

**Fluctuating Levels of Personal Role Engagement within the Working Day****ABSTRACT**

In this paper, we tested Kahn's (1990) proposition that levels of personal role engagement are influenced by fluctuating perceptions of meaningfulness, safety and availability through the working day. We hypothesized that meaningfulness, safety and availability perceptions would be directly associated with engagement and also that they would mediate the associations between specific job factors, notably job design and fit, social support, and personal and organizational resources, and engagement. A total of 124 participants each completed a quantitative work diary relating to the most and least engaging situations every day within six working days ( $n = 723$  occasions). Multilevel analysis of the findings showed that meaningfulness and availability, but not safety, may be important for boosts and drops in levels of engagement, and that job design, job fit and personal resources play an especially critical role. Organizational resources, co-worker support, and safety were not associated with fluctuations in the level of engagement.

**Keywords:**

Engagement; work context; psychological processes; within-day fluctuations

### **Fluctuating Levels of Personal Role Engagement within the Working Day**

'Engagement' refers to a positive, fulfilling work-related psychological state; it is "the harnessing of organization members' (preferred) selves to their work roles" (Kahn, 1990, p.694). However, engagement is not a static experience but rather one that fluctuates over time (Sonnentag, Dormann, & Demerouti, 2010). Situational and personal experiences can give rise to short-term boosts and drops in levels of engagement as individuals go about their daily work activities (Bakker, 2014; Bledlow, Schmitt, Frese, & Kuehnel, 2011).

However, the propositions developed by William Kahn (1990) in his seminal qualitative study concerning the influence of meaningfulness, safety and availability in determining individuals' moment-by-moment experiences of personal engagement within their work roles have hitherto remained untested. Although widely accredited with providing the cornerstone for the burgeoning literature on engagement (Christian, Garza, & Slaughter, 2011), Kahn's personal role engagement theory has only been the subject of a handful of studies (Chen, Zhang, & Vogel, 2011; May, Gilson, & Harter, 2004; Rich, LePine, & Crawford, 2010). These have all adopted a between-persons design and so have been unable to fully test the model's core propositions concerning the episodic and fluctuating experience of engagement. Given that one study has shown how within-person fluctuations can account for as much as 47% of the total variance in engagement levels (Bakker & Bal, 2010), there is considerable evidence that understanding more about the factors that influence individuals' engagement through the day is important to advancing knowledge in the field.

This present study addresses this gap and aims to move towards a contextually and temporally sensitive understanding of the antecedents of engagement. We make three contributions to the literature. First, we add to within-person studies that have focused on the antecedents of engagement by taking into account a wider range of factors based on personal role engagement theory (Kahn, 1990). Second, our study looks at the psychological processes

through which these work factors are associated with engagement within the day. Specifically, we extend prior research on the antecedents of engagement by comparing and contrasting individuals' experiences of their most and least engaging situations. Understanding these may help identify ways in which high levels of engagement can be facilitated, and prevent reductions in engagement from occurring. Third, we provide the first within-person empirical test of Kahn's (1990) propositions. We thus add to the previously sparse literature on personal role engagement, and seek to clarify the strengths and drawbacks of this theory to the future development of the engagement domain.

### **Engagement within the Working Day**

William Kahn (1990) argued that engagement varies during the day due to 'self-in-role calibrations', as the individual alternates between full expression and employment (i.e. engagement) and withdrawal (i.e. disengagement) of the self as they strive to maintain a balanced and fulfilling state of authenticity between themselves and their work role. Scholars have agreed that engagement is a transient experience (Sonnentag et al., 2010, p.26), and have distinguished between-person or 'enduring' engagement from within-person or 'situational' engagement (Bakker, 2014; Schaufeli & Salanova, 2011). An individual may have a relatively stable 'average' level of engagement, yet will likely fluctuate significantly around this level across brief periods of time. Support for this proposition is drawn from a number of diary studies based on job demands-resources (JD-R) theory (Sonnentag et al., 2010) that have established an association between a range of factors including social support (Xanthopoulou, Bakker, Heuven, Demerouti, & Schaufeli, 2008), leadership style (Tims, Bakker, & Xanthopoulou, 2011; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009), job resources (Breevaart, Bakker, & Demerouti, 2014) and personal resources such as self-efficacy and optimism (Xanthopoulou et al., 2008; 2009), and engagement at the between-person level.

However, few studies have explicitly examined engagement within the working day, and these have almost exclusively focused on affective processes (Bledow et al., 2011; Ouweneel Le Blanc, Schaufeli, & Van Wijhe, 2012). As Bakker (2014, p.8) highlights "further insights into the mechanisms that explain daily work engagement are needed" so that theoretical frameworks can be established or refined. This current study aims to shed light on the situational mechanisms proposed by Kahn's (1990) original personal role engagement theory, which have remained untested.

### **Hypothesis Development**

#### **Kahn's (1990) Psychological Conditions Framework.**

Kahn (1990, p.695) argued that engagement's antecedents are the "psychological experiences of rational and unconscious elements of work conditions". More specifically, an individual will assess whether they would engage at a particular moment in time based on the following questions: a) are they in a psychologically *safe* environment? b) do they have the *availability* to employ their preferred self? and c) would they find it personally *meaningful* to employ their preferred self? Empirical support has been found for the relationship between these three psychological conditions and general levels of engagement (May et al, 2004), but the relationship with situational engagement has not hitherto been examined.

#### **Psychological safety.**

Psychological safety involves the perception that one can take interpersonal risks, such as bringing up problems and asking for help, within the social work environment (Edmondson, 2004). Since engagement can be regarded as an important psychological state that underpins positive health and wellbeing (Bakker & Demerouti, 2008), it is likely that individuals will behave in ways that protect their engagement against loss by withdrawing themselves during situations that they perceive as psychologically unsafe, and investing more of themselves (i.e. engaging) during situations they perceive as non-threatening (Kahn, 1990).

Available evidence shows that psychological safety is associated with engagement at the general level (Chen et al., 2011; May et al., 2004). Thus, we predict that engagement will be higher during situations that allow the ability to voice true thoughts and feelings openly, and will be reduced during situations that involve a fear that negative consequences, such as ridicule or disrespect, could result from such self-expression (Kahn & Heaphy, 2013).

*Hypothesis 1a:* Psychological safety will be positively associated with situational engagement.

This ‘safety’ hypothesis stems largely from the social context, i.e. where the relations and interactions individuals have with co-workers and managers are based on trust, respect, and openness (Edmondson, 2004). According to social exchange theory (SET - Blau, 1964), employees participate with these other parties in an ongoing exchange of resources that occurs within a framework of rules and norms of reciprocity, such that when an employee receives resources from the other party they will feel obliged to repay in kind (Shore, Coyle-Shapiro, Chen, & Tetrick, 2009). If the employee receives socio-emotional resources from co-workers or line managers, such as receiving help and advice, they may feel obliged to repay the person by engaging more with their work. There is evidence to show that social support from co-workers and supervisors experienced during the day is related to higher levels of engagement (e.g. Xanthopoulou et al., 2008; 2009).

We predict that social support is related to engagement indirectly via psychological safety. Receiving social support from co-workers and managers signals to the individual that they are participating in a social exchange relationship that is based on mutual trust and respect (Shore et al., 2009), and is likely to signal to the individual that they are able to express their true self in that situation, which in turn enables them to engage (Kahn, 1990). Based on evidence supporting this process at the between-person level (May et al., 2004), we hypothesise that this will also occur at the within-person level.

*Hypothesis 1b:* Social support (specifically perceived supervisory and co-worker support) will be positively related to situational engagement.

*Hypothesis 1c:* Psychological safety will mediate the relationship between social support and situational engagement.

**Psychological availability.**

Psychological availability signifies is concerned with assessing an individual's confidence or readiness to be engaged in their work role, given other work and non-work roles (May et al., 2004). Individuals not only try to protect themselves against threats to their engagement, but also act in ways aimed at fostering higher levels of wellbeing (Gorgievski, Halbesleben, & Bakker, 2011). Therefore, situations where psychological availability is high will likely be associated with high levels of engagement, since the individual will feel comfortable that they can invest themselves in their work roles without the fear of being over-depleted and in anticipation of a higher sense of wellbeing. On the other hand, situations that engender low levels of psychological availability will likely be associated with low levels of engagement, as the individual will feel that the potential cost of engaging (i.e. depletion of finite resources) outweighs the potential benefit (i.e. increased wellbeing).

*Hypothesis 2a:* Psychological availability will be positively associated with situational engagement.

As psychological availability concerns the readiness to invest one's own resources to engage fully in one's work role (Kahn, 1990), it follows that the degree of personal resources that one has at one's disposal will be a key antecedent. Personal resources have been conceptualized as 'psychological capital' (Luthans, Avolio, Avey, & Norman, 2007) – a higher-order construct that includes optimism, hope, self-efficacy and resiliency, or as a specific aspect of emotional wellbeing and personal agency (May et al., 2004). Although

conceptualized primarily as individual differences, personal resources are also susceptible to change and flux due to being more or less activated by the work context (Ouweneel et al., 2012; Xanthopoulou et al., 2009). Indeed, studies show that such resources vary across and within days (Xanthopoulou et al., 2008; 2009). Therefore, situations which strengthen personal resources will be associated with higher levels of engagement, whereas situations that deplete one's personal resources will be associated with lower levels of engagement.

Psychological availability is also likely to vary according to degree to which the individual has adequate organizational resources, such as the right equipment/information (Crawford Rich, Buckman, & Bergeron, 2013). Meta-analyses (e.g. Crawford, LePine, & Rich, 2010) have found evidence that working under situational constraints is associated with low levels of engagement. Therefore, we propose that situations where organizational resources are not available and are not readily accessible will decrease engagement because the individual is having to use their own energies to deal with problems caused by the organizational environment (Zapf, 1993), whereas situations where such resources are easily accessible and available will increase engagement as individuals can concentrate on investing these resources into activities that enable productive work-role performances (Kahn, 1990).

*Hypothesis 2b:* Resources (specifically personal and organizational resources) will be positively related to situational engagement.

Conservation of resources theory (COR; Hobfoll, 1989) stipulates that decisions about when and how much to invest resources, both personal and organizational, into activities are crucial for the successful protection and fostering of wellbeing, such as engagement. Therefore, psychological availability acts as a mediator between organizational/personal resources and engagement because it signals to the employee whether investing resources into activities that facilitate engagement is possible and likely to be beneficial. Evidence shows

that this mediation process occurs at the between-person level (May et al., 2004) and so drawing on this we propose that this is also likely to occur at the within-person level.

*Hypothesis 2c:* Psychological availability will mediate the relationship between resources and situational engagement.

### **Psychological meaningfulness.**

Psychological meaningfulness implies that the individual must feel that their work role is “worthwhile, useful and valuable” (Kahn, 1990, p.703-4). It has long been positioned as a core motivational experience that is actively sought for by individuals (Rosso, Dekas, & Wrzesniewski, 2010). Meaningfulness is a component of Fredrickson's (2001) broaden-and-build process (B&B) because it generates interest in the wider work context which 'broadens' the potential expressions of engagement and 'builds' cognitive resources needed for sustained engagement (Soane et al., 2013). Therefore, situations within the day where the work tasks being conducted are viewed as personally valuable will generate higher levels of engagement. In contrast, a lack of meaningfulness is associated with feeling that an insignificant amount is asked or expected of one's self (Kahn & Heaphy, 2013), and so situations within the day where work tasks are viewed in such a way will reduce engagement during that time.

*Hypothesis 3a:* Meaningfulness will be positively associated with situational engagement.

Perceptions of the design and characteristics of one's job are particularly important to engagement via the process of experienced meaningfulness (Kahn, 1990; May et al., 2004). This is because, as highlighted by the JD-R model of engagement (Bakker & Demerouti, 2008), the characteristics of one's job act as motivational resources that help one to achieve work goals and foster personal growth. As no studies have examined the relationship between job design and engagement at a situational level, this current study will focus on two



characteristics when examining how job design may boost engagement within the working day: job variety/challenge and job clarity/purpose. These two characteristics have been chosen because it is likely that perceptions of these factors will change during the day depending on the nature, scope and range of tasks being conducted at any moment in time (Amabile & Kramer, 2011). Moreover, evidence shows that these two characteristics are more strongly associated with general level of engagement than other job design characteristics (Christian et al., 2011). Therefore, it could be argued that as these characteristics act as motivational resources (Bakker & Demerouti, 2008), engagement will be boosted when perceived levels of variety/challenge and clarity/purpose are high and reduced when such perceptions are low.

Job variety and challenge signify that the job holder has a wide range of work tasks to perform and indicates that some of those tasks will have utilized or stretched their skills and abilities (Hackman & Oldham, 1976). If an individual perceives their work as challenging and varied within the day then they are more likely to feel that their work serves to meet their intrinsic needs (Cohen-Meitar, Carmeli, & Waldman, 2009) and so they will feel that their tasks are meaningful, and will likely experience engagement because they feel "a sense of energetic connection with work activities" (Shantz, Alfes, Truss, & Soane, 2013, p.2611).

Job clarity and purpose refer to the extent of clarity over job tasks in terms of expectations; and the extent to which they are understood to have value to the organization (Sawyer, 1992). Emphasizing how work tasks contribute to the achievement of organizational aims is important to engagement as this instils a sense of pride for one's work, which strengthens the perceptions that one's work tasks, at the moment, are of significance and importance to the individual and the organization (Shantz et al., 2013).

We predict that meaningfulness will mediate the relationships between job design factors and engagement because such factors broaden the scope to find meaning in one's work, as personal growth and mastery are facilitated (Crawford et al., 2013) which, in turn,

enables a greater range of opportunities to engage in one's work role (Kahn, 1990). Indeed, Christian et al's (2011) meta-analysis found that job design characteristics associated with meaningfulness were most strongly associated with general levels of engagement.

*Hypothesis 3b:* Job design (specifically job variety/challenge and job clarity/purpose) will be positively related to situational engagement.

*Hypothesis 3c:* Meaningfulness will mediate the relationship between job design and situational engagement.

Another core component of personal role engagement theory (Kahn, 1990; May et al., 2004; Rich et al., 2010) is the perceived degree of 'fit' between what the job role offers to, and demands from, the employee. Two main aspects of fit are deemed important: a) where the job role supplies work tasks and opportunities that meet the employee's needs from a job, i.e. need-supply fit; b) where the job role demands appropriate levels of abilities and skills that the employee possesses and wants to utilize, i.e. demand-ability fit (Cable & DeRue, 2002). As individuals will be undertaking different tasks within the working day, it is likely that perceptions of fit will also vary in strength during the working day depending on which elements of their job roles are being performed. Situations that strengthen positive perceptions of fit send cognitive signals that personal investment of the self would likely yield a beneficial return, such as increased performance, and so the individual would be more willing to engage (Crawford et al., 2013). In contrast, situations that weaken perceptions of fit signify that such beneficial returns would be less likely and so the individual would be less willing to engage.

We predict that meaningfulness will mediate the relationship between job fit perceptions and engagement because when individuals feel a strong perceived fit between their personal needs/abilities and what the job role offers in terms of tasks and duties, they derive greater meaning from their work because they feel better able to express their values,

beliefs and creativity through their work tasks (Shamir, 1991). This increased ability to express such meaningful work attitudes and behaviours increases engagement as the individual can meet their needs for self-expression and authenticity (Kahn, 1990).

*Hypothesis 3d:* Job fit (specifically needs-supply and demand-ability fit) will be positively related to situational engagement.

*Hypothesis 3e:* Meaningfulness will mediate the relationship between job fit and situational engagement.

In sum, we propose that a) the psychological conditions of meaningfulness, availability and safety will be positively related to situational engagement; b) work contextual factors in the form of job design (variety/challenge and clarity/purpose), job fit (need-supply and demand-abilities fit), resources (organizational and personal), and social support (from co-workers and supervisors) will be positively associated with situational engagement; and c) the psychological conditions will mediate the relationships between the work contextual factors and situational engagement. This full model is illustrated in Figure 1.

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## **Method**

### **Procedure and Participants**

Six organizations participated in the study between January 2012 and August 2013. All were based in the UK and employed between 150 and 500 staff. A total of 151 participants across the six organizations were recruited onto the study, of whom 124 completed the work diary (i.e. 82% response rate). Age, gender, educational background, tenure, fulltime/part-time status, level of responsibility is summarised for the whole sample in Table 1.

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### **Quantitative Work Diaries**

An event-based quantitative diary was utilized because such diaries reduce the problem of retrospective recall, allow examination of phenomena as they occur in their natural context, and help uncover the mechanisms by which specific psychological states change over time (Bolger, Davies, & Rafaeli, 2003). Participants were asked to focus on two types of event that occurred during the day in question: a) where they felt the *most* positive about, focused on, and energised by their job (most engaging situation), b) where they felt the *least* positive about, focused on, and energised by their job (least engaging situation). Participants were randomly assigned to a work diary pack ordered either a) with the most engaging situation presented first, or b) with the least engaging situation presented first. The diary was conducted over a three to five week period in each research setting, with a total of six days sampled from each individual. The average length of duration for each individual was 19 days (range of 6 to 38 days, *SD* of 7 days). Multilevel modelling (Snijders & Bosker, 2012) was used to analyze the work diaries as the data was hierarchically clustered (i.e. days nested within individuals).

### **Measures**

All measures used a 7-pt Likert scale (1-strongly disagree to 7-strongly agree).

**Day-level positivity.** Studies have indicated that people experience good day/bad day effects (e.g. Sheldon, Ryan & Reis, 1996; Amabile and Kramer, 2011), which then shape how situations, within that day, are perceived. These 'day-level' perceptions may influence the way in which engagement-related situations within the day are interpreted. To control for 'day-level' effects participants were asked to rate four statements based on Amabile and Kramer's (2011) and Sheldon et al's (1996) findings: '*All things considered, I had a good day at work today*', '*All things considered, I had a bad day at work today*' (r), '*I achieved a great deal at work today*', '*I accomplished less than what I set out to achieve today*' (r). An exploratory factor analysis was conducted on the four day-level items for the first day's diary entry. A one

factor solution fitted the data the best:  $\chi^2(2) = 13.64, p = .001$ , RMSEA = 0.22, CFI = 0.93, SRMR = 0.07. A confirmatory factor analysis was then conducted using data from the second day's diary entries. The one-factor model was a reasonable fit:  $\chi^2(2) = 35.06, p < .001$ , RMSEA = 0.37, CFI = 0.90, SRMR = 0.07. Inter-item reliability for day-level positivity across measurement occasions ranged from  $\alpha = .71$  to  $.87$  (mean  $\alpha = .80$ ).

**Engagement.** Rich et al's (2010) job engagement scale captures the three dimensions of personal role engagement that Kahn (1990) proposed: emotional (e.g. *'I am enthusiastic about my job'*), cognitive (e.g. *'I focus a great deal of attention to my job'*), and physical (e.g. *'I exert my full effort to my job'*). The current study used a 12-item shortened version and items were modified to reflect a situational perspective as recommended by Zuckerman (1983), e.g. *'During that time, I was enthusiastic about my job'*. Inter-item reliability ranged from  $\alpha = .93$  to  $.96$  (mean  $\alpha = .94$ ). Although situational engagement in each of the respective situations was the dependent variable, it is also likely that cross-over effects between the different types of engaging situations will occur. This is because they are experienced within the same day by the same individual and so if one type of situation is experienced first then this may affect how the other type of situation is perceived. Therefore, engagement in one type of situation was controlled for when predicting engagement in the other type of situation.

**Safety.** Brown and Leigh's (1996) four item 'self expression' scale assesses the extent to which employees feel able to "infuse their personalities, creativity, feelings, and self-concepts into their work role" (p.360). The items were modified to reflect a situational perspective, e.g. *'During that time, I felt completely free to be myself'*. Inter-item reliability ranged from  $\alpha = .88$  to  $.95$  (mean  $\alpha = .91$ ).

**Availability.** May et al's (2004) five item 'psychological availability' scale specifically "assesses the readiness, or confidence, of a person to engage" (p.17). The items were modified

to reflect a situational perspective, e.g. *'During that time, I was confident in ability to deal with problems'*. Inter-item reliability ranged from  $\alpha = .81$  to  $.92$  (mean  $\alpha = .87$ ).

**Meaningfulness.** Spreitzer's (1995) three item 'meaning' scale captures "the value of a work goal or purpose, judged in relation an individual's own ideals or standards"(Thomas & Velthouse, 1990, p.672). The items were modified to reflect a situational perspective, e.g. *'The work I was doing during that time was very important to me'*. Inter-item reliability ranged from  $\alpha = .84$  to  $.96$  (mean  $\alpha = .92$ ).

**Job variety and challenge.** Cohen-Meitar et al's (2009) five item 'job challenge' scale adequately captures characteristics of task complexity and variety (Hackman & Oldham, 1976). The items were modified to reflect a situational perspective, e.g. *' The work I was doing at the time demanded that I use some complicated abilities'*. Inter-item reliability ranged from  $\alpha = .79$  to  $.87$  (mean  $\alpha = .84$ ).

**Job clarity and purpose.** Langford's (2009) three item 'role clarity' scale adequately captures aspects of having clear expectations as well as knowing the purpose or reason for carrying out tasks within the statements (Sawyer, 1992). The items were modified to reflect a situational perspective, e.g. *'I understood my goals and objectives and what was required of me during that time'*. Inter-item reliability ranged from  $\alpha = .63$  to  $.86$  (mean  $\alpha = .70$ ).

**Need-supply job fit.** Cable and DeRue's (2002) three item 'need-supply fit' scale was specifically developed to capture "judgments of congruence between employees' needs and the rewards they receive in return for their service and contribution on a job" (p.875). The items were modified to reflect a situational perspective, e.g. *'There was a good fit between what I was doing at the time and what I look for in a job'*. Inter-item reliability ranged from  $\alpha = .86$  to  $.93$ (mean  $\alpha = .89$ ).

**Demand-ability job fit.** Cable and DeRue's (2002) three item 'demand-ability fit' scale was specifically developed to capture "judgments of congruence between an employee's

skills and the demands of a job" (p.875). The items were modified to reflect a situational perspective, e.g. *'My abilities and training were a good fit with what was required from me at the time'*. Inter-item reliability ranged from  $\alpha = .86$  to  $.93$  (mean  $\alpha = .89$ ).

**Organizational resources.** Langford's (2009) three item 'resources' scale adequately assesses the accessibility of crucial equipment, information and resources needed to perform one's job role (Crawford et al., 2013), e.g. *'I have access to the right equipment and resources to do my job well'*. The items were easily modified to reflect a situational perspective, e.g. *'During that time I had access to the right equipment and resources to do my job well'*. Inter-item reliability ranged from  $\alpha = .66$  to  $.90$  (mean  $\alpha = .81$ ).

**Personal resources.** Langford's (2009) four item 'wellness' scale sufficiently captures the degree to which the respondent felt they had adequate personal resources to cope with work (Kahn, 1990), e.g. *'I feel in control and on top of things at work'*. The items were easily modified to reflect a situational perspective, e.g. *'I felt in control and on top of things during that time'*. Inter-item reliability ranged from  $\alpha = .77$  to  $.91$  (mean  $\alpha = .85$ ).

**Co-worker support.** Gillen, Baltz, Gassel, Kirsch and Vaccaro's (2002) 4 item 'co-worker support' scale examined a good range of socio-emotional support perceptions (Eisenbeger, Huntington, Hutchinson & Sowa, 1986), e.g. *'People I work with are helpful in getting the job done'*. The items were easily modified to reflect a situational perspective, e.g. *'During that time, my co-workers were helpful in getting the job done'*. Inter-item reliability ranged from  $\alpha = .86$  to  $.94$  (mean  $\alpha = .92$ ).

**Supervisory support.** Langford's (2009) four item 'supervision' scale assessed a good range of perceptions regarding socio-emotional support behaviours (Eisenberger et al., 1986), e.g. *'My manager listens to what I have to say'*. The items were easily modified to reflect a situational perspective, e.g. *'At the time, my manager listened to what I had to say'*. Inter-item reliability ranged from  $\alpha = .93$  to  $.96$  (mean  $\alpha = .95$ ).

## Results

### Multilevel Analyses

Multilevel modelling was conducted using MLwiN version 2.26 (Rashbash, Steele, Browne & Goldstein, 2012). As the data was sampled across several measurement occasions it was necessary to examine the effect of time and autocorrelation. Time was not significantly associated with either situation ( $\gamma = 0.00, p > .05$ ;  $\gamma = 0.04, p > .05$ ). Allowing random slopes of time did not improve model fit:  $\Delta-2 \cdot \log = 1.40, p > .05$ ;  $\Delta-2 \cdot \log = 0.00, p > .05$ . Therefore, random intercepts but not random slopes were used for time. The model was re-fitted using an autocorrelation structure of order 1 (AR1), but this did not improve model fit ( $\Delta-2 \cdot \log = 3.64, p > .05$ ;  $\Delta-2 \cdot \log = 0.84, p > .05$ ). Thus, AR1 models were not used, but time was included as a control variable. IGLS estimation was used due to the need to compare the fit of nested models and random intercept models were tested due to there being no underlying theoretical rationale for examining slope effects (Snijders & Bosker, 2012). The Monte Carlo Method for Assessing Mediation (MCMAM; Selig & Preacher, 2008) was used to test mediation effects. The completely standardized indirect effect size was calculated (Preacher & Kelley, 2011), i.e. situational engagement (DV) increases/decreases by  $x$  standard deviations for every one standard deviation increase in the predictor via the mediator. Furthermore, as recommended by Zhang, Zyphur and Preacher (2009), an adaptation to the three-step Baron and Kenny (1986) mediation approach was used. This entails using group-mean centred means for predictors and mediators as well as their corresponding group-level counterparts. This separates out 'transient' (or within-person) and 'typical' (or between-person) components of the predictors and mediators, respectively.

Figure 2 illustrates what these refer to in the present case. The 'typical' level reflects the individual's typical perceptions during the most, or the least, engaging situations (i.e. average score for the individual) whereas the 'transient' level refers to how much one's perceptions on



a specific day deviates from the person's 'typical' perceptions. When a 'typical' level of a predictor is positively related to situational engagement it refers to between-person differences, whereas when a 'transient' level of a predictor is positively related to situational engagement it refers to within-person differences, and as such means that higher levels of engagement will occur when the score for the predictor, on that particular day, is higher than one's typical level for situations where engagement is boosted or reduced.

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### **Descriptive Statistics**

To determine the amount of variance that is attributed to the different levels of analysis ( $N=723$  occasions;  $k=124$  individuals), the intraclass correlation for each of the first-level variables was calculated (Snijders & Bosker, 2012). These analyses found that 49.1% (most engaging) and 49.8% (least engaging) of variance in situational engagement was attributed to the between-persons level, thus there are significant proportions of variance left to be explained by within-person fluctuations, supporting the application of multilevel analysis. Means, standard deviations and correlations for all continuous variables are given in table 2 (most engaging situation) and 3 (least engaging situation). All hypothesised relationships were in the expected direction and were statistically significant.

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### **Measurement Models**

Confirmatory factor analyses (CFAs) were conducted using data from the first day's diary entries, and to verify the underlying theoretical constructs. The likelihood ratio  $\chi^2$  and

degrees of freedom were calculated. The following fit indices were also used to determine model fit more accurately: a) Root Mean Square Error of Approximation (RMSEA; Steiger, 1990) where values of .10 or below indicates a plausible fit; b) the Comparative Fit Index (CFI; Bentler, 1990), where a value of .90 or above indicates a plausible fit; c) the standardized Root Mean Square Residual (SRMR; Hu & Bentler, 1999) where values of .08 or below indicates a plausible fit. A model was determined to fit adequately if two of the three indices indicated a plausible fit.

First, the job engagement factor structure and the psychological conditions factor structure were tested. The three-dimensional (i.e. emotional, cognitive, physical) second-order factor structure for job engagement was a permissible fit for both situations:  $\chi^2(52) = 226.38$ ,  $p < .001$ , RMSEA = 0.16, CFI = 0.87, SRMR = 0.07;  $\chi^2(52) = 165.91$ ,  $p < .001$ , RMSEA = 0.13, CFI = 0.90, SRMR = 0.08, and these were a better fit than the one-factor alternatives:  $\Delta \chi^2(2) = 108.93$ ,  $p < .001$ ;  $\Delta \chi^2(2) = 282.89$ ,  $p < .001$ . The three psychological conditions of meaningfulness, availability and safety were found to be distinct factors for both situations:  $\chi^2(51) = 123.04$ ,  $p < .001$ , RMSEA = 0.11, CFI = 0.91, SRMR = 0.06;  $\chi^2(51) = 109.22$ ,  $p < .001$ , RMSEA = 0.10, CFI = 0.94, SRMR = 0.06; and these three-factor model were a better fit than the one-factor alternatives:  $\Delta \chi^2(3) = 271.21$ ,  $p < .001$ ;  $\Delta \chi^2(3) = 329.10$ ,  $p < .001$ . Furthermore, key aspects of the whole model were tested. Due to sample size restricting the amount of parameters, separate CFAs were conducted on specific models based on the study's underlying theoretical rationale. All CFAs were found to produce reasonable fitting models that were better than one-factor alternatives, thus indicating that the hypothesised model was viable. The results of these analyses are available from the corresponding author by request.

### **Test of Hypotheses**

Each set of multilevel analyses was conducted sequentially in four stages. The first stage (Model 0) was the null model, which had no predictors. The second stage (Model 1)

built from the null model by including predictors that were to be controlled for as the analysis progressed (i.e. time, day-level positivity, and engagement in the other engaging situation). The third stage built from Model 1 and examined the additive effects of the psychological conditions of meaningfulness, availability and safety (Model 2a - testing hypotheses 1a, 2a and 3a), and of the work condition variables (Model 2b - testing hypotheses 1b, 2b, 3b and 3d). The fourth stage built from Model 2b and examined the additive effects of meaningfulness (Model 3a - testing hypotheses 3c and 3e) and availability (Model 3b - testing hypothesis 2c) when the effects of the work condition variables were accounted for (safety was not examined as model 2a showed no significant effect of safety on situational engagement in either the most or the least engaging situations). Tables 4 (most engaging situation) and 5 (least engaging situation) shows the results of these models.

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 Insert Table 4 about here  
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#### **Model 1: Control variables.**

Model 1 was a better fit of the data than the null model for both situations ( $\Delta-2*\log = 282.66, p < .001$ ;  $\Delta-2*\log = 177.23, p < .001$ ), and so was used as a baseline model to compare models 2a and 2b against. Day-level positivity and engagement in the other type of situation were positively associated with situational engagement for the most and the least engaging situations; although time was not.

#### **Model 2a: Psychological conditions.**

Model 2a was a better fit of the data than Model 1 for both situations ( $\Delta-2*\log = 260.43, p < .001$ ;  $\Delta-2*\log = 170.74, p < .001$ ). For the most engaging situation, a significant positive effect of transient and typical meaningfulness ( $\gamma = .21, p < .001$ ;  $\gamma = .37, p < .001$ ), as well as

transient and typical availability ( $\gamma = .27, p < .001$ ;  $\gamma = .29, p < .001$ ) was found; however there was no significant effect of transient and typical psychological safety ( $\gamma = -.01, p > .05$ ;  $\gamma = .05, p > .05$ ). For the least engaging situation, the same pattern of effects was found: transient and typical meaningfulness ( $\gamma = .21, p < .001$ ;  $\gamma = .40, p < .001$ ), transient and typical availability ( $\gamma = .19, p < .001$ ;  $\gamma = .20, p < .01$ ), transient and typical psychological safety ( $\gamma = .00, p > .05$ ;  $\gamma = .09, p = .09$ ). These findings support hypotheses 2a and 3a (i.e. meaningfulness and availability related to engagement), but not 1a (i.e. safety related to engagement), and so only meaningfulness and availability were taken forward for mediation analyses. Hypothesis 1c was therefore not supported as safety could not be a potential mediator (Baron & Kenny, 1986).

**Model 2b: Work conditions.**

Model 2b was a better fit of the data than Model 1 for both situations ( $\Delta-2 * \log = 269.95, p < .001$ ;  $\Delta-2 * \log = 251.91, p < .001$ ).

For the most engaging situations, it showed significant positive effects of transient and typical job variety/challenge ( $\gamma = .15, p < .001$ ;  $\gamma = .21, p < .001$ ), transient and typical job clarity/purpose ( $\gamma = .10, p < .01$ ;  $\gamma = .20, p < .01$ ), transient demand-ability fit ( $\gamma = .08, p < .05$ ), transient and typical personal resources ( $\gamma = .17, p < .001$ ;  $\gamma = .17, p < .05$ ), and transient supervisory support ( $\gamma = .06, p > .01$ ). However, transient and typical need-supply fit ( $\gamma = .03, p > .05$ ;  $\gamma = .03, p > .05$ ), transient and typical organisational resources ( $\gamma = -.02, p > .05$ ;  $\gamma = .01, p > .05$ ), and transient and typical co-worker support ( $\gamma = -.01, p > .05$ ;  $\gamma = .09, p > .05$ ) were not significantly associated with boosts in engagement.

For the least engaging situations, positive effects of transient job variety/challenge ( $\gamma = .10, p < .01$ ), transient job clarity/purpose ( $\gamma = .18, p < .001$ ), transient and typical need-supply fit ( $\gamma = .15, p < .001$ ;  $\gamma = .16, p < .05$ ), as well as transient and typical personal resources ( $\gamma = .08, p < .05$ ;  $\gamma = .24, p < .001$ ) were found. However, typical demand-ability fit

( $\gamma = .21, p < .01$ ), but not transient demand-ability fit ( $\gamma = .01, p > .05$ ) was positively associated with the situational engagement in the least engaging situation. In addition, transient and typical organisational resources ( $\gamma = .01, p > .05$ ;  $\gamma = -.11, p = .08$ ), transient and typical supervisory support ( $\gamma = .06, p = .07$ ;  $\gamma = .08, p > .05$ ), as well as transient and typical co-worker support ( $\gamma = .04, p > .05$ ;  $\gamma = .06, p > .05$ ) were not significantly associated with such situational engagement.

Therefore, hypothesis 3b was fully supported as both job design characteristics were positively associated with situational engagement in both the most and the least engaging situations whereas hypothesis 1b and 1b were partially supported as only one type of social support (i.e. line management) and resource (i.e. personal) were significantly associated with engagement in both situations. Job fit perceptions seem to have an interesting effect: transient levels of demand-ability fit were involved in situations that boosted engagement whereas transient levels of needs-supply fit were involved in situations that depleted engagement. Therefore, hypothesis 3d was supported with a caveat that each type of job fit perception may have a specific function in relation to engagement.

### **Model 3a: Meaningfulness**

Before testing mediation effects, it was first necessary to ensure that meaningfulness was still significant when the work conditions variables were included. Model 3a was a better fit than Model 2b for both situations ( $\Delta-2*\log = 26.11, p < .001$ ;  $\Delta-2*\log = 10.82, p < .01$ ). Both transient and typical psychological meaningfulness were still positively related to situational engagement in the most engaging situation ( $\gamma = .10, p < .01$ ;  $\gamma = .23, p < .001$ ) as well as for the least engaging situation ( $\gamma = .06, p < .05$ ;  $\gamma = .19, p < .01$ ). The estimates for the job design and job fit variables were reduced (some to non-significance) when compared with the 2b models, thus indicating that meaningfulness may mediate these relationships.

### **Model 3b: Psychological availability.**

Before testing mediation effects, it was first necessary to ensure that psychological availability was still significant when the work conditions variables were included. Model 3b was a better fit than Model 2b for the most engaging situation ( $\Delta-2*\log = 21.23, p < .001$ ), but not for the least engaging situation ( $\Delta-2*\log = 2.54, p > .05$ ). Only transient psychological availability was still positively related to situational engagement in the most engaging situation ( $\gamma = .21, p < .001$ ). The estimates for transient and typical personal resources were reduced (to non-significance) when compared with model 2b, thus indicating that psychological availability may mediate these relationships for the most engaging situation. However, psychological availability may not be a mediator within the least engaging situation as the model was not a better fit than the work conditions model (2b), and the effects of transient and typical availability became non-significant (2a).

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 Insert Table 6 about here  
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### **Mediation Effects**

First, the relationships between significant predictors and significant mediators were analysed (see table 6). For the most engaging situation, transient and typical job variety/challenge, transient job clarity and purpose, and transient demand-ability fit were positively related to meaningfulness whereas transient and typical job clarity/purpose, and transient and typical personal resources were positively related to availability. Supervisory support was not significantly associated with either meaningfulness or availability, and so its positive relationship with boosts in engagement can be deemed a direct effect. For the least engaging situation, transient job variety/challenge, transient and typical need-supply fit, and typical personal resources were positively related to meaningfulness, whereas transient job clarity/purpose, typical demand-ability fit and transient personal resources were not.

Second, MCMAM tests (Selig & Preacher, 2008) were conducted for each of the above significant predictor – mediator relationships. MCMAM is a repeated simulation (20,000 repetitions) of  $a*b$ . In the case of no mediation  $a*b$  would be zero, i.e. mediation should be accepted if the 95 percent confidence interval of the indirect effect does not contain zero.

For the most engaging situation, the results (see table 7) show that transient as well as typical meaningfulness mediated the relationships between a) transient job variety/challenge and engagement ( $ab = .02$ ,  $ab = .06$ ), b) typical job variety/challenge and engagement ( $ab = .04$ ,  $ab = .09$ ), c) transient job clarity/purpose and engagement ( $ab = .02$ ,  $ab = .05$ ), and d) transient demands-ability fit and engagement ( $ab = .03$ ,  $ab = .07$ ). However neither transient nor typical meaningfulness mediated the relationship between typical job clarity/purpose and engagement. Transient psychological availability, mediated the relationship between transient as well as typical personal resources and engagement ( $ab = .13$ ;  $ab = .14$ ), as well as between transient as well as typical job clarity/purpose and engagement ( $ab = .04$ ;  $ab = .02$ ). The mediation tests were rerun with both meaningfulness and availability included. No major differences were found; the mediated relationships between transient job clarity/purpose and engagement via transient/typical meaningfulness and transient availability still held.

For the least engaging situation, the results (see table 7) show that transient as well as typical meaningfulness mediated the relationships between a) transient job variety/challenge and engagement ( $ab = .01$ ,  $ab = .06$ ), b) transient need-supply fit and engagement ( $ab = .03$ ,  $ab = .11$ ), and c) typical need-supply fit and engagement ( $ab = .03$ ,  $ab = .09$ ). However, neither transient nor typical meaningfulness mediated the relationship between typical personal resources and engagement.

Overall, these results find consistently strong support for hypothesis 3c and 3e as meaningfulness was a primary mediator in the relationships between job design as well as job fit factors and situational engagement. Psychological safety was not found to mediate any

relationships due to it not having a significant association with situational engagement, thus not supporting hypothesis 1c. Psychological availability was seen to be a mediator of the personal resource- situational engagement relationship in the most engaging situation only, thus partially supporting hypothesis 2c. However, its mediating potential in the least engaging situation may have been suppressed - see the following section. Although not hypothesised, availability was also a mediator, alongside meaningfulness, in the relationship between job clarity/purpose and engagement in the most engaging situations.

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 Insert Table 7 about here  
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#### **Multilevel Analyses without Control Variables**

Models 2a, 2b, 3a, and 3b were rerun without each of the control variables in turn. The only relationship that differed significantly was when the situational engagement score for the most engaging situation was not included in the analyses for the least engaging situation. The transient availability-situational engagement association for the least engaging situation within model 3b was found to be significant and positive ( $\gamma=.08, p < .05$ ) rather than non-significant ( $\gamma=.07, p > .05$ ). This model with availability included was a better fit than the previous model (with only work conditions as predictors):  $\Delta-2\chi^2 = 10.65, p < .01$ . Thus, transient availability was a potential mediator alongside meaningfulness for the least engaging situations. Mediation tests were conducted using the outputs from these models. All indirect relationships between predictors and situational engagement with meaningfulness as the mediator remained at a very similar level. Transient availability was found to mediate the relationship between transient job clarity/purpose and situational engagement ( $ab = .02$ , effect size = .02) and between transient as well as typical personal resources and situational engagement ( $ab = .06$ , effect size = .06;  $ab = .06$ , effect size = .06) for the least engaging situations. This suggests that there the most engaging situation may suppress the mediating



role of psychological availability in the least engaging situation. It lends support to hypothesis 2c by showing that psychological availability mediates the relationship between personal resources and situational engagement, and adds to the finding that it also plays a role in the job clarity/purpose-situational engagement relationship.

### **Discussion**

Drawing on Kahn (1990), we hypothesised that safety, availability and meaningfulness would be positively related to boosts and drops in engagement within the working day. Our findings showed that meaningfulness and availability, but not safety, were significantly associated with these fluctuations in engagement, reflecting the findings of between-person studies (e.g. May et al., 2004). Participants experienced boosts in engagement when they felt that their work tasks were meaningful, and when they felt psychologically able to engage. In contrast, engagement was decreased when the individual felt that their work tasks and activities lacked any notable worth or value and when their ability to engage was thwarted.

Contrary to Kahn (1990), we found that psychological safety may not be significant when levels of personal role engagement fluctuate within the working day. One possible explanation for this may be that perceptions of psychological safety change more gradually over time due to the formation and evolution of other pervasive features of the employee-employer relationship; such the psychological contract (Rousseau, 1995). Based on this rationale, it may be that psychological safety would not have a systematic influence on engagement within the working day. An alternative explanation may be that the other psychological conditions override and suppress the effect of psychological safety on engagement. It may be only in certain circumstances, such as if meaningfulness and availability are low, that safety becomes a salient condition for engagement.

Second, we hypothesised that four categories of work context factors are particularly associated with fluctuations in situational engagement: social support (Xanthopoulou et al.,

2008), resources (Bakker & Demerouti, 2008), job design (Hackman & Oldham, 1976), and job fit (Cable & DeRue, 2002). The findings showed consistent and strong support for the positive association between job design and job fit with situational engagement levels within the working day. However, only partial support was found for the positive effect of resources, and weak support was found for positive effect of social support.

Situational engagement was higher when tasks had clear aims and demonstrable outcomes and were varied and challenging; and was lower when tasks were routine, mundane, ambiguous or lacked purpose. These findings build on prior studies that have found positive associations between job design and job fit factors in relation to general levels of engagement (e.g. May et al., 2004; Shantz et al., 2013), and lend support to the theoretical propositions that job design characteristics act as motivational resources (Bakker & Demerouti, 2008), and that positive job fit perceptions demonstrate to the individual that engaging in their work role is likely to be a rewarding and valued experience (Kahn, 1990).

However, our study also suggests that the two types of job fit perceptions may have differential effects on engagement. High levels of demands-ability fit were more involved when engagement was boosted, whereas a lack of needs-supply fit was more involved when engagement was reduced within the day. Demands-ability fit may represent a motivational factor that acts to enhance engagement, whereas needs-supply fit may represent a hygiene factor that depletes engagement if a certain threshold level is not met (Herzberg, 1987).

In support of prior studies that find a positive association between personal resources and engagement at the between-person level, we found a strong positive association between personal resources and situational engagement (Ouweneel et al., 2012; Xanthopoulou et al., 2008; 2009). This corroborates Kahn's (1990) as well as Bakker and Demerouti's (2008) theoretical arguments that personal resources act to help protect and enhance wellbeing.

The lack of a significant association between organizational resources and engagement seems to run counter to earlier studies (Crawford et al., 2013). However, it may be that simply having adequate and satisfactory levels of resources in the work environment may not influence engagement, rather, it may be how resources are utilized by the individual that is important. This connects with personal agency theories of motivation and behaviour, which suggest that individuals actively and intentionally interact with their environment in order to influence and alter it (Bandura, 2006). It may be that engagement is only affected by organizational resources when those resources are intentionally being utilized by the individual, or where the individual is interacting, in an active way, with those resources.

Contrary to expectations, there was no evidence that co-worker support was positively associated with fluctuating levels of personal role engagement within the day, and line managers seemed to exert just a small, marginally positive effect (this being stronger in the most engaging situations than the least). Prior studies have found that social support from co-workers and line managers is positively associated with day-level engagement (e.g. Xanthopoulou et al, 2008; 2009). A possible explanation is that there may be boundary conditions that restrict the impact of social support at the situational level. Another may be that, when considered alongside other contextual factors, co-worker support does not have any additional influence as these other factors overpower the effects of social support.

Lastly, we hypothesised that safety would mediate the relations between social support and situational engagement, availability would mediate the relations between resources and situational engagement, and meaningfulness would mediate the relations between job design as well as job fit and situational engagement. The findings showed consistently strong support for the proposition that meaningfulness mediated the relations between job design as well as job fit perceptions and situational engagement, partial support for the mediating role of availability, and no support for the mediating role of safety. More specifically,

meaningfulness mediated the relationship between job variety/challenge and situational engagement as well as between job fit perceptions and situational engagement, and psychological availability mediated the relationship between personal resources and situational engagement. This extends May et al's between-person study (2004) which found that meaningfulness mediated the relationships between job design as well as job fit and engagement, and availability mediated the relationship between resources and engagement.

The relationship between job clarity/purpose and situational engagement seemed to be mediated by both meaningfulness and availability in the most engaging situations, yet only by availability in the least. This may be because job clarity and purpose connect the individual with the wider meaning and value of their work tasks/activities (i.e. enhances meaningfulness) as well as providing crucial information about the demands and expectations of those tasks that reduces uncertainty (i.e. strengthens availability).

We also found that the most engaging situation suppressed the mediating role of psychological availability in the least engaging situation. This may be an important cross-over effect that should be considered when developing engagement theory. Engagement research has started to uncover other cross-over effects such as between co-workers (Bakker & Xanthopoulou, 2009) and between negative and positive events (Bledow et al., 2011). This current study adds to this by highlighting that the positive uplift effects of high engagement may have wider impacts that help buffer against situations that deplete engagement.

### **Limitations and Areas for Future Research**

Even though the study used a multilevel methodology and verified the factor structures to test for common method bias, there remains the issue of cross-sectionality (Maxwell & Cole, 2007). Longitudinal studies are needed to explore how work conditions, psychological conditions, and engagement are causally and dynamically related within and across working days. Related to this, in our study the time and duration of the events were not assessed and so

further investigation of such effects was limited. Future research could capture more details regarding the temporal aspects of the events and benefit from utilising an experience-sampling method (Bolger et al., 2003).

Due to the lack of quantitative studies that focus on within-person fluctuations in work experiences, all of the scales used in the study were derived from between-person, cross-sectional studies and were modified to reflect the situation in question. Although this is common practice, using modified between-persons scales may not be the most accurate way of assessing situational perceptions (Sonnentag et al., 2010). Future research should consider how to assess these perceptions more accurately by developing new measures.

Lastly, researchers may want to explore meaningfulness and its relationship with engagement in more depth by applying Pratt and Ashforth's (2003) distinction between meaningfulness *in* work and meaningfulness *at* work. Currently only meaningfulness in work has been examined; however Saks (2011, p.328) argues that both should be investigated as ignoring meaningfulness at work "limits the extent and degree to which an employee can become and stay engaged at work". In addition, the finding that psychological safety was not significantly associated with situational engagement was unexpected. Further research that seeks to identify the boundary conditions of the safety-engagement relationship is warranted.

### **Practical Implications and Conclusion**

Organizations should examine the way in which job roles are designed at the day-level, and how the individuals who occupy those roles perceive their daily tasks and responsibilities. More specifically, the workday should be designed in a way that provides a variety of work activities that have clear and purposeful aims (Hackman & Oldham, 1976). Line managers should regularly discuss with their direct reports the tasks and responsibilities that most align with the individual's abilities and needs, especially when managing the performance and future role/career development of that individual (Cable & DeRue, 2002). Organizations

should enable their employees to regulate their engagement during the day by ensuring that employees are able to protect, build and utilize their personal resources (Hobfoll, 2011).

This study was the first to test Kahn's (1990) personal role engagement theory within the working day by examining specific situations where engagement was boosted and where it was reduced within the day. The findings of this study indicate that meaningfulness and availability are core psychological processes through which the work context influences engagement at a situational level. These are significant theoretical contributions because they affirm the role of two of Kahn's (1990) psychological conditions as important to the development of engagement theory, yet suggest that the role of psychological safety may need to be reconsidered. Moreover, personal role engagement theory may also need to give closer attention to how different situations impact on each other within the day. This study indicates that focusing on the application of B&B (Fredrickson, 2001) and COR (Hobfoll, 1989; 2011) theories would be particularly beneficial for understanding how engagement functions.

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Figure 1. Conceptual model linking work conditions and psychological conditions to boosts in engagement

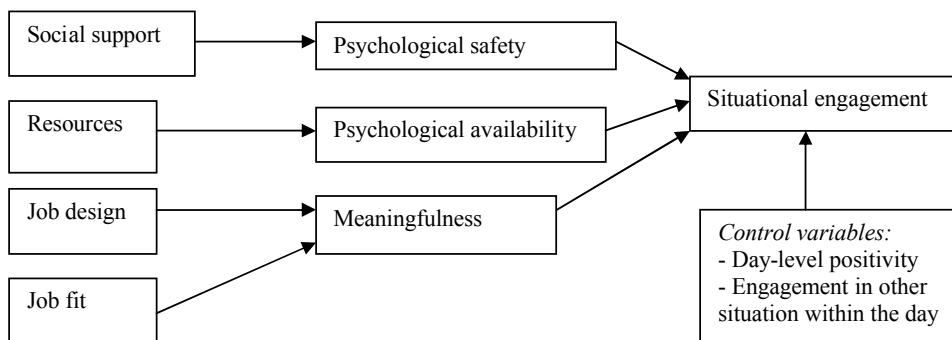


Figure 2. Illustration of transient and typical levels for most engaging situation

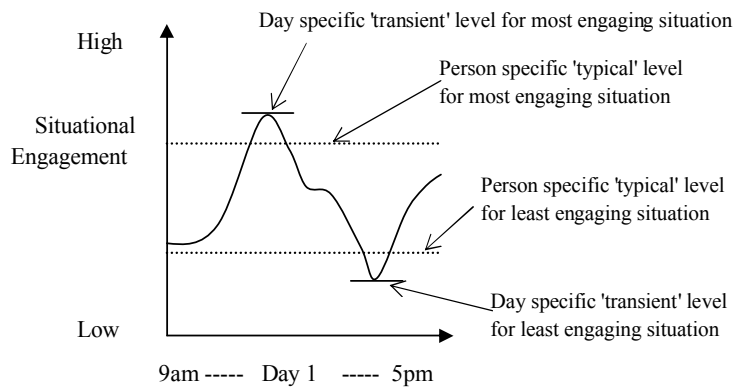


Table 1. Sample characteristics

Sample size	Male	Age (in yrs) (Mean: SD)	Higher education	Tenure (in yrs) (Mean: SD)	Managers	Fulltime
124	40%	39.3 : 11.4	36%	9.1: 7.9	42%	80%

Table 2. Means, standard deviations and zero-order correlations of continuous variables for the most engaging situation

Variable	Mean <sup>a</sup>	SD <sup>a</sup>	Mean <sup>b</sup>	SD <sup>b</sup>	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Day-level positivity	5.01	0.74	5.00	1.19	-	.32	.41	.35	.32	.50	.36	.26	.31	.37	.44	.31	.52
2. Job variety/challenge	4.71	0.87	4.71	1.25	.45	-	.30	.70	.69	.26	.18	.25	.23	.68	.28	.16	.60
3. Job clarity/purpose	5.79	0.62	5.79	0.80	.53	.45	-	.42	.45	.50	.50	.31	.37	.47	.55	.42	.52
4. Need-supply fit	4.71	1.04	4.71	1.36	.44	.75	.51	-	.79	.37	.34	.30	.29	.74	.34	.26	.60
5. Demand-ability fit	5.27	0.94	5.27	1.24	.38	.74	.53	.82	-	.36	.33	.22	.27	.71	.36	.23	.61
6. Personal resources	5.73	0.62	5.73	0.94	.56	.37	.64	.39	.39	-	.51	.37	.41	.40	.82	.52	.52
7. Organisational resources	5.41	0.74	5.41	1.03	.48	.23	.59	.37	.37	.68	-	.33	.36	.33	.48	.38	.37
8. Supervisory support	5.11	0.92	5.11	1.21	.42	.27	.47	.36	.29	.47	.51	-	.49	.27	.35	.24	.36
9. Co-worker support	5.28	0.69	5.29	0.99	.43	.29	.54	.36	.34	.49	.45	.59	-	.30	.41	.25	.38
10. Meaningfulness	5.13	0.98	5.13	1.30	.50	.77	.55	.76	.75	.47	.38	.31	.39	-	.37	.22	.67
11. Availability	5.92	0.52	5.92	0.79	.49	.35	.70	.34	.38	.88	.64	.47	.52	.41	-	.55	.55
12. Safety	5.37	0.79	5.36	1.13	.46	.23	.55	.30	.28	.55	.47	.32	.25	.25	.62	-	.34
13. Situational engagement	5.68	0.71	5.70	0.88	.59	.72	.65	.69	.71	.60	.47	.41	.50	.80	.60	.43	-

Note: Above diagonal are day-level correlations ( $p < .05$  +/-.  $.08$ ,  $p < .01$  +/-.  $.10$ ,  $p < .001$  +/-.  $.13$ ) where situational variables are not centred. Below diagonal are person-level correlations ( $p < .05$  +/-.  $.18$ ,  $p < .01$  +/-.  $.23$ ,  $p < .001$  +/-.  $.28$ ). To attain values for the situational variables at the person-level, the scores were aggregated (i.e. averaged) on participant and so represent the person-centred means for each situational variable.

<sup>a</sup>means and standard deviations at the person-level, <sup>b</sup>means and standard deviations at the day-level

Table 3. Means, standard deviations and zero-order correlations of continuous variables for the least engaging situation

Variable	Mean <sup>a</sup>	SD <sup>a</sup>	Mean □	SD □	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Day-level positivity	5.01	0.74	5.00	1.19	-	.19	.32	.31	.23	.43	.31	.27	.24	.30	.39	.32	.39
2. Job variety/challenge	4.05	1.01	4.06	1.37	.34	-	.22	.69	.70	.04	.11	.25	.23	.68	.03	.12	.52
3. Job clarity/purpose	5.36	0.75	5.36	1.02	.45	.33	-	.36	.41	.42	.47	.37	.29	.40	.48	.33	.47
4. Need-supply fit	3.65	1.13	3.66	1.46	.42	.76	.43	-	.77	.32	.34	.34	.32	.73	.27	.29	.62
5. Demand-ability fit	4.52	1.06	4.54	1.42	.33	.80	.48	.83	-	.24	.32	.30	.29	.67	.24	.20	.59
6. Personal resources	4.76	0.98	4.77	1.31	.47	.15	.49	.36	.29	-	.56	.43	.36	.27	.81	.56	.41
7. Organisational resources	4.89	0.90	4.90	1.27	.44	.20	.55	.43	.43	.71	-	.41	.30	.27	.49	.39	.35
8. Supervisory support	4.82	1.05	4.83	1.31	.42	.33	.50	.48	.43	.60	.58	-	.45	.30	.35	.30	.43
9. Co-worker support	4.87	0.77	4.88	1.11	.32	.32	.41	.42	.44	.46	.40	.53	-	.28	.32	.32	.38
10. Meaningfulness	4.30	1.12	4.32	1.47	.47	.78	.55	.79	.76	.36	.40	.44	.40	-	.21	.24	.62
11. Availability	5.24	0.74	5.24	1.08	.45	.11	.55	.29	.25	.90	.64	.53	.45	.33	-	.53	.39
12. Safety	4.55	0.97	4.55	1.32	.40	.27	.42	.39	.30	.64	.54	.43	.37	.36	.63	-	.33
13. Situational engagement	4.77	0.82	4.78	1.08	.48	.67	.56	.74	.75	.50	.47	.57	.51	.79	.47	.47	-

Note: Above diagonal are day-level correlations ( $p < .05$  +/-.08 ;  $p < .01$  +/-.10 ;  $p < .001$  +/-.13) where situational variables are not centred. Below diagonal are person-level correlations ( $p < .05$  +/-.18 ;  $p < .01$  +/-.23 ;  $p < .001$  +/-.28). To attain values for the situational variables at the person-level, the scores were aggregated (i.e. averaged) on participant and so represent the person-centred means for each situational variable

<sup>a</sup>means and standard deviations at the person-level, □ means and standard deviations at the day-level

Table 4. Multilevel models for the most engaging situation with situational engagement as dependent variable

Parameter	Null Model			Model 1			Model 2a			Model 2b			Model 3a			Model 3b			
	Est.	SE	$\gamma$	Est.	SE	$\gamma$	Est.	SE	$\gamma$	Est.	SE	$\gamma$	Est.	SE	$\gamma$	Est.	SE	$\gamma$	
Intercept	5.69	0.06	94.88***	2.19	0.31	7.17***	0.07	0.34	2.17*	0.52	0.33	1.56	0.75	0.32	2.37*	0.30	0.36	0.82	
Time (Day)				0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.50	-0.00	0.00	0.50	0.00	0.00	0.00	
<b>Transient Aspects</b>																			
Day-level positivity				0.25	0.02	10.65**	0.13	0.02	6.38***	0.12	0.02	5.50***	0.12	0.02	5.45***	0.12	0.02	5.45***	
Engagement in least engaging situation				0.19	0.03	6.43***	0.16	0.03	6.00***	0.16	0.03	6.12***	0.16	0.03	6.23***	0.14	0.03	5.46***	
Job variety/challenge										0.15	0.03	5.56***	0.13	0.03	4.75***	0.14	0.03	5.30***	
Job clarity/purpose										0.10	0.04	2.67**	0.08	0.04	1.93†	0.08	0.04	2.03*	
Need-supply fit										0.03	0.03	0.79	-0.01	0.04	0.17	0.03	0.03	0.85	
Demand-ability fit										0.08	0.03	2.24*	0.06	0.03	1.64	0.07	0.03	2.06*	
Personal resources										0.17	0.03	5.50***	0.16	0.03	5.27***	0.04	0.04	1.10	
Org. resources										-0.02	0.03	0.67	-0.02	0.03	0.63	-0.02	0.03	0.70	
Supervisory support										0.06	0.02	2.63**	0.06	0.02	2.54*	0.06	0.02	2.58**	
Co-worker support										-0.01	0.03	0.52	-0.01	0.03	0.52	-0.02	0.03	0.69	
Meaningfulness				0.21	0.02	9.55***	0.27	0.04	7.00***				0.10	0.03	3.17**	0.21	0.05	4.45***	
Availability				-0.01	0.03	0.24													
Safety																			
<b>Typical Aspects</b>																			
Day-level positivity				0.31	0.06	4.92***	0.09	0.05	1.73†	0.09	0.06	1.71†	0.08	0.05	1.48	0.10	0.06	1.89†	
Engagement in least engaging situation				0.41	0.06	7.18***	0.14	0.05	2.94**	0.16	0.06	2.72**	0.12	0.05	2.15*	0.15	0.06	2.61**	
Job variety/challenge										0.21	0.06	3.54***	0.12	0.06	1.92†	0.20	0.06	3.44***	
Job clarity/purpose										0.20	0.08	2.58**	0.17	0.07	2.31*	0.16	0.08	1.93	
Need-supply fit										0.03	0.06	0.57	-0.02	0.05	0.35	0.05	0.06	0.84	
Demand-ability fit										0.09	0.07	1.40	0.07	0.06	1.05	0.09	0.07	1.37	
Personal resources										0.17	0.08	2.12*	0.14	0.07	2.00*	0.05	0.11	0.46	
Org. resources										0.01	0.06	0.16	0.00	0.06	0.02	0.00	0.06	0.06	
Supervisory support										-0.05	0.05	1.02	-0.02	0.04	0.50	-0.05	0.05	1.00	
Co-worker support										0.09	0.06	1.37	0.07	0.06	1.15	0.07	0.06	1.19	
Meaningfulness													0.23	0.06	4.20***				
Availability										0.37	0.04	8.90***				0.19	0.13	1.40	
Safety										0.29	0.08	3.70***							
Level 2 / 1 variance	0.38	0.39		0.16	0.29		0.07	0.22		0.08	0.21		0.06	0.20		0.08	0.20		
$-2*\log/\Delta -2*\log$	1611.17			1328.51 / 282.66***			1068.08 / 260.43***			1058.56 / 269.95***			1032.44 / 26.11***			1037.33 / 21.23***			

Note: †  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 5. Multilevel models for the least engaging situation with situational engagement as dependent variable

Parameter	Null Model			Model 1			Model 2a			Model 2b			Model 3a:			Model 3b			
	Est.	SE	$\gamma$	Est.	SE	$\gamma$	Est.	SE	$\gamma$	Est.	SE	$\gamma$	Est.	SE	$\gamma$	Est.	SE	$\gamma$	
Intercept	4.78	0.07	64.53***	-0.17	0.49	0.36	-0.07	0.42	0.16	-0.37	0.36	1.02	0.00	0.37	0.00	-0.49	0.40	1.23	
Time (Day)				0.00	0.00	1.33	0.00	0.00	0.67	0.00	0.00	0.33	0.00	0.00	0.00	0.33	0.00	0.33	
<b>Transient Aspects</b>																			
Day-level positivity				0.14	0.03	4.31***	0.08	0.03	2.71**	0.06	0.03	1.97*	0.06	0.03	1.97*	0.06	0.03	1.97*	
Engagement in most engaging situation				0.33	0.05	6.33***	0.22	0.05	4.53***	0.23	0.05	4.91***	0.22	0.05	4.68***	0.23	0.05	4.79***	
Job variety/challenge										0.10	0.04	2.94**	0.09	0.04	2.50*	0.11	0.04	3.09**	
Job clarity/purpose										0.18	0.04	4.49***	0.17	0.04	4.38***	0.16	0.04	4.05***	
Need-supply fit										0.15	0.04	3.79***	0.13	0.04	3.00**	0.15	0.04	3.72***	
Demand-ability fit										0.01	0.04	0.14	0.00	0.04	0.03	0.00	0.04	0.05	
Personal resources										0.08	0.03	2.35*	0.08	0.03	2.35*	0.04	0.03	1.05	
Org. resources										0.01	0.03	0.17	0.01	0.03	0.2	0.00	0.03	0.14	
Supervisory support										0.06	0.03	1.81†	0.06	0.03	1.84†	0.06	0.03	1.84†	
Co-worker support										0.04	0.03	1.22	0.04	0.03	1.22	0.04	0.03	1.19	
Meaningfulness													0.06	0.03	2.00*				
Availability										0.21	0.03	7.81***				0.07	0.05	1.44	
Safety										0.19	0.04	5.14***							
										0.00	0.03	0.07							
<b>Typical Aspects</b>																			
Day-level positivity				0.15	0.09	1.65	-0.07	0.07	0.96	-0.07	0.07	1.09	-0.07	0.06	1.05	-0.07	0.07	1.09	
Engagement in most engaging situation				0.73	0.10	7.20***	0.35	0.09	4.02***	0.41	0.08	5.16***	0.35	0.08	4.31***	0.41	0.08	5.22***	
Job variety/challenge										0.05	0.07	0.67	-0.03	0.07	0.47	0.05	0.07	0.70	
Job clarity/purpose										0.05	0.07	0.71	0.01	0.07	0.08	0.03	0.07	0.48	
Need-supply fit										0.16	0.06	2.46*	0.10	0.06	1.48	0.16	0.06	2.51*	
Demand-ability fit										0.21	0.07	2.78**	0.20	0.07	2.82**	0.21	0.07	2.80**	
Personal resources										0.24	0.06	4.07***	0.21	0.06	3.63***	0.21	0.07	1.91†	
Org. resources										-0.11	0.06	1.78†	-0.11	0.06	1.75†	-0.11	0.06	1.75†	
Supervisory support										0.08	0.05	1.53	0.08	0.05	1.79†	0.08	0.05	1.59	
Co-worker support										0.06	0.06	0.95	0.06	0.06	1.11	0.05	0.06	0.88	
Meaningfulness													0.19	0.07	2.89**				
Availability										0.40	0.05	8.29***				0.08	0.12	0.70	
Safety										0.20	0.07	2.81**							
Level 2 / 1 variance	0.58	0.58		0.49	0.29		0.42	0.12		0.39	0.09		0.39	0.08		0.39	0.09		
$-2*\log/\Delta -2*\log$	1896.23			1718.97/177.23***			1548.23 / 170.74***			1467.06 / 251.91***			1456.25/ 10.82**			1464.52/ 2.54			

Note: †  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 6. Multilevel models predicting mediators for the most and the least engaging situations

Parameter	Most Engaging Situation				Least Engaging Situation				
	Predicting Meaningfulness		Predicting Availability		Predicting Meaningfulness		Predicting Availability		
	Est	SE	$\gamma$	Est	SE	$\gamma$	Est	SE	
Intercept	-1.03	0.51	2.04*	1.17	0.22	5.34***	-2.03	0.49	
Time (Day)	0.00	0.00	1.33	-0.01	0.00	3.00**	0.01	0.00	
<b>Transient Aspects</b>									
Day-level positivity	0.01	0.03	0.24	0.01	0.02	0.37	-0.02	0.04	
Engagement in other engaging situation	-0.02	0.04	0.69	0.08	0.02	3.73***	0.19	0.06	
Job variety/challenge	0.18	0.04	4.97***	0.04	0.02	1.52	0.24	0.04	
Job clarity/purpose	0.23	0.05	4.37***	0.12	0.03	3.61***	0.07	0.05	
Need-supply fit	0.34	0.04	7.75***	-0.01	0.03	0.39	0.41	0.05	
Demand-ability fit	0.21	0.05	4.73***	0.03	0.03	1.07	0.10	0.05	
Personal resources	0.07	0.04	1.80	0.58	0.03	22.19***	0.01	0.04	
Organisational resources	-0.01	0.04	0.17	0.01	0.02	0.22	-0.03	0.04	
Supervisory support	0.03	0.03	0.84	0.01	0.02	0.35	-0.02	0.04	
Co-worker support	0.01	0.04	0.14	0.02	0.02	0.96	-0.00	0.04	
<b>Typical Aspects</b>									
Day-level positivity	0.07	0.09	0.86	-0.05	0.04	1.46	-0.03	0.09	
Engagement in other engaging situation	0.17	0.09	1.93	0.03	0.04	0.84	0.37	0.11	
Job variety/challenge	0.40	0.09	4.35***	0.03	0.04	0.82	0.41	0.09	
Job clarity/purpose	0.13	0.12	1.12	0.21	0.05	4.28***	0.22	0.09	
Need-supply fit	0.22	0.09	2.56**	-0.09	0.04	2.35*	0.33	0.08	
Demand-ability fit	0.12	0.10	1.17	0.01	0.05	0.22	0.02	0.10	
Personal resources	0.11	0.12	0.89	0.61	0.05	11.86***	0.16	0.08	
Organisational resources	0.04	0.10	0.43	0.03	0.04	0.73	-0.03	0.09	
Supervisory support	-0.11	0.07	1.61	-0.01	0.03	0.29	-0.05	0.07	
Co-worker support	0.08	0.10	0.81	0.06	0.04	1.41	-0.04	0.08	
Level 2 / 1 variance	0.20	0.37		0.02	0.15		0.56	0.18	
-2*log		1504.37			762.74		1764.07		

Note: †  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 7. MCMAM tests on the indirect relationships between work condition variables and engagement via the significant psychological conditions

Predictor	a	SE	b	SE	a*b	LB	UB	c'	SE	c	Effect Size	
<b>Most engaging situations</b>												
<b>Transient meaningfulness as mediator</b>												
Transient job variety/challenge	0.18	0.04	0.10	0.03	0.02	0.01	0.03	0.13	0.03	0.15	0.02	
Typical job variety/challenge	0.40	0.09	0.10	0.03	0.04	0.01	0.07	0.12	0.06	0.16	0.04	
Transient job clarity/purpose	0.23	0.05	0.10	0.03	0.02	0.01	0.04	0.08	0.04	0.10	0.02	
Typical job clarity/purpose	0.13	0.12	0.10	0.03	0.01	-0.01	0.04	0.17	0.07	0.18	n/a	
Transient demand-ability fit	0.21	0.05	0.10	0.03	0.02	0.01	0.04	0.06	0.03	0.08	0.03	
<b>Typical meaningfulness as mediator</b>												
Transient job variety/challenge	0.18	0.04	0.23	0.06	0.04	0.02	0.07	0.13	0.03	0.17	0.06	
Typical job variety/challenge	0.40	0.09	0.23	0.06	0.09	0.04	0.16	0.12	0.06	0.21	0.09	
Transient job clarity/purpose	0.23	0.05	0.23	0.06	0.05	0.02	0.09	0.08	0.04	0.13	0.05	
Typical job clarity/purpose	0.13	0.12	0.23	0.06	0.03	-0.02	0.09	0.17	0.07	0.20	n/a	
Transient demand-ability fit	0.21	0.05	0.23	0.06	0.05	0.02	0.08	0.06	0.03	0.11	0.07	
<b>Transient availability as mediator</b>												
Transient job clarity/purpose	0.12	0.03	0.21	0.05	0.02	0.01	0.05	0.08	0.04	0.10	0.02	
Typical job clarity/purpose	0.21	0.05	0.21	0.05	0.04	0.02	0.08	0.16	0.08	0.20	0.04	
Transient personal resources	0.58	0.03	0.21	0.05	0.12	0.07	0.18	0.04	0.04	0.16	0.13	
Typical personal resources	0.61	0.05	0.21	0.05	0.13	0.07	0.19	0.05	0.11	0.18	0.14	
<b>Least engaging situations</b>												
<b>Transient meaningfulness as mediator</b>												
Transient job variety/challenge	0.24	0.04	0.06	0.03	0.01	0.01	0.03	0.09	0.04	0.10	0.01	
Transient need-supply fit	0.41	0.05	0.06	0.03	0.02	0.01	0.05	0.13	0.04	0.15	0.03	
Typical need-supply fit	0.33	0.08	0.06	0.03	0.02	0.01	0.04	0.10	0.06	0.08	0.03	
Typical personal resources	0.16	0.08	0.06	0.03	0.01	-0.01	0.03	0.21	0.06	0.22	n/a	
<b>Typical meaningfulness as mediator</b>												
Transient job variety/challenge	0.24	0.04	0.19	0.07	0.05	0.01	0.08	0.09	0.04	0.14	0.06	
Transient need-supply fit	0.41	0.05	0.19	0.07	0.08	0.02	0.14	0.13	0.04	0.21	0.11	
Typical need-supply fit	0.33	0.08	0.19	0.07	0.06	0.01	0.12	0.10	0.06	0.16	0.09	
Typical personal resources	0.16	0.08	0.19	0.07	0.03	-0.01	0.08	0.21	0.06	0.24	n/a	

Note: a= regression coefficient for association between predictor and mediator; b= regression coefficient for association between mediator and engagement (DV) when predictors are also included; c' regression coefficient for association between predictor and engagement (DV) – direct effect; a\*b= regression coefficient for indirect association between predictor and engagement, via mediator – indirect effect; and c= sum of a\*b and c' – total effect. LB = lower bound confidence interval; UB = upper bound confidence interval.