ORIGINAL ARTICLE

Portuguese validation of the Cognitive and Affective Mindfulness Scale-Revised and the Philadelphia Mindfulness Scale

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Abstract

Objectives: The purpose of this study was the validation of two instruments: Cognitive and Affective Mindfulness Scale-Revised (CAMS-R) and the Philadelphia Mindfulness Scale (PHLMS) in a non-clinical Portuguese sample.

Methods: Participants were 168 undergraduates (123 women), aged 18–50 years old ($M = 22$; $SD = 5.94$). Participants answered the following instruments: Cognitive and Affective Mindfulness Scale-Revised (CAMS-R); Philadelphia Mindfulness Scale (PHLMS); Portuguese version of the Toronto Alexithymia Scale; and Separation/Individuation Process Inventory.

Results: The factorial analysis for the CAMS-R yielded a 9-items one factor with adequate internal consistency (.76). For PHLMS, the results showed a clear two-factor structure with exactly the same structure as the original version, and with adequate internal consistencies: awareness (.77) and acceptance (.85). The quality of mindfulness (CAMS-R) was positively correlated with awareness and acceptance (PHLMS), and negatively with self-differentiation (more problematic) and alexithymia.

Conclusion: Both instruments seem to present adequate psychometric properties to be used in the Portuguese population.

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Validación portuguesa de la *Cognitive and Affective Mindfulness Scale-Revised* y de la *Philadelphia Mindfulness Scale*

Resumen

Objetivos: El presente estudio evalúa la validación de dos instrumentos: la *Cognitive and Affective Mindfulness Scale-Revised* (CAMS-R) y la *Philadelphia Mindfulness Scale* (PHLMS) en una muestra portuguesa no clínica.

Métodos: Participaron 168 estudiantes (123 mujeres), con una edad de entre 18 y 50 años (*M* = 22; DE = 5,94). Los participantes respondieron a los siguientes instrumentos: CAMS-R; PHLMS; versión en portugués de la Escala de Alexitimia de Toronto, e Inventario del Proceso de Separación/Individuación.

Resultados: El análisis factorial de la CAMS-R produjo un factor de 9 artículos con una coherencia interna adecuada (0,76). Los resultados de la PHLMS mostraron una clara estructura de dos factores exactamente con la misma estructura que la versión original y con coherencias internas adecuadas: conciencia (0,77) y aceptación (0,85). La calidad de la conciencia plena o *mindfulness* (CAMS-R) se correlacionó positivamente con la conciencia y la aceptación (PHLMS), y negativamente con la autodiferenciación (más problemática) y la alexitimia.

Conclusión: Parece que ambos instrumentos presentan propiedades psicométricas adecuadas para ser utilizados en la población portuguesa.

Introduction

In the last decade, there has been a growing interest in the study of mindfulness, moving from a Buddhist approach to a psychotherapy technique (Davis & Hayes, 2011). Mindfulness can be defined as the ability to be focused and aware of the present moment, without any judgment or avoidance (Brown & Ryan, 2003; Brown, Ryan, & Creswell, 2007; Kabat-Zinn, 2005; Lykins & Baer, 2009). The practice of mindfulness has affective, interpersonal and intrapersonal benefits to the individual (Davis & Hayes, 2011). Actually, mindfulness promotes the development of emotional regulation, allowing the individual to manage the problems and worries in a healthy way, helping to cope with life contingencies with emotional balance and without distorting the experience (Davis & Hayes, 2011; Hayes & Feldman, 2004). Lykins and Baer (2009) compared mindfulness meditators with non-meditators and found that the meditators reported higher scores on mindfulness globally, and in the dimensions of observing, describing, non-judging and non-reactivity, than non-meditators. Meditators also showed lower psychological symptoms and higher psychological well-being. The practice of meditation was also associated with mindfulness in daily life, which, in turn, was associated with lower rumination and fear of emotions, and higher behavioral self-regulation. Therefore, meditators were more likely to show an adaptive functioning (Lykins & Baer, 2009).

In the same sense, several studies showed an association between mindfulness and lower levels of depression and anxiety, more clarity of feelings, cognitive flexibility and more well-being (Davis & Hayes, 2011; Hayes & Feldman, 2004). Mindfulness facets, namely ''describe'', ''act aware'', ''nonjudge and nonreact'', were negatively associated with psychological symptoms and alexithymia (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006).

Alexithymia is characterized by the difficulty in identifying and describing feelings, limited skills of imagination, as well as an external style of thinking (Taylor et al., 1991, 1997). Individuals with higher levels of alexithymia have been shown intolerance to stress, lack of skills to use emotions in order to guide their behavior, as well as lack of adaptive resources (Parker, Taylor, & Bagby, 2001). Mindfulness and alexithymia may be interpreted as opposite concepts, since mindfulness is focused on the awareness of the present thoughts and feelings without reaction or judgment while alexithymia is characterized by the inability to identify and describe feelings (Gilbert et al., 2012). In fact, lower alexithymia has been associated with the quality of mindfulness, greater acceptance and awareness (Teixeira & Pereira, 2015). Also, Dekeyser, Raes, Leijssen, Leysen, and Dewulf (2008) found that difficulties in identifying or describing feelings were associated with lower mindful dimensions, namely description, acting with awareness and non-judgmental acceptance.

Literature has also shown that alexithymia is positively associated with depression (Gilbert et al., 2012) and negatively with emotional intelligence (Parker et al., 2001) and self-differentiation (Teixeira & Pereira, 2015). In fact, like mindfulness and alexithymia, self-differentiation is an important concept related to one's psychological functioning (Kerr & Bowen, 1988; Murdock & Gore, 2004). This concept has been proposed by Bowen describes the capacity to function autonomously as an individual, being emotionally independent from the family of origin (Bowen, 1978; Kerr & Bowen, 1988). Murdock and Gore (2004) provided evidences that corroborate the Bowen's theory, since they found that self-differentiation moderated the relationship between psychological distress and psychological functioning. The finding revealed that poor differentiated individuals who experienced higher distress showed greater psychological

dysfunction, than well-differentiated individuals experiencing the same stress levels (Murdock & Gore, 2004). Poor differentiated individuals are also more likely to report anxiety regarding leaving the family of origin, lack of confidence in taking care of their own lives, as well as lower adaptation to stress (cf. Miller, Anderson, & Keala, 2004). Several studies have suggested that lower differentiation of self was associated with higher psychological distress (cf. Miller et al., 2004). The literature is scarce regarding the association between mindfulness and self-differentiation (Appel & Kim-Appel, 2010). Notwithstanding, the quality of mindfulness and acceptance has been associated with higher self-differentiation (Teixeira & Pereira, 2015).

In general, the literature has shown the benefits of mindfulness to an individuals' psychological functioning. As a result, it is important to have operational definitions of mindfulness in order to develop valid instruments to study the psychological processes associated with it (Bishop et al., 2004; Brown & Ryan, 2004). However, there is some divergences about how to measure mindfulness, since some authors suggested that it comprises only one factor – the attention and awareness to the present moment (Brown & Ryan, 2004); while others proposed that it comprises several factors, such as observation of the present moment, acceptance, non-judgment and non-reactivity (Segal, Williams, & Teasdale, 2002). Taking in consideration the different facets of the construct mindfullness, this study was focused in the validation of the instruments ''Cognitive and Affective Mindfulness Scale-Revised'' (CAMS-R) and the ''Philadelphia Mindfulness Scale'' (PHLMS), in a non-clinical Portuguese sample.

Materials and methods

Participants

The sample included 168 undergraduates from a Northern Portugal University, 123 were women, aged between 18 and 50 years old ($M = 22$, $SD = 5.94$). This study used a cross-sectional design. Participation was voluntary and the students were enrolled in several courses such as psychology, literature, business, management, sociology, biochemistry, and communication sciences. Students were invited to participate through a flyer, on campus and contact the researcher if interested.

After the approval of the institutional board of the university, students were asked to fill a set of four instruments, assessing the constructs of mindfulness, self-differentiation, and alexithymia. All participants signed an informed consent.

Measurements

Cognitive and Affective Mindfulness Scale–Revised (CAMS-R; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007; Teixeira & Pereira, 2015) consists of 12 items that assess everyday mindfulness, acquired through life experiences, religious practices, and therapies that do not directly teach mindfulness skills. The instrument measures the degree to which individuals experience their thoughts and feelings and does not require meditation training. Items are answered

in a 4-point Likert scale from 1 (not at all) to 4 (almost always). Higher scores indicate greater mindfulness qualities i.e. less experiential avoidance, thought suppression, rumination, worry, and overgeneralization (Feldman et al., 2007). In other studies, CAMS-R has shown acceptable levels of internal consistency with an alpha of .81 (Greeson et al., 2011) and .77 (Feldman et al., 2007). In the present study, the Cronbach alpha was .76.

The Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008; Teixeira & Pereira, 2015) is a self-report instrument of 20 items that measure two central components of mindfulness: awareness and acceptance. The items are answered in a 5-point Likert scale from 0 (never) to 4 (always). Higher scores in each subscale indicate greater present moment mindfulness capacities. In the original version, alphas for the awareness subscale were .75 and .82 for the acceptance subscale (Cardaciotto et al., 2008). In the present sample, the Cronbach alphas were .77 for the awareness subscale and .85 for acceptance subscale.

Toronto Alexithymia Scale (TAS-20; Bagby, Parker, & Taylor, 1994; Veríssimo, 2001), a self-report questionnaire of 20 items that assess three dimensions of alexithymia. The first dimension concerns the ability to identify feelings; the second is focused in the ability to communicate/describe feelings to other people; and the last deals with externally oriented thinking. Answers are given in a 5-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate greater alexithymia. In order to discriminate the presence of alexithymia, a cutoff point of 61, may be used (Bagby et al., 1994). In the present sample, the subscales showed Cronbach alphas of .82 for ''difficulty in identifying feelings'' and of .72 for ''difficulty in describing feelings''. The subscale ''externally oriented thinking'' showed an alpha of .55 and, therefore, was excluded from the statistical analysis. The alpha for the total scale was .84.

The Separation/Individuation Process Inventory (S-IPI; Christenson & Wilson, 1985; Pereira & Machado, 2007) includes 39 items that assess disturbances in the separation/individuation process. Items are answered in a 10-point Likert scale, ranging from 1 ''not at all characteristic'' to 10 ''very characteristic''. Higher scores indicate problematic or less resolved, separation–individuation processes. The Portuguese version (Pereira & Machado, 2007) includes 25 items, grouped in two main dimensions, ''What I think about me'' and ''What I think about others'' with alphas of .87 and .73 respectively. In the present sample, the alpha for the total scale was .83., and .85 for the first subscale and .56. for the second. Therefore, the last subscale was not included in the hypothesis testing.

Statistical analyses

To test the validity of the instruments, an exploratory factor analysis (principal components analysis) with varimax rotation was conducted for both the CAMS-R and the PHLMS.

In order to test the convergent validity, the relationships between mindfulness, self-differentiation, and alexithymia were analyzed with a Pearson's correlation test. To assess gender differences in the two mindfulness scales, *t*-tests were performed.

Table 1   Factor loadings for the Cognitive and Affective Mindfulness Scale-Revised.

	Factor 1
It is easy for me to concentrate on what I am doing	.73
I am able to pay close attention to one thing for a long period of time	.66
I am able to focus on the present moment	.66
I try to notice my thoughts without judging them	.61
I am able to accept the thoughts and feelings I have	.58
It's easy for me to keep track of my thoughts and feelings	.56
I am easily distracted	.49
I am preoccupied by the past	.48
I can usually describe how I feel at the moment in considerable detail	.48

Results

Construct validity of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R)

The one factor solution following the original one showed that items 2, 3, and 4 had poor loadings (.22, .25, and .25, respectively), and were therefore deleted from the scale. Without these items, the one-factor solution had an eigenvalue of 3.10, explaining 34.55% of the total variance. Factor loadings ranged from .73 for item 1 to .48 for item 5. The items and factor loadings are shown in Table 1. The final internal consistency of CAMS-R was good, showing an alpha of .76.

Construct validity of the Philadelphia Mindfulness Scale (PHLMS)

An exploratory factor analysis (principal components) revealed two factors, explaining 40.58% of total variance. Factor 1 (acceptance) included 10 items and accounted for 22.88% of the variance, while Factor 2 (awareness) included the remaining 10 items and explained 17.70% of the variance. The items were evenly spread by the two factors. The items loaded exclusively on the respective subscale, with a minimum loading of .39 (Table 2). The final internal consistency of PHLMS presented alphas of .77 for the subscale ''awareness'' and .85 for ''acceptance''.

Convergent validity

Pearson's correlation coefficients for mindfulness, self-differentiation, and alexithymia showed quality of mindfulness positively correlated with awareness ($r = .332$, $p \leq .001$) and acceptance ($r = .332$, $p \leq .001$), and negatively with self-differentiation ($r = -.339$, $p \leq .001$) and alexithymia ($r = -.553$, $p \leq .001$). Awareness did not correlate with acceptance, but correlated negatively with

Table 2   Factor loadings for the Philadelphia Mindfulness Scale.

	Factor 1	Factor 2
There are things I try not to think about	.79	
If there is something I don't want to think about, I'll try many things to get it out of my mind	.76	
I tell myself that I shouldn't have certain thoughts	.71	
There are aspects of myself I don't want to think about	.69	
When I have a bad memory, I try to distract myself to make it go away	.69	
I try to stay busy to keep thoughts or feelings from coming to mind	.68	
I wish I could control my emotions more easily	.64	
I try to put my problems out of mind	.59	
I tell myself that I shouldn't feel sad	.54	
I try to distract myself when I feel unpleasant emotions	.42	
When talking with other people, I am aware of the emotions I am experiencing		.71
Whenever my emotions change, I am conscious of them immediately		.67
I am aware of thoughts I'm having when my mood changes		.67
When someone asks how I am feeling, I can identify my emotions easily		.67
I notice changes inside my body, like my heart beating faster or my muscles getting tense		.61
I am aware of what thoughts are passing through my mind		.60
When talking with other people, I am aware of their facial and body expressions		.52
When I am startled, I notice what is going on inside my body		.51
When I walk outside, I am aware of smells or how the air feels against my face		.43
When I shower, I am aware of how the water is running over my body		.39

the S-IPI subscale ''what I think about me'' ($r = -171$, $p \leq .05$). Awareness showed a negative correlation with alexithymia ($r = -.399$, $p \leq .001$). As expected, acceptance was negatively correlated with self-differentiation ($r = -.358$, $p \leq .001$) and alexithymia ($r = -.509$, $p \leq .001$), and the latter was positively correlated with self differentiation ($r = .396$, $p \leq .001$).

Differences according to gender

Differences were found in males that scored higher than females on acceptance subscale from PHLMS [$t(166) = 3.06$,

$p < .01$]. However, these results must be carefully interpreted, as the male sample in this study was considerably smaller compared to women. Considering the cutoff point for alexithymia, an interaction between gender and alexithymia was not found [$\chi^2(1) = 1.010$, $p = .315$].

Discussion

Regarding the CAMS-R, the exploratory factor analysis did not yield the expected results, since the initial solution produced four factors (with multiple cross-loadings). When, forcing a single-factor solution, three items showed loadings below .30, and were excluded. The 9-item CAMS-R showed adequate internal consistency (.76). From these findings, further studies with larger samples using this scale are needed to support this 9-item version. The same procedure was performed for PHLMS. A clear two-factor structure was found in the sample, with exactly the same factor structure as the original version, and with adequate internal consistencies: awareness (.77) and acceptance (.85). This equal distribution of items was also found in the Brazilian version of the PHLMS (Silveira, Castro, & Gomes, 2012).

No significant gender differences in mindfulness dimensions, with the exception of the acceptance subscale from PHLMS were found. In fact, other studies that examined gender differences in quality of mindfulness (CAMS-R) did not find significant differences (Brown & Ryan, 2003; Catak, 2012a, 2012b; Feldman et al., 2007). On the other hand, Neff (2003) has found that males reported higher levels of specifically mindfulness, than females. In this study, males showed higher levels of acceptance in mindfulness than females. Also, Baer, Smith, and Allen (2004) found similar results. Indeed, the literature has suggested that females are less likely to be mindful and are more vulnerable to the negative consequences of stress (Kelly, Tyrka, Anderson, Price, & Carpenter, 2008; Merikangas & Pollock, 2000). Taking in consideration the buffering effects of mindfulness against negative stress outcomes, future studies should examine gender differences with larger male samples.

In terms of convergent validity, significant associations between mindfulness qualities (CAMS-R) and awareness and acceptance (PHLMS), were found as expected. However, PHLMS subscales were not significantly associated, which is congruent with the findings of Cardaciotto et al. (2008), regarding the original version of the instrument, that reported that acceptance and awareness are distinct dimensions of mindfulness and, therefore, should be independently examined.

In the present study, almost all the mindfulness dimensions measured were strongly correlated with differentiation of self (total and subscales) and alexithymia (total and subscales). Nevertheless, the dimension of awareness showed weaker correlations with the total scale and subscale of self-differentiation. As expected, alexithymia was negatively associated with mindfulness dimensions and showed the strongest relationship with CAMS-R. These results were congruent with Baer's et al. (2006) study, that found negative associations between the mindfulness facets ''describe'', ''act aware'', ''nonjudge and nonreact'', and alexithymia. In fact, mindfulness characteristics–focus on the awareness of the present thoughts and feelings without reaction or judgment – were contrary to alexithymia features of difficulty in identifying and describing feelings (Gilbert et al., 2012). Other studies reported that mindfulness promoted the development of emotional regulation, allowing the individual to manage daily problems in a healthy way (Davis & Hayes, 2011; Hayes & Feldman, 2004). Therefore, it makes intuitive-sense that awareness and acceptance were negatively correlated with alexithymia. Also, Dekeyser et al. (2008) found that difficulties in identifying or describing feelings were associated with less acting with awareness and non-judgmental acceptance.

Limitations

This study has some limitations that should be addressed. First, the factor structure of the Portuguese CAMS-R is different than the original one with less three items (items 2, 3 and 4). Inconsistencies with the original version were found in other studies, as well (Neff, 2003). Therefore, future studies should replicate these findings with larger samples.

Conclusions

The results of this study provide evidence for the use of the adapted PHLMS in Portuguese adults, with 20 items grouped into two subscales–awareness and acceptance, similar to the original version. Regarding CAMS-R, the 9-item solution should be supported by future studies with larger samples. The analysis of gender differences and correlations between the mindfulness dimensions of CAMS-R, PHLMS, alexithymia and self-differentiation corroborate, the convergent validity of the scales, in a non-clinical sample.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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