

VALIDATION OF THE PORTUGUESE VERSION OF THE LANGER MINDFULNESS SCALE AND ITS RELATIONS TO QUALITY OF WORK LIFE AND WORK-RELATED OUTCOMES

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Mindfulness is an active mindset characterized by novel distinction-drawing and has been related to happiness and well-being. This study aims to validate the Portuguese version of the Langer Mindfulness scale (LMS14), to explore its psychometric and structural properties, and to analyze the role of mindfulness on the relation between work characteristics and performance. We conducted three studies; the first ($N = 141$) tested the scale's factorial structure and its psychometric properties. In the second we used two samples ($N = 330$) and tested the factorial structure of the scale, its reliability and validity. In the third ($N = 154$) we analyzed the moderating role of mindfulness in the relationship between autonomy and feedback with performance. Results showed three factors — novelty seeking, novelty producing, and engagement — and convergent, discriminant, and criterion validity as the scale correlates with well-being, affect, creativity, and work engagement. Results demonstrated that mindfulness moderates the link between autonomy and feedback with performance.

Keywords: Mindfulness; Langer; Scale validation; Performance; Well-being.

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Mindfulness has been consistently related to individual outcomes, such as individual creativity and well-being (Delizonna et al., 2009), as well as organizational outcomes, such as innovation (e.g., Lebeda et al., 2016), problem-solving strategies (e.g., Ostafin, & Kassman, 2012) and performance (e.g., Zivnuska et al., 2016).

There are two approaches to mindfulness. One is related to the practice of meditation and to the degree of awareness of the present moment. This perspective arises from Buddhism and philosophical traditions. The sociocognitive approach conceives mindfulness as a flexible cognitive state that results from drawing novel distinctions about the situation and environment (Langer, 1989). That is, mindful individuals are actively engaged in the present, sensitive to both context and perspective, and open to novelty (Carson, & Langer, 2006). This study is based on the latter approach. While studies derived from the meditation approach have been conducted mostly within clinical samples (e.g., Gu et al., 2015), the sociocognitive perspective has been used in organizational settings (e.g., Jordan et al., 2009).

Mindfulness, in the workplace, is recognized as a personal and valuable resource. It may enhance the workers' ability to efficiently manage several work characteristics, by allowing them to better use their own resources (Schultz et al., 2015). Autonomy and task feedback are job characteristics that are positively related to performance (Morgeson et al., 2005). Moreover, these two work characteristics appear to be closely related to mindfulness (e.g., Grover et al., 2017). For example, Teper and Inzlicht (2014), demonstrated that mindfulness was related to performance feedback, as it reduced neuroaffective reactions to external feedback.

Despite its increased importance for research and practice, it is relevant to first validate the scale for the target population, the Portuguese one, and then to analyze the role that mindfulness may play between these two job characteristics and performance. Therefore, the set of these three studies has two main goals: (a) to validate the Portuguese version of the Langer Mindfulness Scale for the working population (Study 1), also considering a sample from sea coast part of the country, with higher economic conditions and another sample from the inland part of the country, with lower economic situation (Study 2); and (b) to test the moderating role that mindfulness may play on the relation between work characteristics (autonomy and task feedback) and individual performance (Study 3).

THEORETICAL BACKGROUND OF MINDFULNESS

There has been an increased interest in mindfulness in the last decades. Mindfulness has its origins in Eastern Buddhist tradition. However, more recently, another perspective on understanding it has emerged; namely, the Western scientific approach (see Hart et al., 2013).

From the Buddhist tradition, mindfulness emerged as a way to reduce cognitive susceptibility to stress and emotional distress (Bishop et al., 2004). It has been defined as a process of consciousness to current experience (Kabat-Zinn, 1990). Therefore, being mindful is paying full attention to what is happening in the present moment with openness and a nonjudgmental acceptance (e.g., Bostock et al., 2019).

The main role of mindfulness within this approach was to increase awareness of the present and to create strategies to reduce suffering, pain, emotional distress, and maladaptive behavior (Bishop et al., 2004). Diverse studies have reported the benefits of mindfulness-based psychological interventions regarding stress reduction and other psychosocial outcomes, such as anxiety and depression (Kuyken et al., 2016). Other studies have reported positive effects on health symptoms, such as chronic pain (e.g., Wielgosz et al., 2019). Plus, it seems that mindfulness-based psychological interventions are of potential relevance to psychiatric comorbidity. For example, there is evidence of positive effects of such interventions focused on attention disorders, traumatic stress, dysregulated eating, and serious mental illness (e.g., Wielgosz, et al., 2019). Additionally, there is also evidence of the positive benefits of mindfulness meditation on substance abuse (e.g., Alizadehgoradel et al., 2019).

To operationalize and measure mindfulness within this approach, several measures were created. One example is the Mindfulness Attention and Awareness Scale (MAAS; Brown, & Ryan, 2003). This measure is a 15-item unidimensional scale, that measures the degree of attention and awareness to present moment experiences. The Freiburg Mindfulness Inventory (FMI) has two versions: one with 30 items (Buchheld et al., 2001) and one with 14 items (Walach et al., 2006). It is also a unidimensional scale. The Cognitive and Affective Mindfulness Scale-Revised (CAMS-R; Feldman et al., 2007) and the Southampton Mindfulness Questionnaires (SMQ; Chadwick et al., 2008) are also well-known measures. The CAMS, FMI, and SMQ are single-factor scales. In addition to awareness of the present moment, these scales also

assess other mindfulness aspects, such as acceptance/nonjudgment, openness to negative experiences, and letting go. There are also measures that operationalize mindfulness as a set of different factors. For instance, the Philadelphia Mindfulness Questionnaire (PMQ; Cardaciotto et al., 2008). This measure operationalizes mindfulness as a bifactorial structure: present-moment awareness and acceptance. The Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004) is a four-component model of mindfulness (observe, describe, act with awareness, and accept without judgment). The Toronto Mindfulness Scale (TMS) has two versions. One version measures mindfulness as a state (Lau et al., 2006), and the other operationalizes it as a trait (Davis et al., 2009). Both versions reflect a two-factor structure of mindfulness: curiosity and decentering. The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2008) proposes five factors: nonreactivity, observing, acting with awareness, describing, and nonjudging. What these measures have in common is that they have been tested, mostly, within clinical samples, to analyze whether meditation has had significant positive effects on individuals.

Aiming to explore mindfulness within social and organizational settings, Langer (e.g., 1989) pioneered the sociocognitive perspective. This approach is different from the former because it encompasses the external, material, and social context of individuals (Langer, 1989). This perspective is more active, as it can enhance individuals' goal orientation, develop their problem-solving strategies and train other cognitive aspects, and consequently develop cognitive and mental skills (Baer et al., 2008). Accordingly, mindfulness is an active mindset determined by novel distinction drawing that results in being: "(1) situated in the present moment; (2) sensitive to the context and to the different experiences, and (3) guided by rules and routines" (Langer, & Moldoveanu, 2000, pp. 2). Mindfulness is conceived as a "general style or mode of functioning through which the individual actively engages in reconstructing the environment through creating new categories or distinctions, thus directing attention to new contextual cues that may be consciously controlled or manipulated as appropriate" (Langer, 1989, p. 4).

On the other hand, mindlessness is characterized by a rigid mindset, in which individuals face difficulties in understanding different perspectives/categories. It also represents the tendency to follow and to be limited to already known information and to disregard new information, perspectives, or categories from the present (Langer, 2009).

Sociocognitive mindfulness has received considerable attention, as it proved to decrease global perceptions of occupational stress and to enhance, for example, adaptive behaviors at work (e.g., Charoensukmongkol, 2020). In addition, mindfulness can stimulate performance and creativity (e.g., Montani et al., 2020). There is also substantial evidence of its benefits to workers' well-being, such as job satisfaction, work engagement, and daily affect (e.g., Gunasekara, & Zheng, 2019).

LANGER MINDFULNESS SCALE

Based on the idea of mindfulness as an active mindset, and in order to complement other measures of mindfulness, Pirson et al. (2012) developed the Langer Mindfulness Scale (LMS14). This scale measures three dimensions of the sociocognitive concept of mindfulness: novelty seeking, novelty production, and engagement. Novelty seeking involves the degree to which an individual is open to and curious about the environment. Engagement is the tendency to interact and address the environmental changes. Novelty production is related to the way that an individual interacts with his/her environment (Langer, 1989) and expresses the tendency to create new categories, despite relying on former ones (Pirson et al., 2018).

Conceptually, these dimensions appear to be more related to the social and organizational context of individuals than the dimensions proposed from the meditative perspective. Studies relying on the medi-

tative perspective have, in some way, disregarded aspects of the individuals' social, and organizational context (Weinstein et al., 2009).

Notwithstanding, it is likely that combining this scale with other measures of mindfulness would allow for a better comprehension of this construct. Additionally, this measure may enhance theoretical and methodological advances in understanding the role of mindfulness for individuals' social and organizational life.

The LMS14 is a self-report questionnaire comprising 14 items; five items relate to novelty seeking; five items relate to novelty production, and the other four concern engagement. In the original study, the scale showed good psychometric properties, with Cronbach's α ranging from .65 to .89 (Pirson et al., 2012). The scale also performed well in terms of convergent validity with other measures of mindfulness (e.g., MAAS), affect, humor, personality (openness and neuroticism), and personal need for structure. Moreover, the scale showed discriminant validity with other measures of mindfulness, and criterion-related validity with measures of psychological well-being (e.g., purpose in life), physical well-being (e.g., health), and social/organizational well-being (e.g., positive relations with others). Plus, each factor correlated significantly with the other. A confirmatory factor analysis (CFA) demonstrated that the three-factor theoretical model fit the data (CFI = .95, and RMSEA = .05).

The Moderating Role of Mindfulness on the Relation Between Work Characteristics and Performance

Despite the growing interest in the benefits of mindfulness regarding health outcomes, little attention has been paid to exploring its benefits regarding organizational outcomes, such as performance.

Mindfulness may enhance the workers' ability to manage their work conditions and characteristics in a more efficient way, by using a variety of resources available to them (Schultz et al., 2015). For instance, mindful workers may easily cope with their job demands, because mindfulness helps them to be focused on what is happening, rather than being focused on problems and consequences beyond their control (Pirson et al., 2018). Therefore, mindful workers may be more competent at work, because they can use their job resources in a more efficient way. Autonomy and task feedback are job characteristics that are positively related to performance (e.g., Morgeson et al., 2005). So, we expect that autonomy will interact with mindfulness to increase performance. In addition, Teper and Inzlicht (2014) showed that mindfulness was related to performance feedback, as it reduced neuroaffective reactions to external feedback. So, we also expect that task feedback would interact with workers' mindfulness and predict job performance.

We therefore examine the extent to which mindfulness increases the influence of work characteristics on performance.

H1. Mindfulness will moderate the relationship between job autonomy and performance, such that as mindfulness increases, the positive effect of autonomy on performance also increases.

H2. Mindfulness will moderate the relationship between task feedback and performance, such that as mindfulness increases, the positive effect of task feedback on performance increases.

Overview of the Studies

We conducted three studies to assess aspects of validity and reliability of the Portuguese version of the LMS14. In the first study, we examined the internal consistency and the factorial validity of the scale. We also explored the scale's convergent and criterion-related validity. In the second study, we tested

the factorial structure of the scale by adopting a multigroup CFA approach. We explored the convergent, criterion and discriminant validity of the scale in greater depth by examining its correlations with other measures. The third study intended to test the moderating role that mindfulness may play on the relation between work characteristics (autonomy and task feedback) and individual performance.

STUDY 1

Method

Participants

We collected participants through our social network, namely Facebook and LinkedIn. In accordance with the research ethics code of our university, participants in this study, as well as in the other two studies, agreed with an informed consent before voluntarily participating in the study. They were asked to take part in a study about the quality of worklife. Their participation was voluntary, and their anonymity was assured. They answered an online questionnaire with measures of mindfulness, creativity, work engagement, and sociodemographic information.

Overall, 141 participants took part in this study, with 68% being female ($N = 96$). The mean age was 22.57 years ($SD = 6.16$), and the mean organizational tenure was 2.31 years ($SD = 4.01$). Most participants had a secondary degree (98%).

Measures

Sociocognitive mindfulness. Participants completed the Langer Mindfulness Scale (LMS14; Pirson et al., 2012). It includes 14 items measuring three components of sociocognitive mindfulness: novelty seeking (five items; e.g., “I am very curious”), novelty production (five items; e.g., “I try to think of new ways of doing things”), and engagement (four items; e.g., “I ‘get involved’ in almost everything I do”). Six items are reverse coded. The items are answered on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). The composite score of the scale may be calculated by obtaining the mean of all the 14 items.

Meditative mindfulness. We measured meditative mindfulness through the Mindful Attention and Awareness Scale (MAAS; Brown, & Ryan, 2003). It is a 15-item scale that evaluates the meditative notions of awareness and attention. Participants answered on a 7-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). An example of the items is: “It seems I am ‘running on automatic’ without much awareness of what I’m doing.” The internal consistency was .93.

Creativity. It was evaluated using the Innovative Work Behavior Scale (IWBS; Janssen, 2000). It is a nine-item self-report scale measuring three dimensions of innovative work behavior: idea generation (three items; e.g., “I created new ideas for difficult issues”), idea promotion (three items; e.g., “I mobilized support for innovative ideas), and idea implementation (three items; e.g., “I transformed innovative ideas into useful applications”). Cronbach α 's of the composite measure was .95.

Work Engagement. We used the short form of the Utrecht Work-Engagement Scale (Schaufeli et al., 2006). It includes nine items distributed across the three dimensions: vigor (three items; e.g., “At work, I feel strong and vigorous”), dedication (three items; e.g., “I am enthusiastic about my job”) and absorption

(three items; e.g., “I feel happy when I am working intensely”). Each item was rated on a 7-point scale ranging from 1 (*never*) to 7 (*always*). Cronbach’s α of the composite scale was .90.

Procedure

First, the English version of the scale was translated into Portuguese. This was then back translated into English. Two bilingual translators made both forward and back translations. Then, they compared the back translation to assess the consistency of the items and agreed on each sentence.

Data Analysis

The main analysis consisted of CFA with R software. We used the maximum likelihood estimator. In line with the theoretical model of the LMS14, we first tested a three-factor model (novelty seeking, novelty producing, and engagement). Then, we tested two alternative models (one- and two-factor models).

To assess the fit of the model, we used goodness-of-fit indices, such as, the chi-square (χ^2) values, the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the Akaike information criterion (AIC). Values between .90 and .94 for both the CFI and TLI indicate adequate fit, whereas values of .95 and higher indicate excellent fit (Browne, & Cudeck, 1993). Values smaller than .10 for the RMSEA indicate acceptable fit, values smaller than .08 indicate good fit, and values lower than .05 indicate excellent fit. The AIC is a measure of relative fit used to compare non-nested models. The model with the lowest AIC will provide the best fit for the data.

Results

Descriptive Statistics

Participants reported a moderate level of sociocognitive mindfulness ($M = 4.44$; $SD = 0.53$). The mindfulness dimension with the lowest mean was engagement ($M = 3.51$; $SD = 0.93$), followed by novelty producing ($M = 4.13$; $SD = 0.59$), and novelty seeking ($M = 5.50$; $SD = 0.78$). Regarding the other variables, participants reported low levels of creativity ($M = 2.93$; $SD = 0.79$) and meditative mindfulness ($M = 2.64$; $SD = 0.69$), and moderate levels of work engagement ($M = 3.52$; $SD = 0.63$).

Confirmatory Factor Analysis

The standardized factor loadings were all statistically significant with a $p < .05$ and ranged from .14 to .92 (Figure 1). First, we tested the three-factor model, as proposed by Pirson et al. (2012). Then, we tested a two-factor model (CFI = .90; TLI = .82; RMSEA = .12), comprising a factor that encompassed both novelty seeking and novelty producing, and a factor that included the engagement items. Lastly, we tested a one-factor model, in which all items loaded onto a single dimension (CFI = .69; TLI = .57; RMSEA = .18). The three-factor model was the one that best represented the data (CFI = .95; TLI = .90; RMSEA = .08). Both the one-factor model ($\Delta AIC = 281.91$, $p < .05$), and the two-factor structure ($\Delta AIC = 47.19$, $p < .05$) evidenced a poorer fit, when compared to the three-factor structure.

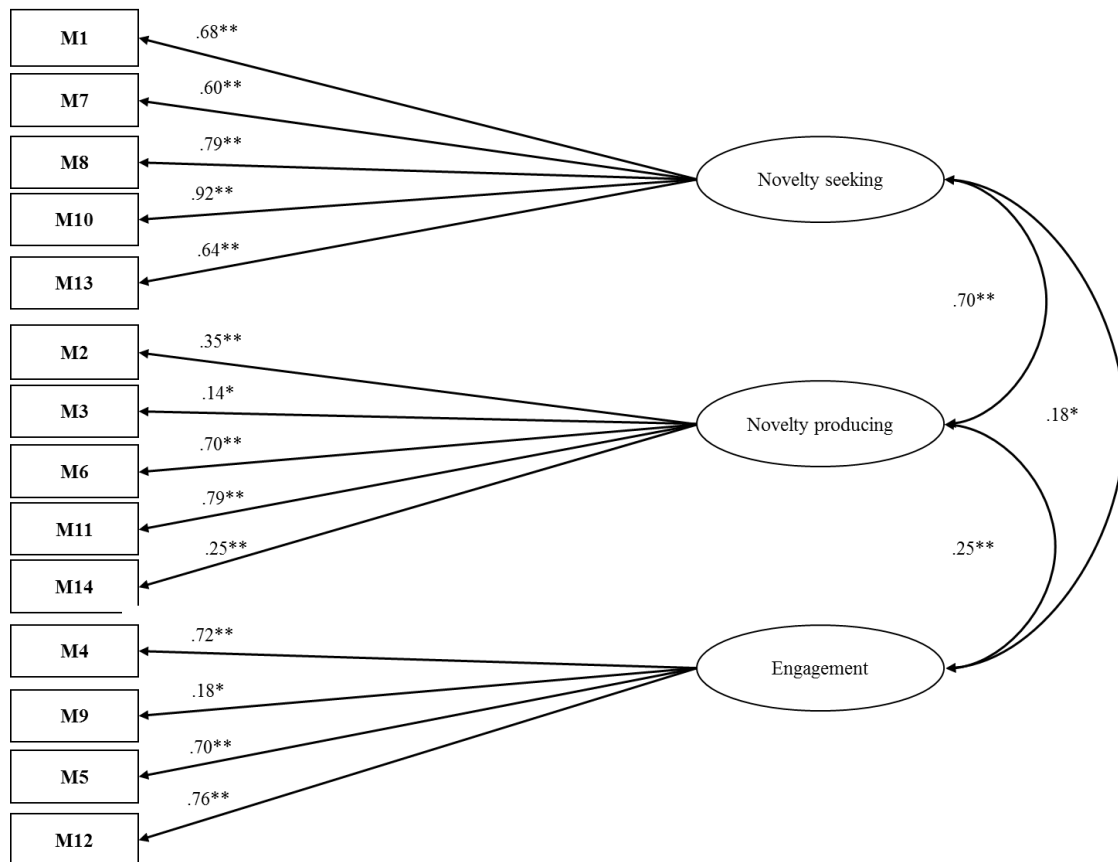


FIGURE 1
LMS14 factor structure.
** $p < 0.001$. * $p < 0.05$

Reliability Analysis

To analyze the reliability of the scale we performed both Cronbach's α and McDonald's ω . The coefficients of the three dimensions were: novelty producing: $\alpha = .70$, $\omega = .87$; novelty seeking: $\alpha = .87$, $\omega = .88$; and engagement: $\alpha = .53$, $\omega = .64$. Because this last dimension (engagement) showed a poor reliability ($\alpha = .53$ and $\omega = .64$), we excluded one item ("I avoid thought provoking conversations"), and the alpha increased significantly ($\alpha = .79$, $\omega = .80$). Moreover, the three dimensions presented significant and positive correlations between each other ($.12 > r < .51$, $p < .05$).

Convergent and Criterion-Related Validity

To analyze convergent validity, we correlated the LMS14 with a measure of meditative mindfulness (MAAS; Brown, & Ryan, 2003). The findings revealed a significant correlation between the measure of sociocognitive mindfulness and meditative mindfulness ($r = .17$, $p < .05$). This result is in line with the original study from Pirson et al. (2012).

To assess the criterion validity of the scale, we correlated it with measures of creativity and work engagement. As expected, the LMS14 showed significant correlations with creativity ($r = .32, p < .01$) and work engagement ($r = .35, p < .01$). These results supported previous findings (Pirson et al., 2012) and provided evidence for both the convergent and criterion-related validity of the scale.

Discussion

The aim of this study was to analyze the factor structure of the Portuguese version of the LMS14, and to find out whether the three-factor structure would fit the data. Despite the existence of a Portuguese version of the longer version of the LMS (21) it is a nonpublished work as it is a master thesis (Silva, 2017). Plus, it was validated with the first version of the scale, the 21-item scale. Moreover, the study presented some issues, as the factor structure had to be readjusted to the data and did not follow the original one. In addition, the study did not evidence convergent (with the Five Facets Mindfulness Questionnaire; Baer et al., 2006) or discriminant validity of the scale (with the Metacognition at Work Inventory; Braya, 2015), nor was the criterion validity (with one item regarding the need to recover from work) verified. So, from a pragmatic perspective, the present validation aims to make available a reliable Portuguese version of the LMS14 that might be used by academics and nonacademics instead of using ad-hoc adaptations as has been the case.

First, results showed a three-factor model which was also consistent with the original study, proposed by Pirson et al. (2012) and, reported by the Italian version of the scale (Pagnini et al., 2018). We also verified that the scale evidenced good reliability across the dimensions, except for engagement ($\alpha = .53$). We then excluded one item ("I avoid thought provoking conversations"), and the α increased significantly ($\alpha = .79$). In the original study, the reliability of this dimension was also the lowest one ($\alpha = .65$; Pirson et al., 2012). The same was also found in the Persian version of the scale ($\alpha = .55$; Moafian et al., 2017).

The convergent validity was analyzed by exploring its relationship with a measure of meditative mindfulness. Results supported the convergent validity of the scale, different from Siegling, Nielsen, and Petrides' study (2014) who showed that the LMS14 did not correlate with other measures of meditative mindfulness. Lastly, we tested its criterion-related validity by analyzing its relationship with measures of creativity and work engagement. We found significant associations between the mindfulness measure and both creativity and work engagement, thus supporting its criterion-related validity. Pagnini and colleagues (2019) also found that the Italian version of the LMS14 showed positive associations with diverse indicators of life quality. In addition, the Persian version of the LMS14 also evidenced a positive relationship between positive affect, physical and psychological health and environmental health.

Despite being significant, the dimension engagement showed weak correlations with these measures. Thus, in the second study we tested the criterion-related validity of the scale by relating it to other measures. We also analyzed whether the three-factor model is invariant across two independent samples.

STUDY 2

In this study, we analyzed the fit of the three-factor model in two additional samples to test the stability of the model. Plus, we explored the scale's convergent, discriminant, and criterion-related validity and, therefore, analyzed the relationships between the LMS14 and measures of well-being and affect.

Method

The data were obtained through two samples, collected at different times and locations. The participants were full-time employees ($N = 322$), of whom 59% ($N = 196$) were female. After being fully informed regarding the aim of the study, its confidentiality and anonymity, all participants then decided whether to participate on a voluntary basis. Moreover, informed consent was obtained, prior to beginning the study. The survey was answered on the Qualtrics suite.

Participants and Procedure

Sample I ($N = 139$) was randomly extracted from a national pool of twenty thousand employees, aged between 20 and 60 years old, all from the coast side of the country. Of the overall sample, 49% were female ($N = 68$). The mean age was 40 years ($SD = 11.74$), the mean organizational tenure was 12.14 years ($SD = 9.54$).

Sample II ($N = 191$) included participants gathered from social networks, such as Facebook, LinkedIn, Twitter, and ResearchGate. These participants were from inland of the country, and 67% were female ($N = 128$). Their ages ranged from 21 to 72 years ($M = 39.18$; $SD = 10.60$). The mean organizational tenure was 10.61 years ($SD = 9.79$). Most participants (42%) work, on average, 35 to 40 hours per week.

Participants completed a structured and anonymous questionnaire assessing mindfulness, well-being, and affective states.

Measures

Mindfulness. We used the LMS14 applied in Study 1.

Life satisfaction. We used the Satisfaction with Life Scale (SWLS; Diener et al., 1985). It includes five items measuring the degree to which an individual is satisfied with his/her life. One item example is “in most ways, my life is close to my ideal”. Participants answered on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*). Cronbach’s α ranged between .83 and .88.

Happiness. We used the Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999). It encompasses four items to assess an individual’s global happiness. Two of the items ask individuals to characterize themselves using absolute ratings and ratings relative to peers, and the other two describe happy and unhappy people and ask individuals the extent to which each characterization describes them. Cronbach’s α ranged between .77 and .82.

Affect. We used the Positive and Negative Affect Scale (PANAS; Watson et al., 1988). This is a 20-item scale divided into two subscales, in which 10 items measure positive affect and the other 10 assess negative affect. The positive affect subscale measures the degree to which individuals experience positive affective states (e.g., interested) and the negative affect subscale measures the degree to which individuals experience negative affective states (e.g., distressed). Responses were given using a five-point scale (1 = *very slightly/not at all* to 5 = *extremely*). The items were answered in accordance with the participants’ experience of each affective state over the previous week. Both subscales showed good internal reliability (α ranged between .88 and .90).

Autonomy, environmental mastery and positive relations with others were measured through the Scales of Psychological Well-being (Ryff, 1989). Each dimension contains nine items with responses on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). Examples of the items are: “I am quite good at managing the many responsibilities of my daily life” (environmental mastery); “People would describe me as a giving person, willing to share my time with others” (positive relations with others), and “My decisions are not usually influenced by what everyone else is doing” (autonomy). Alpha ranged between .62 and .77.

Data Analysis

The main analysis comprised CFA, and a multigroup confirmatory factor analysis (MCFA) using *R*. We also used the maximum likelihood estimator. First, we tested the models separately for each sample, and then we performed a CFA. In line with the theoretical model of the LMS14, we first tested a three-factor model (novelty seeking, novelty producing, and engagement). Then, we tested two alternative models (one- and two-factor models).

To assess the fit of the model, we used the same goodness-of-fit indices applied in Study 1, namely, the chi-square (χ^2) values, the comparative fit index (CFI), the Tucker-Lewis Index (TLI), the root mean square error of approximation (RMSEA), and the Akaike information criterion (AIC).

Then, we used a MCFA to test the structural invariance of the scale across both samples. Lastly, we computed internal consistencies (Cronbach's α) and descriptive analysis, through SPSS and we tested convergent validity with measures of happiness, well-being, and affect.

Results

Descriptive Analysis

The mean value of mindfulness ranged between 5.23 (Sample I) and 5.17 for Sample II ($SD = 0.74$, and 0.75 , respectively). The factor with higher mean values was novelty seeking ($M = 5.85$, for Sample I, and 5.90 for Sample II). For Sample I, novelty producing was the factor with the lowest mean ($M = 4.78$; $SD = 1.03$), whereas, for Sample II, the lowest mean value was for engagement ($M = 4.68$; $SD = 1.14$).

The internal consistency of the three dimensions was acceptable. The reliability coefficients, for Sample I, were: novelty seeking, $\omega = .88$ and $\alpha = .89$; novelty producing, $\omega = .70$ and $\alpha = .70$; and engagement, $\omega = .63$ and $\alpha = .62$. In Sample II, the reliability coefficients were: novelty seeking, $\omega = .71$ and $\alpha = .71$; novelty producing, $\omega = .77$ and $\alpha = .76$; and engagement, $\omega = .68$ and $\alpha = .65$.

Confirmatory Factor Analysis

As we can see in Figure 2, all the items loaded onto the expected dimension. Factor loadings ranged between .23 to .85, in Sample I, and from .19 to .71 in Sample II, with a $p < .05$.

We tested a two-factor model, comprising a factor that encompassed both novelty seeking and novelty producing, and a factor that included the engagement items. In addition, we tested a one-factor

model, where all items loaded onto the same dimension. Both the one- and the two-factor model evidenced a poorer fit than the three-factor structure in both samples. Therefore, the three-factor-model was the one that best represented the data (CFI = .97; TLI = .95; RMSEA = .05, for Sample I; and CFI = .96; TLI = .94; RMSEA = .05, for Sample II).

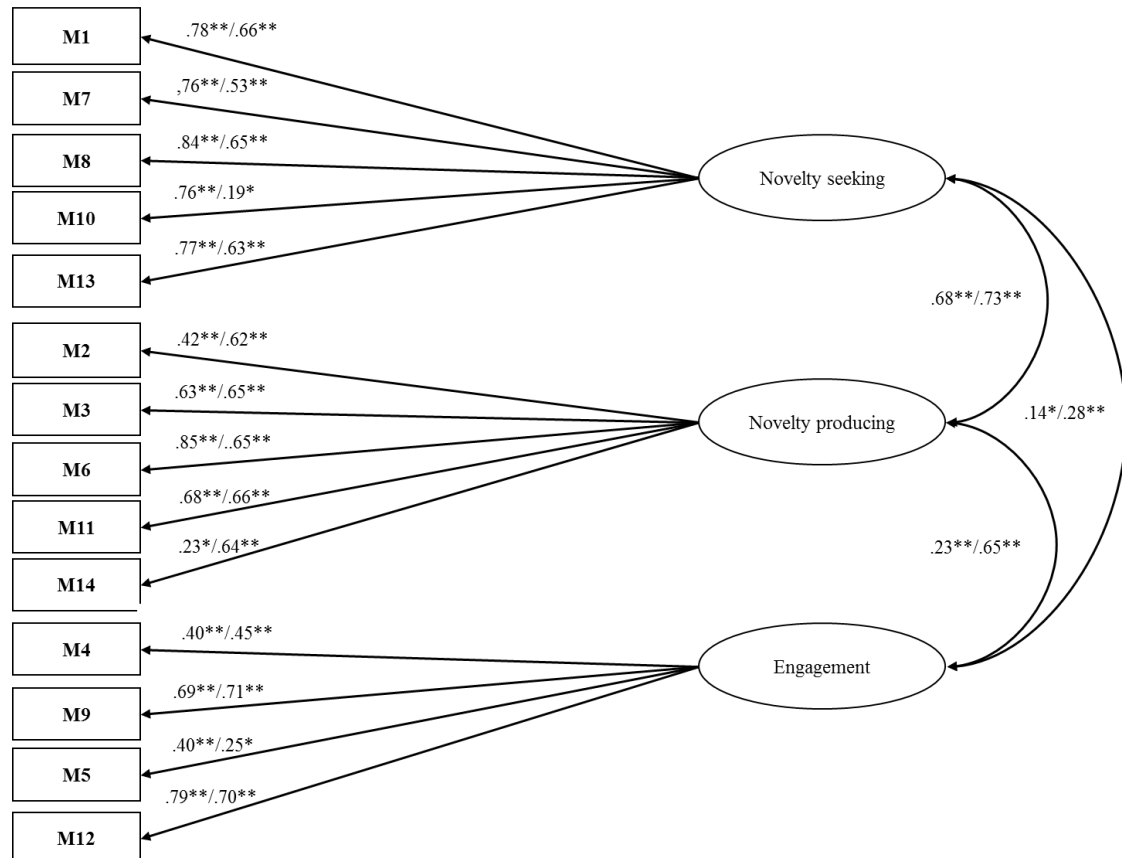


FIGURE 2
LMS14 factor structure for both samples
(first factor loadings correspond to Sample I, and the second factor loadings correspond to Sample II).
** $p < .001$. * $p < .05$.

The multigroup analysis tested a model of configural invariance by simultaneously evaluating the fits of the Sample I and Sample II models. The three-factor model (CFI = .98; TLI = .96; RMSEA = .03) demonstrated the best fit to the data, when compared to the two-factor model ($\Delta AIC = 204.01$, $p < .05$), and the one-factor structure ($\Delta AIC = 313.63$, $p < .05$). Overall, the three-factor model was supported.

Criterion Validity

To analyze the criterion validity of the scale, we related it to well-being constructs. As we can see, the LMS14 presented significant correlations with well-being. We found that across both samples, mindfulness presented a consistent significant correlation with life satisfaction, ($.30 > r < .36$, $p < .01$), happi-

ness ($.27 > r < .34, p < .01$), and psychological well-being ($.40 > r < .51, p < .01$). We found that mindfulness was significantly related to Ryff's dimensions of positive relations with others ($r = .30, p < .01$, for Sample I; $r = .25, p < .01$, for Sample II), autonomy ($r = .44, p < .01$, for both samples), and environmental mastery ($r = .40, p < .01$, for Sample I; $r = .23, p < .01$, for Sample II). Therefore, these results provided evidence for the criterion-related validity.

Convergent Validity

To analyze the convergent validity, we examined its relationship with positive affect (Watson et al., 1988). We found that mindfulness was significantly and positively correlated with positive affect. The correlations ranged from .41 to .60, across samples. The subscales of the LMS14 were also significantly correlated with positive affect for each sample (novelty seeking: $r = .60/.32$; novelty producing: $r = .46/.37$; and engagement: $r = .18/.33; p < .05$). These results supported the scale's convergent validity.

Discriminant Validity

The discriminant analyses focused on the relationship between mindfulness and negative affect (Watson et al., 1988). We found that mindfulness negatively correlates with negative affect at $r = -.26, p < .01$ for Sample I, and $r = -.23, p < .01$ for Sample II. The dimensions also correlated negatively with negative affect (Sample I: novelty seeking: $r = -.15$; novelty producing: $r = -.23$, and; engagement: $r = -.38$; Sample II: novelty Seeking: $r = -.18$; novelty producing: $r = -.20$, and; engagement: $r = -.17; p < .05$). These results supported the discriminant validity of the scale.

Discussion

The aim of this study was to validate the LMS14 for the Portuguese population in two samples, one including participants living on the coast side, and the other one living inland. Data obtained revealed an invariant three-factor structure, which is consistent with the original study (Pirson et al., 2012) and with the Italian version of the scale (Pagnini et al., 2018). In addition, and in line with what was found in the original version of the LMS (Pirson et al., 2012), we found that the scale, and its dimensions, shows a good internal consistency reliability. The dimension engagement demonstrated a better internal consistency than in the previous study, even with all the items that comprise the scale.

We also tested the criterion-related validity, the convergent and the discriminant validity of the scale. The criterion validity was analyzed by exploring the association between the LMS14 and other measures of well-being, such as the satisfaction with life scale, the subjective happiness scale, and the Ryff scales of psychological well-being. Overall, mindfulness was positively related to these measures, supporting the criterion validity of the scale. In addition, the scale also performed well in terms of convergent validity with positive affect, and discriminant validity with negative affect. This was also obtained in the validation of the Persian and the Italian versions of the scale (Moafian et al., 2017; Pagnini et al., 2018). In particular, the LMS14 presented strong and positive correlations to diverse health and psychological indicators, such as positive affect and psychological health.

STUDY 3

Study 3 aimed to test our two hypotheses:

H1. Mindfulness will moderate the relationship between job autonomy and performance, such that as mindfulness increases, the positive effect of autonomy on performance also increases.

H2. Mindfulness will moderate the relationship between task feedback and performance, such that as mindfulness increases, the positive effect of task feedback on performance increases.

Method

Participants and Procedure

Participants in this study were 154 workers from diverse job sectors. Most participants were female (71%, $N = 109$). The mean age was 33 years ($SD = 10.37$), the mean organizational tenure was six years ($SD = 8.12$).

Participants were invited to voluntarily participate in a study about “indicators of job performance.” If they wanted to participate, they had to send an email to one of the authors of the study. Then they received an email containing a link to the study survey including the self-report measures. In the email there was also a short explanation about the study and the assurance of their anonymity and confidentiality. The survey was designed with the Qualtrics suite. As in the other studies, before starting the survey, they signed an informed consent. Participants voluntarily and anonymously answered a questionnaire assessing “day-to-day work-related experiences”. After the data collection, we checked for missing values, and we excluded the participants who did not complete all items of the questionnaire ($N = 12$) (Johnson, 2005).

Measures

Mindfulness. We used the LMS14 (Pirson et al., 2012).

Autonomy and task feedback. We used two dimensions of the Work Design Questionnaire (WDQ; Morgeson, & Humphrey, 2006): decision-making autonomy (e.g., “The job provides me with significant autonomy in making decisions”) and feedback from the job (e.g., “The job itself provides me with information about my performance”). Each dimension comprised three items answered on a 7-point scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The two dimensions showed good internal reliability ($\alpha > .89$).

Performance. We used the In-Role Performance Scale (Abramis, 1994). It encompasses six items to assess perceived performance. An item example is “In the last week, I achieved my objectives at work.” Answers were given on a 7-point scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The measure demonstrated a good internal reliability ($\alpha = .90$).

Results

Autonomy was negatively correlated with mindfulness ($r = -.23, p < .01$) as well as task feedback ($r = -.15, p < .05$), indicating that greater autonomy and task feedback were associated with improved mindfulness. Mindfulness was negatively correlated with performance ($r = -.19, p < .05$). Autonomy and task feedback were also positively correlated with performance ($r = .48, p < .01$; $r = .51, p < .01$, respectively).

Hypothesis Testing

Hypothesis 1 proposed that mindfulness would moderate the relationship between autonomy and performance. Hypothesis 2 also proposed that mindfulness would moderate the relationship between task feedback and performance. To test both hypotheses, we utilized Hayes' (2018) PROCESS macro (Model 1).

Hypothesis 1. Regarding our first hypothesis, results showed that mindfulness moderated the relationship between autonomy and performance ($\beta = -.15, p < .01, CI\ 95\% [-.29, -.01]$). When examining the interaction (Figure 3), performance of individuals with high levels of mindfulness were more strongly impacted by autonomy than individuals with low levels of mindfulness.

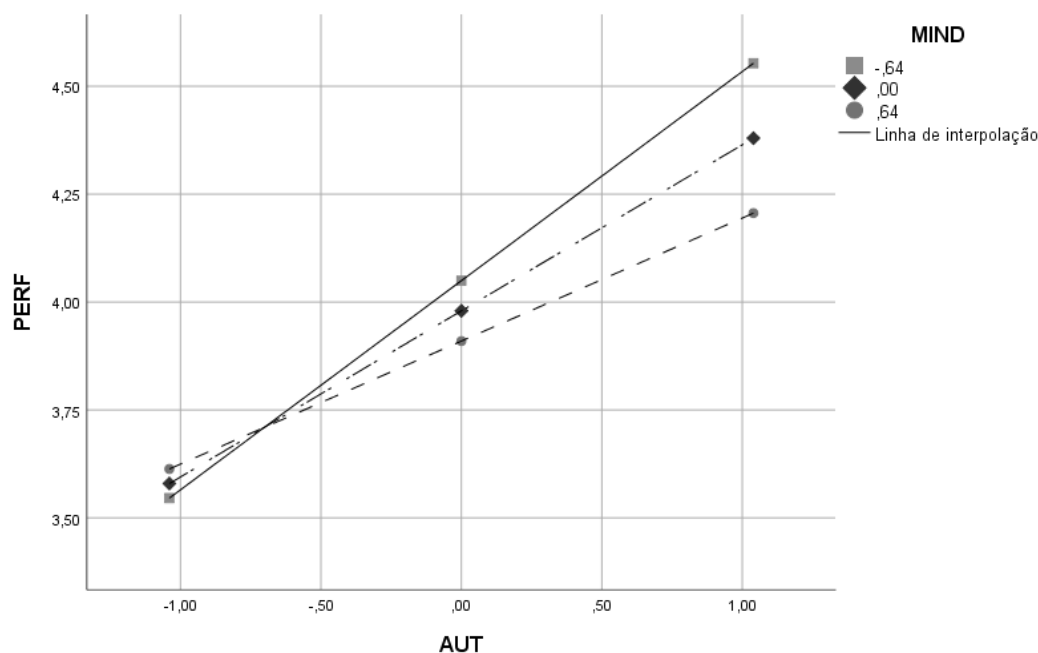


FIGURE 3

The moderating role of mindfulness in the relationship between autonomy and performance.

Hypothesis 2. When analyzing the second hypothesis, results demonstrated that mindfulness also moderated the link between task feedback and performance ($\beta = -.29, p < .01, CI\ 95\% [-.48, -.09]$). An inspection of the interaction showed that the performance of mindful workers was more strongly affected by task feedback, when compared to less mindful workers (Figure 4).

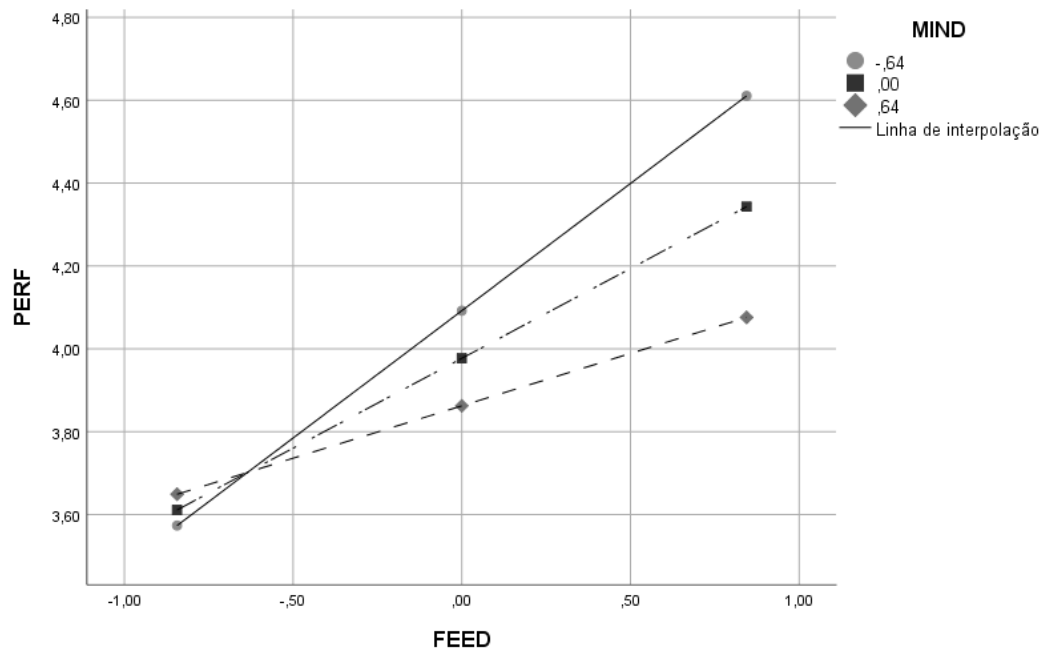


FIGURE 4
The moderating role of mindfulness in the relationship between task feedback and performance.

Discussion

Mindfulness has been related to improved mental health and quality of life outcomes. The aim of this study was to analyze the moderating role that mindfulness could have on the relation between two work characteristics (autonomy, task feedback) and performance.

First of all, mindfulness appears to be a useful trait for individual performance. This is consistent with diverse studies showing that mindfulness has significant impact on individual performance (Van Gordon et al., 2014). Additionally, mindfulness appears to interact with important job characteristics and, as a consequence, affects performance. Specifically, mindfulness significantly interacts with autonomy and predicts performance. Performance increases as the level of autonomy and mindfulness also increases. That is, when autonomy is higher, mindful workers make the most of it, and therefore, their performance significantly increases. The same happens to task feedback. That is, mindfulness interacts with task feedback and influences performance. Performance is higher when task feedback is higher, and when workers are more mindful. When mindfulness is high, workers can easily accept performance feedback and seize the opportunity to improve their performance. We believe that this may happen due to the nonjudgmental and acceptance characteristics of mindful workers (Pirson et al., 2018).

GENERAL DISCUSSION

The first two studies aimed to analyze the factor structure of the Portuguese version of the LMS14, and the third study aimed to analyze the role that mindfulness plays between job characteristics and performance.

The LMS14 was designed to evaluate sociocognitive mindfulness, that is, a flexible cognitive state resulting from drawing novel distinctions about experiences and situations (Carson, & Langer, 2006). This conceptualization of mindfulness differs from the meditative one, which emphasizes the degree of consciousness in present experiences, and the practice of meditation to reduce stress (Baer, 2015). Results supported the proposed three-factor model of the LMS14 (Pirson et al., 2012). Diverse structural equation models in three independent samples supported the three-factor model of Langer's theoretical conceptualization of mindfulness. Thus, novelty seeking, novelty producing, and engagement are dimensions of the sociocognitive mindfulness construct. Moreover, this three-factor structure was invariant across the three samples. This is consistent with the Italian version of the scale (Pagnini et al., 2018) and demonstrates that the construct of Langerian mindfulness, developed in the United States context, may have similar components in the Portuguese and in the Italian settings, supporting, therefore, the intercultural validity of the construct.

In addition, both studies provided support for the convergent validity of the scale. Mindfulness was positively correlated with meditative mindfulness (Study 1) and positive affect (Study 2). The three dimensions showed positive and significant correlations with the general measure of meditative mindfulness. This result is contradictory to Siegling et al.'s (2014) results. They analyzed the convergent validity of diverse measures of mindfulness and showed that the LMS14 was not significantly related to the Brown and Ryan measure of meditative mindfulness. They, however, analyzed data from students, and we used only samples of working people.

We also analyzed the relation between mindfulness and positive affect because recent studies have demonstrated that mindfulness predicts affective responses to situations (Brown, & Ryan, 2003), in which higher levels of mindfulness increase the tendency to experience positive affect. Likewise, our results demonstrated a positive and significant correlation. This result is in line with the original study (Pirson et al., 2012) and with the Persian version of the scale (Moafian et al., 2017), which demonstrated the existence of significant and positive associations with other measures of mindfulness and positive affect. Therefore, these relations support the evidence of convergent validity of the scale.

Moreover, these studies offered evidence for the criterion-related validity of the scale. In the first study, we tested the criterion validity by examining the relationships between the mindfulness scale and measures of creativity and work engagement. We opted for creativity because sociocognitive mindfulness may positively influence the act of generating and promoting new ideas, as it is viewed as a capacity to produce novel distinctions about situations (Carson, & Langer, 2006). Our results lent support to this idea by demonstrating positive and significant associations between mindfulness and creativity. This is also in line with what was demonstrated in the validation of the LMS14 for the German population (Haller, 2015).

In addition, we analyzed the link between mindfulness and work engagement. Our results supported a positive and significant link between mindfulness and work engagement. In the second study, we followed Pirson et al. (2012), and we analyzed the relationship of mindfulness with other measures of well-being (life satisfaction, happiness, and psychological well-being). Mindfulness was positively and significantly related to these measures. High levels of mindfulness tend to lead to higher levels of subjective and psychological well-being. These results are in line with the original study and also with the Italian version of the scale (Pagnini et al., 2018) and provide evidence of the criterion-related validity of the scale.

We also tested the discriminant validity of the scale by relating it to negative affect. As expected, the scale presented a negative and significant relationship with negative affect, which is consistent with previous studies suggesting that high levels of mindfulness tend to reduce levels of negative affect and stress (e.g., Gu et al., 2015).

We also verified, across both studies, that the scale shows good internal consistency reliability. Overall, the LMS14 is an adequate measure of sociocognitive mindfulness. Plus, it is an important predictor of performance (Van Gordon et al., 2014) and it interacts with autonomy and task feedback to predict performance. Being in a nonjudgmental position to what happens and being acceptant may be the reason why mindful workers make the most of their autonomy, and task feedback, and take the opportunity to increase their performance.

Promoting mindfulness at work is, therefore, something that can be valuable, not only for individuals, but also for organizations. Future studies should be directed at examining the relationship of the scale with other measures of well-being (e.g., humor and job satisfaction), and job crafting.

The aims of these studies were met, as our results demonstrate that the Portuguese version of the LMS14 has psychometric properties similar to those found in the original study (Pirson et al., 2012), and demonstrated good reliability, an invariant three-factor structure, convergent, discriminant, and criterion-related validity.

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