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**Mindfulness at work: Positive affect, hope, and optimism mediate the relationship between  
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## **Abstract**

*Mindfulness has been described as a state of awareness characterized by refined attentional skills and a non-evaluative attitude toward internal and external events. Recently it has been suggested that higher levels of mindfulness may be beneficial in the workplace and first programs aiming to increase mindful awareness in occupational settings have been introduced. The current study underpins these developments with empirical evidence regarding the involved psychological processes, by investigating the relationship between dispositional mindfulness, work engagement and well-being in 299 adults in fulltime employment. As hypothesized, the results confirm that self-reported mindfulness predicts work engagement and general well-being. Furthermore, these relationships are mediated by positive job-related affect and psychological capital (hope, optimism, resiliency, and self-efficacy). Investigating mindfulness and psychological capital as multi-faceted concepts by means of structural equation modeling yielded a more precise picture. The ability to step back from automatic, habitual reactions to distress turned out to be the mindfulness facet most central for predicting work engagement and well-being. Furthermore, mindfulness exerts its positive effect on work engagement by increasing positive affect, hope, and optimism, which on their own and in combination enhance work engagement (full mediation). Well-being, on the other hand, is directly influenced by mindfulness, which exerts additional indirect influence via positive affect, hope and optimism (partial mediation). Although exploratory in nature, the results identify non-reactivity and non-judging as important mindfulness skills in the workplace.*

*Keywords:* mindfulness, psychological capital, work engagement, well-being, structural equation modeling, Broaden-and-Build theory

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## **Introduction**

Mindfulness-based interventions have attracted significant attention in clinical psychology and related fields, and increasing numbers of empirical studies confirm their effectiveness in a variety of clinical and sub-clinical settings. Encouraged by the reported positive outcomes, the interest in applying similar interventions and programs in other, non-clinical fields such as education (Meiklejohn et al. 2012; Schonert-Reichl and Lawlor 2010), coaching (Cavanagh and Spence 2012), or leadership training (Sauer and Kohls 2011; Reb et al. 2012) is growing rapidly. Concurrently, mindfulness programs are being introduced in the workplace (e.g. Levy et al. 2012; Klatt et al. 2009; Hülshager et al. 2013; Wolever et al. 2012) under the assumption that a whole range of positive effects on employee performance and well-being would result from increasing levels of mindfulness (Glomb et al. 2011). These include improvements in decision making, communication, task performance and creativity, and

decreases in antisocial behavior, experience of negative emotions and frustration (Dane 2011; Glomb et al. 2011). However, so far the evidence for the assumed beneficial effects of mindfulness in work-related settings is limited and there is a paucity of studies elucidating the mechanisms by which it might exert its assumed beneficial effects. Similarly, very little is known as to whether dispositional mindfulness – how mindful an individual tends to be in their daily life – predicts successful and healthy engagement in the workplace. To address this gap in the literature, the current study investigated the relationship between dispositional mindfulness and work engagement, which has emerged as an important determinant of organizational success (Bakker et al. 2011) for instance, in terms of financial returns (Xanthopoulou et al. 2009) and job performance (Halbesleben and Wheeler 2008). As high work engagement in itself can have negative consequences, for example in terms of interference with family life (Halbesleben et al. 2009), we considered it in conjunction with well-being, rather than in isolation (Robertson and Cooper 2010). Positive affect and of psychological capital were included in the study as potential mediators because both have been implicated in promoting work engagement and well-being (Avey et al. 2011; Avey et al. 2008; Quoidbach et al. 2010; Sonnentag et al. 2008).

Within the psychological literature mindfulness is typically described as “paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment.” (Kabat-Zinn 2003). It is considered to consist of a combination of two core components: refined attentional skills and an open, non-evaluative attitude toward the different mental experiences that may arise (Bishop et al. 2004; Brown et al. 2007; Malinowski 2008). Dispositional mindfulness has been operationalized as a one-dimensional (e.g. Brown and Ryan 2003), two-dimensional (e.g. Cardaciotto et al. 2008; Davis et al. 2009) or multi-dimensional construct with up to five mindfulness facets (Baer et al. 2006; Feldman et al. 2007). Studies measuring dispositional mindfulness in workplace contexts (Allen and Kiburz 2012; Dane and Brummel 2014; Klatt et al. 2009; Leroy et al. 2013; Levy et al. 2012; Roche et al. 2014) so far relied on the one-dimensional Mindful Attention Awareness Scale (MAAS; Brown and Ryan 2003), with the only exception of Wolever et al. (2012), who used the four-factor Cognitive and Affective Mindfulness Scale-Revised (CAMS-R; Feldman et al. 2007), but also treated it like a single-factor construct. Thus, although dispositional mindfulness is likely to be multi-faceted (Baer et al. 2006) the role of different mindfulness facets has not yet been explored within workplace contexts, limiting the understanding in which way mindfulness may be beneficial. The aim of this study is to overcome this limitation by investigating the role of five different mindfulness facets in predicting work engagement and well-being of employees. Towards this end we used the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2006; Baer et al. 2008), which consists of the factors “Non-reactivity to Inner Experience” (Non-Reacting), “Observing sensations, perceptions, thoughts, feelings” (Observing), “Acting with Awareness” (Act Aware), “Describing or labeling with words” (Describing) and “Non-judging of experience” (Non-Judging).

The ability to nonjudgmentally observe and stay with arising thoughts and emotions, primarily captured by the Non-Reacting and Non-Judging subscales of the FFMQ, has been recognized as an

important emotion regulation strategy (Papies et al. 2012). It differs from other forms of emotion regulation as it is based on changing the relationship to one's emotional states rather than the nature of the emotions themselves (Gross and Thompson 2007; Teper et al. 2013). The presence of this skill is thought to be associated with sensitivity to more subtle changes in one's emotional states, allowing an individual to engage in regulation soon after the emotion arises with the effect that potentially detrimental automatic appraisal and response patterns will be less pronounced (Chambers et al. 2009; Teper et al. 2013). The larger flexibility in engaging with cognitions and emotions (Shapiro et al. 2006) is furthermore assumed to be associated with more positive states of mind and a broader range of available thought-action-repertoires (Fredrickson 2004), and less automatic or habitual actions. In support of this view, neuroscientific evidence confirms that mindfulness is related to better attentional skills which interact with cognitive and emotion regulation skills (Chiesa et al. 2013; Malinowski 2013; Moore and Malinowski 2009; Slagter et al. 2011; Teper and Inzlicht 2013).

Work engagement has been demonstrated to be an important indicator of occupational success. On an individual level it is positively associated with work-related constructs such as safety, job satisfaction, employee loyalty, job performance, and organizational citizenship behavior (Harter et al. 2002; Markos and Sridevi 2010; Ram and Prabhakar 2011; Saks 2006; Schaufeli and Bakker 2004; Sonnentag 2003). On an organizational level work engagement is positively related to productivity, customer satisfaction, employee commitment, financial return, profitability, and business success (Attridge 2009; Simpson 2009). Furthermore, the psychological connection of employees to their work is of critical importance for organizational competitiveness (Bakker et al. 2011). Levels of employee work engagement, entailing vigor, dedication and absorption (Schaufeli et al. 2002), can thus be considered an important indicator of the health and preparedness of an organization. A positive association between mindfulness and work engagement would confirm the assumption that accepting, non-reactive emotion regulation strategies may be beneficial in the workplace and contribute to positive organizational outcomes. Mindfulness may support work engagement in a direct way, as a more accepting mental attitude that is less prone to distraction due to automatic response patterns may lead to more positive and fulfilling states of mind that are associated with higher engagement in the specific tasks at hand with the overall evaluation of one's relationship to work. However, so far, evidence regarding such an association is limited. Recently, a specific intervention mapping protocol was employed to develop a mindfulness-based intervention aimed at improving work engagement. Initial evidence suggests that uptake of this intervention by the employees was relatively high (van Berkel et al. 2013; van Berkel et al. 2011), but outcomes of this project regarding work engagement are not yet available. One study reported increased levels of vigor (a component of work engagement) after participation in a mindfulness program (Rosenzweig et al. 2003). In addition, a recent paper using cross-sectional and longitudinal data provides first evidence that mindfulness is, indeed, positively related to work engagement (Leroy et al. 2013).

Besides work engagement, psychological well-being has been identified as an important contributor to positive organizational outcomes. Research demonstrates that levels of psychological well-being are positively related to job performance (Wright and Cropanzano 2000; Wright et al. 2004; Cropanzano and Wright 1999). As work engagement per se can have negative consequences for employees, for instance in terms of work-life conflicts such as work-family interference (Halbesleben et al. 2009), and psychological well-being is positively related to work engagement (Fairlie 2011; Shimazu and Schaufeli 2009; Simpson 2009), Robertson and Cooper (2010) convincingly argue against narrowly focusing on commitment-based engagement. They suggest that aiming for “full engagement”, which includes work engagement *and* employee well-being, constitutes a more profound management strategy for achieving sustainable benefits for individuals and organizations. In line with this view, and to capture a broader picture of the role of mindfulness in employees, we also included a broad measure of psychological well-being as outcome variable in the study. While a positive link between mindfulness and general psychological well-being is well established (Irving et al. 2009; Keng et al. 2011) little is known about whether mindfulness is linked to well-being in the workplace. So far only one study demonstrated that in working parents dispositional mindfulness was positively related to work-family balance, which is closely related to well-being (Allen and Kiburz 2012).

To elucidate the hypothesized relationship between mindfulness, work engagement, and psychological well-being, it will be important to consider other variables that are likely to contribute to this relationship. Psychological Capital (PsyCap) has emerged as an important construct in human resource development. It is a higher order construct consisting of the four psychological resources of hope, self-efficacy, resiliency and optimism (Luthans et al. 2007a) and has been demonstrated to contribute to desirable employee attitudes and behaviors (job satisfaction, organizational commitment, psychological well-being, and citizenship) as well as various measures of job performance (Avey et al. 2011). As mindful individuals tend to experience and respond to emotionally challenging situations in a more flexible and less impulsive way they are likely to be equipped with higher levels of PsyCap. In particular, their ability to be aware of distressing or difficult situations without immediately responding to them (captured by the FFMQ-facet Non-Reacting) is likely to be associated with greater self-efficacy, resiliency, hope, and optimism, the four corner stones of PsyCap. For instance, maintaining a cool head under duress and not responding automatically to experienced negative cognitions and emotions will be related to higher self-efficacy, as this ability to be in control will be related to more confidence in succeeding in challenging tasks. Closely related are hope and optimism, the perceived capability to persevere, motivate oneself and (re-)direct one's pathways to achieve the desired goals (hope; Snyder 2002) and having a positive outlook on one's own future success (optimism; Carver and Scheier 2005), respectively. When mindfulness is high and an individual can step back or disengage from detrimental cognitive or emotional reactivity, a more hopeful and optimistic attitude will usually result. Finally, also resiliency, the ability to bounce back despite challenges and adversity should be more pronounced in mindful individuals, as they will, for instance, engage less in rumination and

habitual worrying (Shapiro et al. 2007; Verplanken and Fisher 2014), but rather maintain a solution-focused outlook. Although plausible, evidence for such a relationship between mindfulness and PsyCap is almost non-existent (but see Avey et al. 2008). Based on these considerations and on the predictive strength of PsyCap regarding various organizational outcome measures we hypothesize that PsyCap may be an important factor mediating the relationship between mindfulness, work engagement and well-being.

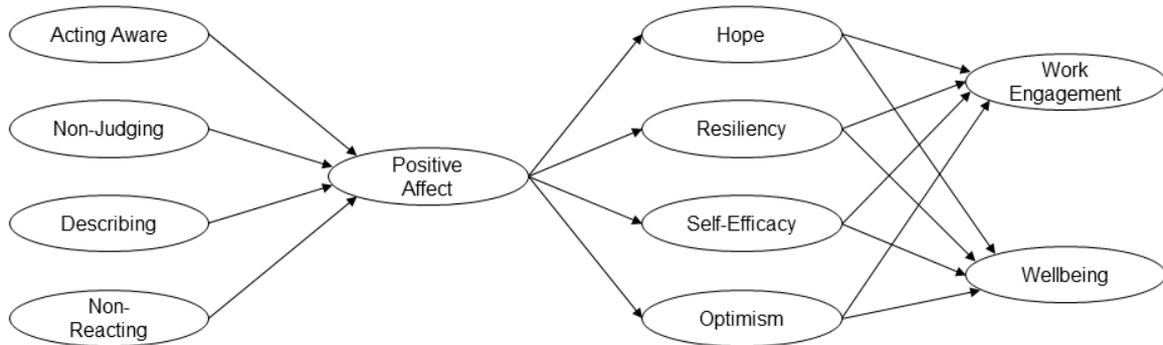
Positive affect is associated with and precedes several outcomes that are indicative of work-related success, such as employment, quality of work, income, and organizational citizenship (Lyubomirsky et al. 2005). Furthermore, evidence indicates a positive relationship between PsyCap and positive affect (Avey et al. 2008; Salanova et al. 2011) and between positive affect and work engagement (Sonnentag et al. 2008). The Broaden-and-Build theory of positive emotions (Fredrickson 2004) predicts that the increase in positive emotions would lead to broadening of one's thought-action-repertoire which, in turn, would result in increased personal resources such as those included in PsyCap. In line with Broaden-and-Build theory, we thus predict that mindfulness at least partially exerts its influence on work engagement and well-being in a serial fashion via positive affect and PsyCap.

Based on the discussed evidence and theoretical considerations we hypothesize that dispositional mindfulness will be positively related to work engagement and to well-being. Furthermore, we predict that this relationship is mediated by positive affect and PsyCap. Reflecting the propositions of the Broaden-and-Build theory, Model 1 (see Figure 1) assumes a strict serial relationship flowing from mindfulness → positive affect → PsyCap → work engagement. Higher mindfulness would be related to more positive affect, a broadened thought-action repertoire, and as a consequence more personal resources (PsyCap). As PsyCap predicts work engagement (Bakker et al. 2011; Luthans et al. 2007a), and PsyCap and positive affect are related to well-being we expect a positive relation to these two outcome variables.

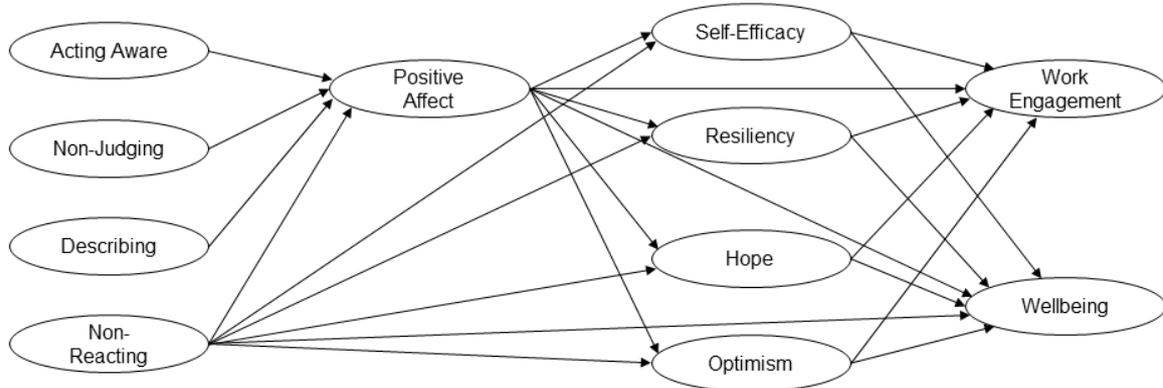
Given that mindfulness reflects psychological core processes such as emotional and cognitive flexibility (Malinowski 2012, 2013; Shapiro et al. 2006), we argued above that some mindfulness facets directly relate to PsyCap facets and to the outcome variables work engagement and well-being. Model 2 (see Figure 1) depicts these additional structural paths. First and foremost, it reflects the theoretically central role of the FFMQ-facet Non-Reacting. As explained before, the ability to bear difficulties and distress without having to respond automatically will not only be related to higher positive affect, but also to the four facets of PsyCap and may also have a direct impact on well-being and work engagement. Thus, four additional structural paths will flow from Non-Reacting to the four PsyCap facets and two further paths to work engagement and well-being. Moreover, it is likely that positive affect is also directly related to well-being (rather than merely through PsyCap) and may also have a positive link to work engagement. Accordingly, these two paths are also included. Due to the strong theoretical grounding for these additional direct links we expect that Model 2, which outlines a partial

mediation, will provide a better fit for the sample data than the serial, full mediation described by Model 1.

### Model 1



### Model 2



**Fig. 1**

Path diagrams for the two hypothesized structural models. Model 1 predicts a strict serial multiple mediation. Model 2 predicts a partial serial mediation, including additional paths originating from FFMQ-Non-Reacting and from Positive Affect.

Notes: Due to the results of the CFAs of the FFMQ and additional theoretical considerations the facet Observing is not included in the models. For reasons of clarity only the latent variables and structural paths are depicted, whereas indicator variables, error terms, residuals and covariances are not displayed.

## Methods

### Participants

299 full-time working adults (123 male, 176 female, mean age 40.1 years, SD: 11.6, mean tenure 5.75 years) from various job sectors (public: 34.8%, private: 53.5%, non-profit: 10.0%, volunteer work: 1.7%) participated in the study by completing an online survey. They had a Western background or were based in one of 36 Western countries (following the classification by Hill et al. 2004) and rated their English language skills as “good” or “excellent”. 146 participants classed themselves as non-meditators and 153 as meditators, defined as an individual with a regular meditation practice of at least once or twice per week (Baer et al. 2008). The meditators had an average of 8.9 years (range 6 weeks to 39 years) of meditation experience and meditated on average 6 times a week (range 1 to 21 times per week). Levels of education and management experience are presented in Table 1.

## Procedure

Participants were recruited via posts on the university website, social networking websites such as Facebook, Linked In, and Yahoo Groups. Furthermore, potential participants were targeted through e-mail distributions, via personal contacts, specific mailing lists (e.g. from meditation centers, company contacts, etc.) and relevant newsletters. After giving informed consent, participants were directed to a secure website that was not publically accessible. Completion of the survey took no more than 20 minutes. All participants were given the opportunity to take part in a prize draw to win one out of 5 Amazon vouchers worth GBP 20 (or the equivalent in USD or Euro). The study was approved by the Research Ethics Committee of the host institution.

**Table 1**

Distribution of highest educational level and managerial responsibilities in the complete sample (N=291) and split into meditators (N=151) and non-meditators (N=140)

<b>Educational Level</b>	<b>All</b>	<b>meditators</b>	<b>non-meditators</b>
High School	8.2	8.6	7.9
Graduate Degree	34.0	29.8	38.6
Masters / Postgrad. Diploma	43.6	45.0	42.1
PhD	9.3	11.9	6.4
Others (Diploma, professional course)	4.8	4.6	5.0
<b>Managerial Responsibilities</b>			
Top management	11.0	13.2	8.6
Middle management	16.2	17.9	14.3
Supervisory role	21.0	20.5	21.4
Employee (no line management)	41.6	35.1	48.6
Self-employed	10.3	13.2	7.1

*Note:* All values are percentage

## Measures

Dispositional trait mindfulness was measured with the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2006). The FFMQ is a 39-item scale assessing the following five components of mindfulness: Observing, Describing, Acting with Awareness, Non-judging, and Non-reacting. Participants rate items such as “I perceive my feelings and emotions without having to react to them” on a 5-point Likert scale (1 = *never or very rarely true*; 5 = *very often or always true*).

Work engagement was assessed with the 9-item version of the Utrecht Work Engagement Scale (UWES-9; Schaufeli et al. 2006). Participants responded to items like “At my job, I feel strong and vigorous.” on a 7-point frequency rating scale (0 = *never*; 6 = *always*).

Positive mental well-being was assessed with the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS; Tennant et al. 2007) consisting of 14 items that cover a broad range of positive health indicators, including hedonic and eudemonic perspectives. Participants rated positively worded items such as “I’ve been feeling optimistic about the future” on a 5-point Likert scale (1 = *none of the time*; 5 = *all of the time*).

Psychological capital was assessed with the Psychological Capital Questionnaire (PCQ; Luthans et al. 2007a; Luthans et al. 2007b). The PCQ consists of 24 items, which measure the four constructs hope, self-efficacy, resiliency, and optimism. Respondents indicate their agreement with statements such as “There are lots of ways around any problem” or “I usually take stressful things at work in stride” on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*).

Job related positive affect was measured with a shortened version of the Job-related Affective Well-being Scale (JAWS; Van Katwyk et al. 2000) limited to the positive items (subsequently: JAWS+). The scale assesses the frequency of experience of positive affective states associated with respondents’ job over the period of the last 30 days on a 5-point Likert scale (1 = *never*; 5 = *always*). In line with previous studies that used shortened versions of the JAWS (e.g. Claes and Loo 2011; Balducci et al. 2012), the internal consistency in our sample was acceptable (see Table 3).

### **Data Analyses**

Data were analyzed with structural equation modeling techniques (SEM) using the AMOS™ (V.21) software package (Arbuckle 2012). To ensure that the measurements of all included latent variables are psychometrically sound, all questionnaires were subjected to confirmatory factor analyses (CFA). Results of these CFAs are presented at the beginning of the results section. The maximum likelihood method was used for SEM and CFA model fitting and goodness of fit of each model was determined by considering a range of model indices (Schermelleh-Engel et al. 2003): the chi-square ( $\chi^2$ ) statistic with degrees of freedom;  $\chi^2$  index divided by the degrees of freedom ( $\chi^2/df$ ); comparative fit index (CFI); non-normed fit index (NNFI); root-mean-square error of approximation (RMSEA); standardized root-mean-square residual (SRMR), and Akaike information criterion (AIC). To evaluate each model these indices are considered collectively, taking into account cutoffs for acceptable and good model fits as suggested in the literature (Byrne 2010; Schermelleh-Engel et al. 2003). To address the problem that the  $\chi^2$ -statistic is strongly influenced by sample size we include the  $\chi^2/df$  index, where a value below 5 indicates acceptable fit and a value close to or less than 2 a good model fit. SRMR indices of less than .10 and less than .08 indicate acceptable and good model fit, respectively. RMSEA values below .10 and .06 are interpreted to reflect acceptable and good model fit. CFI and NNFI values larger than .90 and .95 indicate adequate or good model fit, respectively. Finally, the AIC index is a descriptive measure used to compare the parsimony of models (where appropriate), where a lower AIC is indicative of a better model fit.

## **Results**

Uni- and multi-dimensional outlier analysis based on the extremity of z-scores ( $> 3.29$ ) and Mahalanobis distances ( $\chi^2_{12} > 31.26$ ) resulted in the exclusion of data from 8 participants from all analysis. Skewness and kurtosis were acceptable for all study variables.

### **Confirmatory Factor Analyses for Self-Report Measures**

**Fife Facet Mindfulness Questionnaire – FFMQ.** The initial development of the FFMQ yielded a five-factor hierarchical structure with mindfulness as a latent variable that underlies the five

facets (Baer et al. 2006). However, already at the point of development it was recognized that a four-factor hierarchical structure which did not include the factor Observing provided a better fit for samples with no meditation experience (Baer et al. 2006; Baer et al. 2008). Similar concerns regarding the Observing subscale were also reported by other authors (e.g. Curtiss and Klemanski 2014; Williams et al. 2014). To account for this uncertainty in addition to five-factor models we also considered four-factor models which excluded the items associated with the Observing factor. In total, six FFMQ models were tested. Three models (FFMQ with Observing) included all items of the FFMQ. The other three models included all items except of those mapped onto the observing subscale (FFMQ without Observing). For both types a single-factor model was tested, where all indicators loaded onto the latent variable mindfulness. In two further models the items loaded onto five (or four) inter-correlated factors identified in previous studies. And finally, in two hierarchal solutions the five (or four) factors loaded onto the overall mindfulness construct. To align our analysis approach with previous factor analyses of the FFMQ (Baer et al. 2006; Baer et al. 2008; Curtiss and Klemanski 2014; Williams et al. 2014) item parcels were implemented for these CFAs, whereby items within each subscale were randomly assigned to parcels. Each subscale comprised three parcels, with two or three items each, to a total of 15 parcels. Although there has been some discussion regarding item parceling, various reasons justify this strategy (for details see Little et al. 2002; Curtiss and Klemanski 2014).

As listed in Table 2 neither of the single factor models yielded acceptable solutions. The five-factor correlated model and the five-factor hierarchical model yielded good model fits. In direct comparison the significant  $\chi^2$ -difference test indicates a superior fit of the five-factor hierarchical model over the five-factor correlated model. Also both four-factor models yielded equally good solutions, confirmed by a non-significant  $\chi^2$ -difference test. Overall the four-factor models provided better fit indices than the five-factor models. Although due to the difference in degrees of freedom, these differences should be interpreted with care, combined with the general concerns about the *Observing* subscale we decided to drop this factor and proceed with the four-factor model. As the hierarchical model was not superior to the correlated model, the latter was chosen as it provides more straightforward information regarding the role of the individual factors and does not include additional assumptions regarding 2<sup>nd</sup> order factors.

**Psychological Capital – PsyCap.** PsyCap is a construct combining the four components self-efficacy, hope, optimism, and resiliency. A recent review of the psychometric properties of this questionnaire (Dawkins et al. 2013) indicates issues with some of its items. According to CFAs from several studies the exclusion of some items and in particular those that are reverse-coded tends to increase factor loading and improves model fit (Chen and Lim 2012; Gooty et al. 2009; Rego et al. 2010). To account for the possibility that individual items affect model fit, we scrutinized item properties and tested models that were reduced by eight items (items 1, 7, 9, 13, 15, 18, 20, 23), which included all reverse-coded items. We analyzed five PsyCap models; the first three models maintained all items of the questionnaire: a single-factor model, a model with four inter-correlated factors, and a

hierarchical model with the four factors loading onto the overall PsyCap latent factor. In addition, the two four-factor models were also run after removal of the eight worst-performing items. As can be seen in Table 2, the reduced model with four correlated factors provided the best fit. The significant  $\chi^2$ -difference test indicates a better model fit for the 1<sup>st</sup>-order model compared to the alternative 2<sup>nd</sup>-order model. This model was thus included in the SEM.

**Table 2**

Results of the confirmatory factor analyses for all main study variables.

model	$\chi^2$	<i>df</i>	$\Delta\chi^2$	$\chi^2/df$	SRMR	RMSEA [90% CI]	CFI	NNFI	AIC
FFMQ – with <i>observing</i>									
Single Factor	1274.569***	90		14.162	.1242	.213 [.203 - .223]	.568	.469	1334.569
Five Factors	169.544***	80		<i>2.119</i>	<b>.0449</b>	.062 [.049 - .075]	<b>.967</b>	<b>.957</b>	249.544
Five Factors Hierarchical	185.664***	85	16.12**	<i>2.184</i>	<b>.0534</b>	.064 [.051 - .076]	<b>.963</b>	<b>.955</b>	255.664
FFMQ – without <i>observing</i>									
Single Factor	1034.66***	54		19.16	.1345	.250 [.237 - .264]	.577	.483	1082.66
Four Factors <sup>a)</sup>	108.977***	48		<i>2.270</i>	<b>.0425</b>	.066 [.050 - .083]	<b>.974</b>	<b>.964</b>	168.977
Four Factors Hierarchical	110.580***	50	1.603 ns	<i>2.212</i>	<b>.0443</b>	.065 [.048 - .081]	<b>.974</b>	<b>.965</b>	166.580
PsyCap									
Single Factor	1064.708***	252		4.225	<b>.0788</b>	.105 [.099 - .112]	.735	.709	1160.708
Four Factors	614.604***	246		2.498	<b>.0636</b>	.072 [.065 - .079]	.880	.865	722.604
Four Factors Hierarchical	625.969***	248	11.365**	<i>2.524</i>	<b>.0649</b>	.072 [.065 - .080]	.877	.863	729.969
Four Factors Reduced <sup>a)</sup>	151.259***	98		<b>1.543</b>	<b>.0410</b>	<b>.043</b> [.029 - .056]	<b>.975</b>	<b>.969</b>	227.259
Four Factors Reduced Hierarchical	164.817***	100	13.558**	<b>1.648</b>	<b>.0457</b>	<b>.047</b> [.034 - .060]	<b>.969</b>	<b>.963</b>	236.817
s-JAWS+									
Single Factor <sup>a)</sup>	<b>5.234 ns</b>	2		<i>2.617</i>	<b>.0185</b>	.075 [.000 - .156]	<b>.995</b>	<b>.984</b>	
UWES-9									
Single Factor <sup>a)</sup>	170.285***	27		6.307	<b>.0522</b>	.135 [.116 - .155]	.907	.876	206.285
Three Factors	117.414***	24		4.892	<b>.0441</b>	.116 [.095 - .137]	.939	.909	159.414
WEMWBS									
Single Factor <sup>a)</sup>	47.784***	5		9.56	<b>.0338</b>	.172 [.129 - .218]	<b>.957</b>	<i>.915</i>	

Notes: Bold indices signify a good model fit, indices in italics an acceptable fit; Comparison of nested models with  $\chi^2$ -difference test: a significant  $\Delta\chi^2$  denotes that the larger model (with fewer *df*) fits significantly better than the smaller model (with more *dfs*); a) indicates the models included in the SEM; \*\*  $p < .01$ ; \*\*\*  $p < .001$ ; ns = non-significant

**Job related positive affect – JAWS+.** The positive affect subscale of the JAWS has been constructed as a single-factor scale (Balducci et al. 2012; Van Katwyk et al. 2000). The CFA confirmed good model fit of the shortened scale used in this study (see Table 2).

**Work engagement - UWES-9.** The three-factor and the single factor solution of the 9-item version of the UWES (Schaufeli et al. 2006) yielded acceptable overall model fits (see Table 2). As our hypotheses consider work engagement in broad terms rather than focusing on specific sub-components, we decided to include the single factor model of the UWES-9 in the analysis.

**Mental well-being - WEMWBS.** The WEMWBS has been designed as a one-dimensional scale (Tennant et al. 2007). The single-factor CFA yielded indices indicative of acceptable or good fit.

### **Descriptives and Basic Relationships**

Table 3 lists the means, standard deviations, internal consistencies, and Pearson correlations for all study variables. All measures had acceptable internal consistency (between .72 and .92) and were positively inter-correlated (all  $p < 0.01$ ). Some of these correlations reflect the associations between sub-scales of the same questionnaires, whereas others support our hypothesis that dispositional mindfulness would be positively related to work engagement and psychological well-being and that psychological capital and positive affect may be part of this relationship.

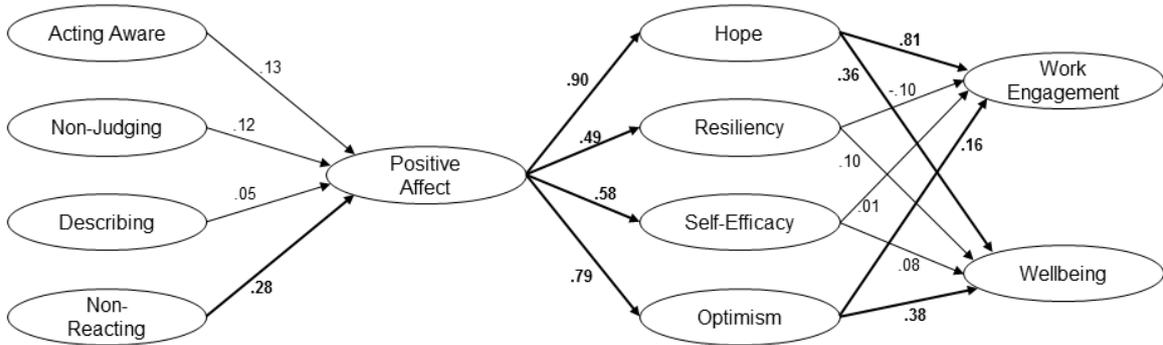
A concern that is commonly raised when such a broad range of significant bivariate correlations are present is that these results may partially be due to common method variance (CMV), i.e. that the correlations are attributable to the method rather than the constructs that are being measured (Podsakoff et al. 2003). However, a Monte Carlo study by (Evans 1985) and a statistical approach by Siemsen et al. (2010) demonstrated that bivariate linear relationships may either be inflated or deflated by CMV, whereas interaction terms in regression models are generally either not affected or are deflated. Similarly, a Monte Carlo simulation demonstrated that cross-level interactions in multi-level linear models would rather be deflated by CMV and that the inclusion of more potentially CMV-contaminated variables would reduce the probability of Type 1 errors (Lai et al. 2013). Thus, although a common method bias cannot be ruled out completely, the use of SEM, which overcomes the problems of simple bivariate relationships, makes it unlikely that the presented results can be attributed to CMV artifacts.

### **Testing the Models**

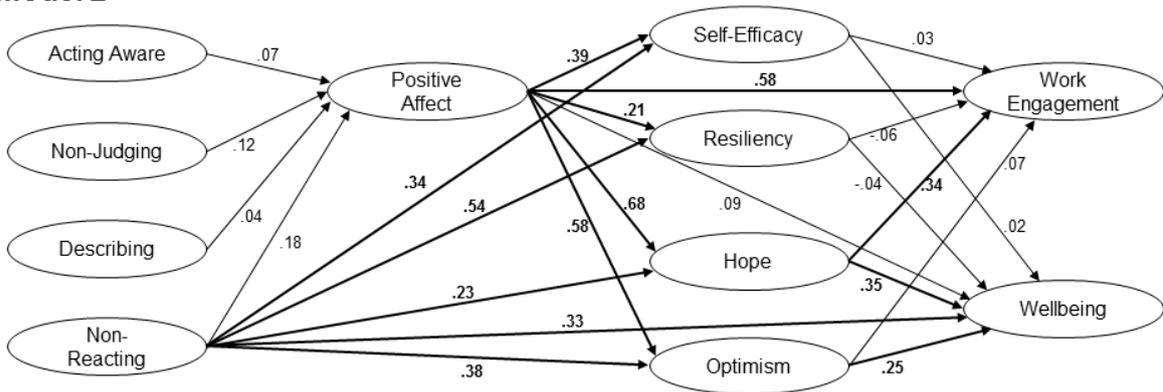
Structural equation modeling (SEM) was used to analyze fit between the hypothesized models (Figure 1) and the sample data and to compare the fit between the suggested models. The fit indices listed in Table 4 show that the strictly sequential model, which assumes full serial mediation through positive affect and PsyCap-facets (Model 1: mindfulness facets → positive affect → PsyCap → work engagement / well-being) does not fit the data as well as Model 2, which is more specific in its predictions and well-being implies partial mediation. The superior fit of Model 2 is furthermore

confirmed by the highly significant  $\chi^2$ -difference test. Figure 2 displays the models with standardized regression weights for all structural parameters. As can be seen, although the overall fit of Model 2 is acceptable, only 13 of the regression weights are significant (plus one marginally significant), while the remaining 9 were statistically non-significant. Thus, several of the initially hypothesized paths may be irrelevant.

**Model 1**



**Model 2**



**Fig. 2**

Path diagrams with standardized regression weights. Arrows and coefficients in bold indicate statistically significant relationships.

Notes: For reasons of clarity only the latent variables and structural paths are depicted, whereas indicator variables, error terms, residuals and covariances are not displayed.

**Table 3**

Means, standard deviations, internal consistencies (Cronbach's  $\alpha$ ), and Pearson correlation coefficients for the variables included in the path analysis

	N=291	M	SD	$\alpha$	1	2	3	4	5	6	7	8	9	10
FFMQ														
1	Act-Aware	3.54	0.67	.89	-									
2	Describing	3.82	0.69	.90	.336	-								
3	Non-Judging	3.71	0.83	.92	.505	.377	-							
4	Non-Reacting	3.47	0.64	.85	.537	.430	.528	-						
5	JAWS+	3.47	0.76	.86	.261	.188	.285	.325	-					
PsyCap														
6	Self-Efficacy	4.95	0.84	.88	.321	.346	.302	.350	.404	-				
7	Hope	4.61	0.82	.84	.375	.253	.321	.330	.626	.567	-			
8	Resiliency	4.73	0.77	.72	.327	.155	.270	.464	.304	.442	.419	-		
9	Optimism	4.35	0.82	.79	.383	.240	.298	.457	.577	.452	.632	.473	-	
10	UWES-9	4.01	0.91	.91	.272	.218	.272	.321	.772	.489	.705	.316	.588	-
11	WEMWBS	3.78	0.57	.92	.455	.368	.426	.524	.568	.479	.647	.418	.626	.589

*Note.* FFMQ: Five-Facet Mindfulness Questionnaire; JAWS+: Job-related Affective Well-being Scale; PsyCap: Psychological Capital Questionnaire; UWES-9: Utrecht Work Engagement Scale; WEMWBS: Warwick-Edinburgh Mental Well-Being Scale; all correlations significant at  $p < .01$ .

**Post hoc model modification.** A strictly confirmatory approach to the data would stop at this point and accept that only some of the hypothesized paths were found to be relevant. However, as we are dealing with an area of research still in its infancy, with little empirical evidence to build on, an exploratory post hoc model fit appeared useful for guiding future research (Byrne 2010; Hoyle 2011). Following established guidelines (Byrne 2010) we first reviewed modification indices of possible structural paths, which indicated that the additional path from Describing to Self-Efficacy should be included. Although Hope, Self-Efficacy and Resiliency were considered to be facets of PsyCap and accordingly not related to each other in a structural way, the modification indices suggested otherwise. We thus relaxed this condition and subsequently included two regression paths flowing from Hope to Self-Efficacy and to Resiliency, respectively. The next model-modification step considered model parsimony. As already discussed, some regression paths were insignificant and these were now removed from the model. These two modification steps had several effects. First, the mindfulness facet Acting with Awareness no longer influenced other factors and was thus eliminated from the model. Furthermore, the two PsyCap-facets Self-Efficacy and Resiliency bear no influence on the two outcome variables Work Engagement and Well-being. They should thus not be maintained in the position of mediating variables. Because they are influenced by other factors in the model it seems reasonable to conceptualize them as further outcome variables, in parallel with Work Engagement and Wellbeing.

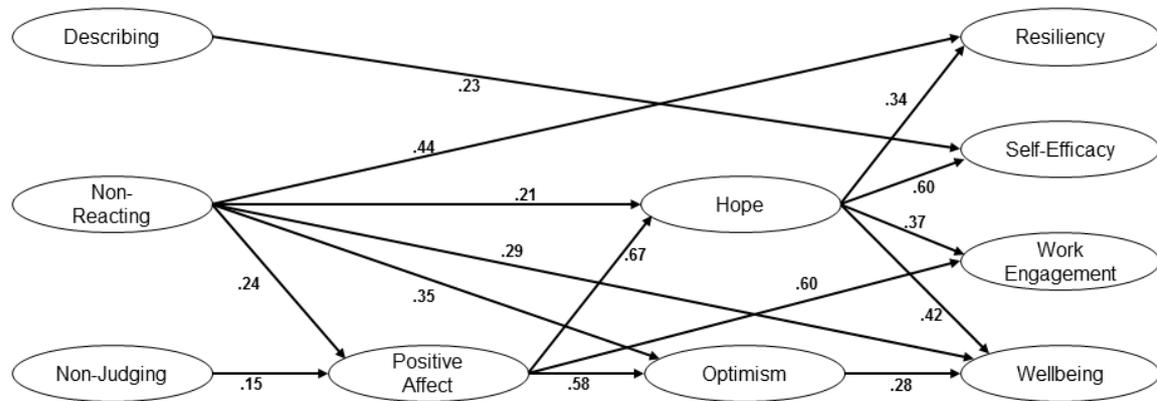
The fit indices of this final post hoc model version show a good fit (Table 4). Figure 3 displays all regression paths of the model. As can be seen, only the two mindfulness facets Non-Judging and Non-Reacting directly or indirectly influence Work Engagement and Well-being, whereas Describing only influences Self-Efficacy. Overall, Non-Reacting clearly stands out as the mindfulness facet with the most prominent influence. Either directly or via mediating factors (Positive Affect, Hope, Optimism) it influences all outcome variables.

### Discussion

To our knowledge this is the first study investigating dispositional mindfulness as a multi-faceted construct in relation to intra-personal factors in organizational settings. To a certain extent the study confirmed the hypothesized positive relationship between dispositional mindfulness and the two outcome variables work engagement and well-being. The more mindful a participant was the higher their work engagement and well-being tended to be. Furthermore, it confirmed that positive work-related affect and some aspects of PsyCap exert a mediating influence on these relationships. Here the comparison of a strictly serial full mediation model (Model 1) was inferior to a partial mediation model (Model 2) which also included links between mindfulness facets and PsyCap facets (bypassing positive affect), between mindfulness and work engagement/well-being (bypassing all mediators) and between positive affect and work engagement/well-being (bypassing PsyCap facets). The post hoc model (Figure 3) developed in an exploratory fashion demonstrates the main findings from this study

and suggests possible pathways as to how mindfulness might influence work engagement and well-being.

### Model 3



**Fig. 3**

Path diagrams with standardized regression weights for the final, post hoc model.

Notes: For reasons of clarity only the latent variables and structural paths are depicted, whereas indicator variables, error terms, residuals and covariances are not displayed.

More precisely, by considering the individual facets of mindfulness and of PsyCap, rather than their higher order constructs, a more differentiated picture emerged. First of all, it turned out that Resiliency and Self-Efficacy neither influenced Work Engagement nor Well-being. This is surprising, given the existing evidence of the positive association between self-efficacy and work engagement (Bakker et al. 2011; Xanthopoulou et al. 2007). It may, however, be that the mindfulness facet Non-Reacting, which has not been included in previous studies in this field, shares some variance with Resiliency, explaining the diminished role of the latter. Similarly, in a study where self-efficacy emerged as an important predictor for work engagement, hope was not included (Xanthopoulou et al. 2007). The large regression weight of the path between Hope and Self-Efficacy indicates a potential partial overlap of these two constructs.

**Table 4**

Results of the SEM for the different models.

model	$\chi^2$	<i>df</i>	$\Delta\chi^2$	$\chi^2/df$	SRMR	RMSEA [90% CI]	CFI	NNFI	AIC
Hypothesized models									
Model 1	2043.722***	967		<i>2.113</i>	.0839	.062 [.058 - .066]	.879	.871	2271.722
Model 2	1848.117***	960	195.605***	<b>1.925</b>	<b>.0641</b>	<b>.056</b> [.053 - .060]	.900	.893	2090.117
Post Hoc model (Model 3)	1574.633***	842		<b>1.870</b>	<b>.0598</b>	<b>.055</b> [.051 - .059]	.912	.906	1782.633

*Notes:* Bold indices signify a good model fit, indices in italics an acceptable fit; Comparison of nested models with  $\chi^2$ -difference test: a significant  $\Delta\chi^2$  denotes that the larger model (with fewer *df*) fits significantly better than the smaller model (with more *dfs*); \*\*\*  $p < .001$ .

Concerning our main question as to how mindfulness fits into the picture, the observation that Non-Reacting emerged as the most important factor of the four included mindfulness facets, is particularly interesting. While the other facets (Describing, Non-Judging) play only a minor role or no role at all (Acting with Awareness), Non-Reacting exerted direct influence on the majority of variables. The influence of mindfulness (Non-Judging and Non-Reacting) on Work Engagement is exclusively indirect, flowing via Positive Affect and directly from Non-Reacting to Hope and from both factors on to Work Engagement. The lack of a direct effect between these mindfulness facets and Work Engagement is in line with a recent study showing that the positive relationship between mindfulness and work engagement is fully mediated by authentic functioning (Leroy et al. 2013), a concept that attracts increasing attention in discussions of leadership qualities (Gardner et al. 2011). In light of this evidence, reports that authentic leadership and PsyCap are interrelated (Jensen and Luthans 2006) and that positive affect has been shown to be an important contributor to authentic leadership (Gardner et al. 2011) are of interest, indicating a possible overlap of positive affect, PsyCap and authentic functioning. Future studies will therefore need to clarify their mediating roles and interactions.

Well-being was influenced by Non-Reacting via direct and indirect routes and by Non-Judging only in indirect ways (the latter including Positive Affect and/or Optimism and/or Hope), confirming previous evidence (Keng et al. 2011) that mindfulness is related to well-being. While the link between optimism and well-being is well established and supported by many studies (Forgeard and Seligman 2012), evidence for a positive link between mindfulness and optimism is still scarce (Kiken and Shook 2011; Weinstein et al. 2009). Although mindfulness is thought to be present centered rather than engaged with outlook into the future, it seems plausible that the ability to refrain from reacting will lead to a more positive and at the same time more realistic outlook on life (Kiken and Shook 2011). Of further interest is the relatively prominent role of Hope. As hopeful individuals are thought to have a sense of goal-directed determination (Snyder et al. 1991), it appears plausible that Non-Reacting, the ability to step back or disengage from automatic response patterns, would be positively related to it. It will be easier for a person to maintain set goals or generate plans to achieve them if they are able to keep a cool head without automatically reacting to distress. In line with this, first studies provide limited evidence that mindfulness practice may increase hope (Sears and Kraus 2009; Shapiro et al. 2011).

The fact that Positive Affect significantly contributed to the observed relationships lends some support to the Broaden-and-Build theory (Fredrickson 2004) indicating that by increasing positive affect psychological resources such as hope and optimism will increase, resulting in higher work engagement and well-being, as well as resiliency and self-efficacy. However, the fact that Model 2 provided a better fit than Model 1 speaks against a strict serial process and that broaden-and-build processes only partially explain the relationship between mindfulness and the outcome variables.

Some limitations of this study should be noted. As the data come from a cross-sectional survey, any causal interpretation has to be treated with care. We used SEM to get a first impression what processes may be involved in the salutary effects of mindfulness on well-being and work engagement.

Future studies that take an experimental or longitudinal approach and investigate how the different contributing variables develop and interact over time will be able to provide more definite answers regarding the possible causal pathways our study suggests. Evidence that individual mindfulness facets may play quite distinct roles highlights the importance of operationalizing mindfulness as a multi-facet construct. While we relied on the most widely used multi-factor scale, the FFMQ, after completion of data collection the four-factor Comprehensive Inventory of Mindfulness Experiences beta (CHIME- $\beta$ ) was proposed (Bergomi et al. 2013), which is said to integrate nine aspects of mindfulness that emerged from reviewing the eight most commonly used mindfulness questionnaires. For moving the field forward, it will be important to remain cautious about the operationalization of mindfulness and the different sub-components that are included in a study.

In conclusion, this study yields useful insights for further exploring the role of dispositional mindfulness and mindfulness programs in work environments. By highlighting the important role of the mindfulness facet Non-reacting it specifies that the ability to inwardly step back from distressing experiences without being taken over by them may be a particularly important contributor to the salutary effects of mindfulness. In addition, the prominent contributions of positive affect, hope and optimism outline pathways by which mindfulness might increase work engagement and well-being and thus develop ‘fully engaged’ employees. Based on these findings we may hypothesize that increasing dispositional mindfulness will: 1) directly promote well-being 2) raise positive affect, hope and optimism resulting in improved work engagement and well-being and 3) engage broaden-and-build processes leading to higher work engagement and well-being. Given the important role of Non-Reacting, programs that emphasize the development of this mindfulness skill hold particular promise.

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