for HRM professionals and their clients, this suggests that academics researching engagement are confused or conflicted, weakening the utility of academic scholarship for professional practice. This is clearly an issue where theoretical progress is needed to support both research and practice (Macey and Schneider 2008).

Both measures of engagement fall short in some respects. We split one UWES item for dedication because it is double-barreled (covering meaning and purpose) and recommend that others follow suit. The May et al. (2004) measure performed less well than the UWES with regard to convergent and predictive validity evidence. Looking at the specific items of each measure, the items for UWES vigor and May et al. (2004) physical are likely to be of most interest to employers, as these assess self-reported energy and persistence at work. However, our results suggest that the most overlap between the two measures is for the absorption and cognitive dimensions. Further, the

items of these scales also capture an essential component of the engagement construct – being totally absorbed and immersed in what one is doing. This aspect of the engagement construct has also been used in other measures of engagement (see Rothbard 2001; Saks 2006).

On the other hand, the dedication dimension of the UWES seems to deviate the most from other definitions and measures of engagement, in that it has a more affective tone. In addition, it also has the most conceptual and empirical overlap with other constructs such as organizational identification and job involvement. In line with this, dedication showed the highest correlations with the four attitudinal constructs in the modeling results thereby questioning its distinctiveness as a measure of engagement.

What then are we to make of the measurement of work engagement? On the one hand, our findings suggest that the UWES demonstrates higher validity than the May et al. (2004) measure. However, this might be because it is more similar to other constructs, especially the dedication dimension. On the other hand, our results also suggest that neither measure should be considered an adequate measure of work engagement. In this regard, much more research is needed on the development and validation of work engagement measures (Sonnentag 2011). Interestingly, in some recent research the UWES authors have dropped the absorption dimension of the UWES (Salanova and Schaufeli 2008) and not the dedication dimension. Yet in other work all three dimensions are retained (Xanthopoulou et al. 2009). No reason is given for such adaptation, but it may reflect a recognition of the need for scale refinement. Our findings, however, suggest that the absorption dimension should be retained and perhaps the dedication dimension should be dropped.

At this time it is not clear if engagement is a multi-dimensional or a uni-dimensional construct or how best to measure it. More attention is needed to better develop the engagement construct along with a nomological network of relationships that are required to evaluate its validity. Given that there are currently at least two other engagement measures that have appeared in the academic literature in recent years (Rothbard 2001; Saks 2006) as well as a short-version of the UWES (Schaufeli Bakker and Salanova 2006), there is an urgent need for more research on the measurement of work engagement.

### ***Study Limitations***

The results of this study should be considered in light of its limitations. Similar to other studies in this area (e.g., May et al. 2004; Rothbard 2001; Schaufeli and Bakker 2004; Sonnentag 2003), this study used cross-sectional and self-report data. This limits the conclusions one can make about causality and also raises concerns about common method bias. The linkages we propose are consistent with the literature on engagement (Kahn 1990, 1992) and burnout (Maslach et al., 2001; Schaufeli and Bakker 2004). Longitudinal and experimental studies are required to provide more definitive conclusions about the causal effects of employee engagement and the extent to which social exchange explains these relationships.

Some caution is also required in the generalization of our results given that our sample consisted of call centre employees working in the finance industry. Previous research has used similar samples including call centre employees (Bhatnagar 2007), telecoms employees (Heger 2007; Salanova and Schaufeli 2008), insurance company employees (May et al. 2004; Schaufeli and Bakker 2004) and hotel customer contact



employees (Moliner et al. 2008; Salanova et al. 2005). However, the correlations from our research are similar to those found in other studies, including meta-analyses (Christian Garza and Slaughter 2011; Halberg and Schaufeli 2006). Therefore, while our research sample and results are fairly typical, it is possible that different patterns of relationships will be found for employees in other roles and industries.

### ***Conclusion***

Although an increasing number of studies on work engagement have begun to appear in the academic literature and at academic conferences in recent years, there has been no comparative research investigating the various measures of this construct even though numerous measures have been developed and are being used. The present study assesses the psychometric properties of two engagement measures each based on a different conceptual model of engagement, namely the UWES as developed by Schaufeli and colleagues (2002) and the measure developed by May et al. (2004). The results show that the UWES performed somewhat better, but that both measures could be improved. Of particular concern is that neither measure showed discriminant validity with respect to job satisfaction. We therefore recommend that more research be devoted to the development and validation of a work engagement measure. The continuation of research that uses different measures of engagement with questionable overlap and validity is likely to thwart the advancement of engagement theory and research and limit its implications for practice.

## Footnotes

<sup>1</sup> Of the three other engagement measures published in academic journals, Rothbard's (2001) scale focuses on attention and absorption, which are both similar to the UWES absorption dimension. Saks (2006) measured job and organization engagement, with job engagement similar to the UWES absorption dimension, and organization engagement having some overlap with the UWES vigor dimension. Recently, Rich, LePine and Crawford (2010) have developed a measure of engagement from Kahn's model, which partly draws from Rothbard's (1991) engagement measure for the cognitive or absorption aspect.

<sup>2</sup> Note that the two item cognitive scale showed acceptable reliability.

<sup>3</sup> Following the advice of one reviewer, we conducted exploratory factor analyses. These were conducted in MPlus version 6.11 since exploratory analyses are simpler with this program. The analyses compared one, two, and three factor models. For both the UWES, and the May, a three factor model gave the best fit to the data (UWES:  $\chi^2 = 219.48$ ,  $df = 102$ ,  $p = .00$ ,  $TLI = .870$ ;  $CFI = .914$ ,  $SRMR = .048$ ; May:  $\chi^2 = 29.514$ ,  $df = 25$ ,  $p = .243$ ;  $TLI = .959$ ,  $CFI = .981$ ,  $SRMR = .036$ ).

## References

- Allen, N. J., and Meyer, J. P. (1990), 'The measurement and antecedents of affective, continuance and normative commitment to the organization', *Journal of Occupational Psychology*, 63, 1-18.
- Avey, J. B., Wernsing, T. S., and Luthans, F. (2008), 'Can positive employees help positive organizational change: Impact of psychological capital and emotions on

- relevant attitudes and behaviors', *The Journal of Applied Behavioral Science*, 44, 48-70.
- Avery, D. R., McKay, P. F., and Wilson, D. C. (2007), 'Engaging the aging workforce: The relationship between perceived age similarity, satisfaction with coworkers, and employee engagement', *Journal of Applied Psychology*, 92, 1542-1556.
- Bakker, A. B., and Demerouti, E. (2007), 'The Job Demands-Resources model: State of the art', *Journal of Managerial Psychology*, 22, 309-328.
- Bakker, A. B., and Demerouti, E. (2008), 'Towards a model of work engagement', *Career Development International*, 13, 209-223.
- Bakker, A. B., Hakanen, J. J., Demerouti, E., and Xanthopoulou, D. (2007), 'Job resources boost work engagement, particularly when job demands are high', *Journal of Educational Psychology*, 99, 274-284.
- Bakker, A. B., and Schaufeli, W. B. (2008), 'Positive organizational behavior: Engaged employees in flourishing organizations', *Journal of Organizational Behavior*, 29, 147-154.
- Baron, R. M., and Kenny, D. A. (1986), 'The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations', *Journal of Personality and Social Psychology*, 51, 1173-82.
- Bates, S. (2004), 'Getting engaged', *HR Magazine*, 49, 44-51.
- Baumruk, R. (2004), 'The missing link: The role of employee engagement in business success', *Workspan*, 47, 48-52.
- Bhatnagar, J. (2007), 'Talent management strategy of employee engagement in Indian ITES employees: Key to retention', *Employee Relations*, 29, 640-663.

- Birdi, K., Warr, P., and Oswald, A. (1995), 'Age differences in three components of employee well-being', *Applied Psychology: An International Review*, 44, 345-373.
- Byrne, B. M. (2001), *Structural equation modeling with Amos: Basic concepts, applications, and programing*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Cable, D. M., and DeRue, D. (2002), 'The convergent and discriminant validity of subjective fit perceptions', *Journal of Applied Psychology*, 87, 875-884.
- Cammann, C., Fichman, M., Jenkins, G. D., and Klesh, J. R. (1983), 'Assessing the attitudes and perceptions of organizational members', In Seashore, S. E., Lawler, III, E. E., Mirvis, P.H., and Cammann, C. (Eds.), *Assessing organizational change: A guide to methods, measures, and practices* (pp. 71-138), New York: Wiley.
- Cheung, G. W., and Rensvold, R. B. (2002), 'Evaluating goodness-of-fit indexes for testing measurement invariance', *Structural Equation Modeling*, 9, 233-255.
- Christian, M. S., Garza, A. S., and Slaughter, J. E. (2011), 'Work engagement: A quantitative review and test of its relations with task and contextual performance', *Personnel Psychology*, 64, 89-136.
- Colarelli, S. M. (1984), 'Methods of communication and mediating processes in realistic job previews', *Journal of Applied Psychology*, 69, 633-42.
- Colquitt, J. (2001), 'On the dimensionality of organizational justice: A construct validation of a measure', *Journal of Applied Psychology*, 86, 386-400.

- Colquitt, J. A., Conlon, D. E., Wesson, M. J., Porter, C. O. L. H., and Ng, K. Y. (2001), 'Justice at the millennium: A meta-analytic review of 25 years of organizational justice research', *Journal of Applied Psychology*, 86, 425-45.
- Cook, J. D., Hepworth, S. J., Wall, T. D., and Warr, P. B. (1981), *The experience of work*. New York: Academic Press.
- Cooper-Thomas, H. D., Leighton, N. Xu, J. and Knight-Turvey, N. (2010): Measuring change: Does engagement flourish, fade, or stay true? In S. Albrecht (Ed.) *The Handbook of Employee Engagement* (pp. 87-97). Cheltenham, UK: Edwin Elgar.
- Cropanzano, R. and Mitchell, M. S. (2005), 'Social exchange theory: An interdisciplinary review', *Journal of Management*, 31, 874-900.
- Frank, F. D., Finnegan, R. P., and Taylor, C. R. (2004), 'The race for talent: Retaining and engaging workers in the 21<sup>st</sup> century', *Human Resource Planning*, 27, 12-25.
- Ganzach, Y., Pazy, A., Ohayun, Y., and Brainin, E. (2002), 'Social exchange and organizational commitment: Decision-making training for job choice as an alternative to the realistic job preview', *Personnel Psychology*, 55, 613-637.
- Gonzalez-Roma, V., Schaufeli, W. B., Bakker, A. B., and Lloret, S. (2006), 'Burnout and work engagement: Independent factors or opposite poles?', *Journal of Vocational Behavior*, 68, 165-174.
- Hackman, J. R., and Oldham, G. R. (1980), *Work redesign*. Addison-Wesley, Reading, MA.
- Halberg, U. E., and Schaufeli, W. B. (2006), '“Same same” but different? Can work engagement be discriminated from job involvement and organizational commitment?', *European Psychology*, 11, 119-127.

- Harter, J. K., Schmidt, F. L., and Hayes, T. L. (2002), 'Business-unit level relationship between employee satisfaction, employee engagement, and business outcomes: A meta-analysis', *Journal of Applied Psychology*, 87, 268-279.
- Heger, B. K. (2007), 'Linking the Employment Value Proposition (EVP) to employee engagement and business outcomes: Preliminary findings from a linkage research pilot study', *Organization Development Journal*, 25, 121-132.
- Hoelter, J. W. (1983), 'The analysis of covariance structures: Goodness-of-fit indices', *Sociological Methods and Research*, 11, 325-344.
- Hu, L.-T., and Bentler, P. M. (1999), 'Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives', *Structural Equation Modeling*, 6, 1-55.
- Johnson, G. (2004), 'Otherwise engaged', *Training*, 41, 4.
- Judge, T. A., Bono, J. E., and Locke, E. A. (2000), 'Personality and job satisfaction: The mediating role of job characteristics', *Journal of Applied Psychology*, 85, 237-249.
- Judge, T. A., Thoresen, C. J., Bono, J. E., and Patton, G. K. (2001), 'The job satisfaction – job performance relationship: A qualitative and quantitative review', *Psychological Bulletin*, 127, 376-407.
- Kahn, W. A. (1990), 'Psychological conditions of personal engagement and disengagement at work', *Academy of Management Journal*, 33, 692-724.
- Kahn, W. A. (1992), 'To be fully there: Psychological presence at work', *Human Relations*, 45, 321-349.

- Kanungo, R. N. (1982), 'Measurement of job and work involvement', *Journal of Applied Psychology*, 67, 341-349.
- Kowalski, B. (2003), 'The engagement gap', *Training*, 40, 62.
- Kress, N. (2005), 'Engaging your employees through the power of communication', *Workspan*, 48, 26-36.
- Kristof-Brown, A. L., Zimmerman, R. D., and Johnson, E. C. (2005), 'Consequences of individual's fit at work: A meta-analysis of person-job, person-organization, person-group, and person-supervisor fit', *Personnel Psychology*, 58, 281-342.
- Lee, K., and Allen, N. J. (2002), 'Organizational citizenship behavior and workplace deviance: The role of affect and cognitions', *Journal of Applied Psychology*, 87, 131-142.
- Loehlin, J. C. (1992). *Latent variable models: An introduction to factor, path, and structural analyses*. Hillsdale, NJ: Erlbaum.
- Macey, W. H., and Schneider, B. (2008), 'The meaning of employee engagement', *Industrial and Organizational Psychology*, 1, 3-30.
- Maslach, C., and Leiter, M. P. (1997), *The truth about burnout*. San Francisco: Jossey-Bass.
- May, D. R., Gilson, R. L., and Harter, L. M. (2004), 'The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work', *Journal of Occupational and Organizational Psychology*, 77, 11-37.
- Maslach, C., Schaufelli, W. B., and Leiter, M. P. (2001), 'Job burnout', *Annual Review of Psychology*, 52, 397-422.

- Moliner, C., Martinez-Tur, V., Ramos, J., Peiro, J. M., and Cropanzano, R. (2008), 'Organizational justice and extrarole customer service: The mediating role of well-being at work', *European Journal of Work and Organizational Psychology*, 17, 327-348.
- Newman, D. A., and Harrison, D. A. (2008), 'Been there, bottled that: Are state and behavioral work engagement new and useful construct "wines"?'', *Industrial and Organizational Psychology*, 1, 31-35.
- Rhoades, L., and Eisenberger, R. (2001), 'Perceived organizational support: A review of the literature', *Journal of Applied Psychology*, 87, 698-714.
- Rhoades, L., Eisenberger, R., and Armeli, S. (2001), 'Affective commitment to the organization: The contribution of perceived organizational support', *Journal of Applied Psychology*, 86, 825-836.
- Richman, A. (2006), 'Everyone wants an engaged workforce, how can you create it?', *Workspan*, 49, 36-39.
- Robinson, D., Perryman, S., and Hayday, S. (2004), *The drivers of employee engagement*. Falmer, Brighton: Institute for Employment Studies.
- Rothbard, N. P. (2001), 'Enriching or depleting? The dynamics of engagement in work and family roles', *Administrative Science Quarterly*, 46, 655-684.
- Saks, A. M. (2006), 'Antecedents and consequences of employee engagement', *Journal of Managerial Psychology*, 21, 600-619.
- Saks, A. M., and Ashforth, B. E. (2002), 'Is job search related to employment quality? It all depends on the fit', *Journal of Applied Psychology*, 87, 646-654.



- Saks, A. M., and Gruman, J. A. (2011), 'Getting newcomers engaged: The role of socialization tactics', *Journal of Managerial Psychology*, 26, 383-402.
- Salanova, M., Agut, S., and Peiro, J. M. (2005), 'Linking organizational resources and work engagement to employee performance and customer loyalty: The mediation of service climate', *Journal of Applied Psychology*, 90, 1217-1227.
- Salanova, M., and Schaufeli, W. B. (2008), 'A cross-national study of work engagement as a mediator between job resources and proactive behavior', *International Journal of Human Resource Management*, 19, 116-131.
- Schaufeli, W. B., and Bakker, A. B. (2004), 'Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study', *Journal of Organizational Behavior*, 25, 293-315.
- Schaufeli, W. B., Bakker, A. B., and Salanova, M. (2006), 'The measurement of work engagement with a short questionnaire: A cross-national study', *Educational and Psychological Measurement*, 66, 701-716.
- Schaufeli, W. B., Salanova, M., Gonzalez-Roma, V., and Bakker, A. B. (2002), 'The measurement of engagement and burnout: A two sample confirmatory factor analytic approach', *Journal of Happiness Studies*, 3, 71-92.
- Sonnentag, S. (2003), 'Recovery, work engagement, and proactive behavior: A new look at the interface between nonwork and work', *Journal of Applied Psychology*, 88, 518-528.
- Sonnentag, S. (2011), 'Research on work engagement is well and alive', *European Journal of Work and Organizational Psychology*, 20, 29-38.

- Spector, P. E. (1987), 'Method variance as an artifact in self-reported affect and perceptions at work: Myth or significant problem?', *Journal of Applied Psychology*, 72, 438-443.
- Wellins, R. S., Bernthal, P., and Phelps, M. (n.d.), *Employee engagement: The key to realizing competitive advantage*. Downloaded 4 September 2008 from [http://www.ddiworld.com/pdf/ddi\\_employeeengagement\\_mg.pdf](http://www.ddiworld.com/pdf/ddi_employeeengagement_mg.pdf)
- Wright, T. A., Cropanzano, R., and Bonett, D. G. (2007), 'The moderating role of employee positive well being on the relationship between job satisfaction and job performance', *Journal of Occupational Health Psychology*, 12, 93-104.
- Xanthopoulou, D., Bakker, A. B., Demerouti, E., and Schaufeli, W. B. (2009), 'Work engagement and financial returns: A diary study on the role of job and personal resources', *Journal of Occupational and Organizational Psychology*, 82, 183-200.

Table 1. Means, standard deviations, reliabilities, and intercorrelations of the study variables.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Gender	1.63	0.49														
2 Age	21-30 <sup>§</sup>	1.02	-.06													
3 P-J fit	4.81	1.09	.01	.22*	.80											
4 P-O fit	4.68	1.33	-.07	.13	.62 <sup>#</sup>	.90										
5 Vigor	5.28	0.95	-.20*	.30 <sup>#</sup>	.62 <sup>#</sup>	.58 <sup>#</sup>	.81									
6 Absorption	4.80	1.16	-.02	.25 <sup>#</sup>	.44 <sup>#</sup>	.55 <sup>#</sup>	.51 <sup>#</sup>	.85								
7 Dedication	5.25	1.23	-.08	.20*	.62 <sup>#</sup>	.66 <sup>#</sup>	.68 <sup>#</sup>	.57 <sup>#</sup>	.89							
8 Cognitive	4.56	1.44	-.13	.16	.28 <sup>#</sup>	.38 <sup>#</sup>	.40 <sup>#</sup>	.40 <sup>#</sup>	.40 <sup>#</sup>	.77						
9 Emotional	5.47	1.00	.04	.14	.32 <sup>#</sup>	.36 <sup>#</sup>	.39 <sup>#</sup>	.50 <sup>#</sup>	.42 <sup>#</sup>	.23 <sup>#</sup>	.66					
10 Physical	5.06	1.04	.01	.15	.22*	.34 <sup>#</sup>	.26 <sup>#</sup>	.44 <sup>#</sup>	.28 <sup>#</sup>	.34 <sup>#</sup>	.37 <sup>#</sup>	.49				
11 Job Involvement	3.59	1.14	-.17	.06	.46 <sup>#</sup>	.61 <sup>#</sup>	.46 <sup>#</sup>	.57 <sup>#</sup>	.52 <sup>#</sup>	.28 <sup>#</sup>	.49 <sup>#</sup>	.32 <sup>#</sup>	.83			
12 Org. Commitment	4.20	1.29	-.06	.15	.37 <sup>#</sup>	.60 <sup>#</sup>	.48 <sup>#</sup>	.54 <sup>#</sup>	.52 <sup>#</sup>	.38 <sup>#</sup>	.42 <sup>#</sup>	.34 <sup>#</sup>	.52 <sup>#</sup>	.80		
13 Job Satisfaction	4.78	1.15	.04	.27 <sup>#</sup>	.49 <sup>#</sup>	.51 <sup>#</sup>	.56 <sup>#</sup>	.39 <sup>#</sup>	.62 <sup>#</sup>	.44 <sup>#</sup>	.32 <sup>#</sup>	.28 <sup>#</sup>	.34 <sup>#</sup>	.46 <sup>#</sup>	.74	
14 Intention to Stay	3.12	1.16	.12	.16	.35 <sup>#</sup>	.39 <sup>#</sup>	.31 <sup>#</sup>	.16	.44 <sup>#</sup>	.19*	.12	.20*	.18*	.41 <sup>#</sup>	.53 <sup>#</sup>	.73

Note. \*  $p < 0.05$ ; <sup>#</sup>  $p < 0.01$ ; internal reliabilities are on the diagonal; sex 1 = male, 2 = female; <sup>§</sup> modal category.

Table 2. Goodness-of-fit statistics for the UWES and May engagement scales

Model	$X^2$	$df$	$X^2/df$	$\Delta X^2$	$\Delta df$	$p$	RMSEA	CFI	TLI	$\Delta CFI$
Model 1: UWES	257.784*	132	1.953				.083	.905	.878	--
Model 2: May	74.587*	41	1.819				.077	.853	.764	--
Model 3: UWES & May 6 factors	632.184*	362	1.746				.074	.848	.817	--
Model 4: Vigor-Physical	661.752*	370	1.789	29.658 <sup>#</sup>	8	.013	.076	.836	.807	.012
Model 5: Absorption-Cognitive	640.981*	370	1.732	8.797	8	.360	.073	.847	.820	.001
Model 6: Dedication-Emotional	650.298*	370	1.758	18.114 <sup>#</sup>	8	.020	.074	.842	.814	.006

Note.  $N = 139$ . <sup>#</sup>  $p < .05$ , \*  $p \leq .001$ . Models 4-6 were compared directly against Model 3; in each case, the covariance between the two focal engagement constructs, and their covariances with each of the remaining four engagement constructs, were constrained to be equal.

Table 3. Goodness-of-fit statistics for the UWES and May scales with job involvement, organizational commitment, job satisfaction, and intent to stay.

Model	$X^2$	$df$	$X^2/df$	$\Delta X^2$	$\Delta df$	$p$	$\Delta CFI$
<b>UWES</b>							
Model 7: Job involvement	654.158*	349	1.874	21.181*	5	.001	.008
Model 8: Org. commitment	587.175*	251	2.339	23.446*	5	.000	.011
Model 9: Job satisfaction	475.417*	229	2.076	6.840	5	.233	.001
Model 10: Intention to stay	339.181*	188	1.804	14.022 <sup>#</sup>	5	.015	.005
<b>May</b>							
Model 11: Job involvement	345.852*	188	1.84	3.213	5	.667	.002
Model 12: Org. commitment	290.645*	118	2.463	14.474 <sup>#</sup>	5	.013	.015
Model 13: Job satisfaction	186.403*	103	1.810	6.427	5	.267	.003
Model 14: Intent to stay	117.493*	76	1.546	4.805	5	.440	.001

Note.  $N = 139$ . <sup>#</sup>  $p < .05$ , \*  $p < .001$ . Models 7-10 (UWES) and Models 11-14 (May) had the covariances between the three engagement factors and the fourth criterion construct were constrained to be equal; these were each compared against an equivalent model with no such constraints.

Table 4. Goodness-of-fit statistics for person-job and person-organization fit, age and gender.

Model	$X^2$	$df$	$X^2/df$	$\Delta X^2$	$\Delta df$	$p$	$\Delta CFI$	$R^2$	$R^2$	$R^2$
								<u>Vigor</u>	<u>Absorption</u>	<u>Dedication</u>
Model 15: All variables	591.192*	339	1.744					.706	.379	.719
Model 16: PJ & PO fit only	619.184*	345	1.795	27.993	6	.001	.010	.680	.380	.741
Model 17: age & gender only	836.546*	345	2.425	245.354	6	.000	.109	.155	.084	.065
								<u>Physical</u>	<u>Cognitive</u>	<u>Emotional</u>
Model 18: All variables	301.844*	178	1.696					.413	.135	.307
Model 19: PJ & PO fit only	322.332*	184	1.752	20.487	6	.002	.015	.329	.178	.290
Model 20: age & gender only	361.638*	184	1.965	59.794	6	.000	.056	.046	.007	.034

Note.  $N = 139$ . \*  $p \leq .001$ . Models 15 and 18 represent baseline models which include all paths from PE fit and demographic variables to the three different engagement factors for the UWES and May measure; these are compared against a model having PE fit paths only (Models 16 and 19 respectively), and against models having demographic paths only (Models 17 and 20 respectively).