



Is parental psychological flexibility a (uni) dimensional construct? A bifactor analysis of the Portuguese version of the parental acceptance questionnaire (6-PAQ)

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Abstract

This study aimed to examine the (uni) dimensionality of the Parental Acceptance Questionnaire (6-PAQ) in a sample of Portuguese parents of children within the community using a bifactor model that can test the separate contribution of the dimensions and of the general score. 390 parents of children (1–11 years) recruited online and in-person completed the assessment protocol, including the 6-PAQ and other measures. The bifactor model showed the best fit to data ($\chi^2(118) = 382.95$, $p < .001$, CFI = .95). The degree of unidimensionality (.59) and the OmegaH indexes (.81 for the general factor and $< .47$ for the dimensions) supported the strength of the general factor of parental psychological flexibility, which accounted for 87% of the reliable variance in the total score. Reliability indices showed high reliability for the general factor (.93). Although the 6-PAQ contains items assessing the Hexaflex six core-processes, the results were globally supportive of the unidimensionality of the Portuguese version of the 6-PAQ, and thus of computing its total score.

Keywords Bifactor model · Parental acceptance questionnaire · Parental psychological flexibility · Psychometric properties · Reliability · Validity

Introduction

Psychological flexibility is a broad, high-level construct, conceptualized as a key process of change in Acceptance and Commitment Therapy (ACT). It is defined as the individual's ability to contact with the present moment as a conscious human being, showing openness to internal experiences (e.g., negative thoughts, feelings, and events), while still making behavioral choices in service of the areas of life that are personally valued and important to them (Hayes et al. 2004, 2006; Rolffs et al. 2018). According to the Hexaflex model, psychological flexibility includes six intercorrelated psychological processes: Acceptance (embracement of private

experiences without attempts to change them), Defusion (recognition of thoughts as thoughts and not as a reality), Being Present (being psychologically present at each moment), Self as Context (recognition that each individual is more than the sum of their private experiences), Values (staying connected with the areas of life that are important, allowing the clarification of personally meaningful guiding principles that direct the individual's life and behaviors) and Committed Action (chosen behaviors or actions consistent with the individual's values and that move toward important aspects of life; Hayes et al. 2012; Rolffs et al. 2018).

Psychological flexibility has been positively associated with emotional wellbeing (Kashdan and Rottenberg 2010). On the other hand, psychological inflexibility has been considered a transdiagnostic process for several disorders (e.g., depression, anxiety, generalized distress; Bond et al. 2011; Hayes et al. 2006; Leahy et al. 2012; Panayiotou et al. 2014), and may be defined as a dominance of the avoidance of private negative experiences over chosen values and contingencies in guiding action (Bond et al. 2011; Rolffs et al. 2018). Although distinct, the core processes underlying psychological flexibility and inflexibility are strongly interconnected with mutual facilitative relationships (Rolffs et al. 2018), that may be context-dependent (i.e., may vary

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according to the situations and according to what is relevant to the individual; Hayes et al. 1999).

More recently, research has suggested that psychological flexibility may be an important resource not only at the individual level but also for the relationships among family members, such as parent-child relationships (Burke and Moore 2015; Williams et al. 2012). Parental psychological flexibility is defined as the individual's ability to non-judgmentally accept changes and negative thoughts and emotions (e.g., self-doubt, fear) in relation to their parenting experience, while also engaging in value-based actions that promote good parenting practices and sensitive responses to their child's needs (Brassell et al. 2016; Burke and Moore 2015). Parental psychological flexibility may be an important resource in the context of stressful parenting demands. The parents who present lower levels of parental psychological flexibility deal with their unpleasant inner experiences (e.g., negative thoughts and emotions that arise from stressful demands) by attempting to control, avoid or suppress them (Burke and Moore 2015). These control/avoidance strategies can have the paradoxical effect of heightening parent's levels of stress (Sairanen et al. 2018), which in turn may contribute to the use of more inconsistent and maladaptive parenting practices (e.g., severe discipline, inconsistent rules) (Burke and Moore 2015; Sairanen et al. 2018; Shea and Coyne 2011). Ultimately, parent's inability to be psychologically flexible in the context of parent-child interactions may hinder the children's ability to appropriately respond to environmental demands with goal-directed actions (Williams et al. 2012) and, consequently, compromise the children's adjustment (Cheron et al. 2009). The promotion of psychological flexibility in the context of parent-child relationships seems important both for the parent's and the child's adjustment. Therefore, a deeper knowledge of parental psychological flexibility is paramount to inform the design of ACT-based interventions in the parenting context and, to allow that, appropriate measures to assess this construct are needed.

Measures of Parental Psychological Flexibility

Several studies have targeted psychological flexibility in the parenting context by using general measures of psychological flexibility (e.g., the Acceptance and Action Questionnaire-II [AAQ-II]; Chong et al. 2017; Hahs et al. 2019; Shea and Coyne 2011), while others have used modified versions of general measures (AAQ-II) by adapting the item content to address parenting issues (Brassell et al. 2016). Brassell et al. (2016) performed psychometric analyses of a modified measure of parental psychological flexibility that showed construct validity as a unidimensional measure and good reliability.

Three additional measures were recently developed to assess parental psychological flexibility. First, the Parental

Acceptance and Action Questionnaire (PAAQ) was developed by Cheron et al. (2009) based on some of the items of the Acceptance and Action Questionnaire, which were modified to focus on the parenting-child interaction. The PAAQ comprises 15 items organized into two subscales: unwillingness to witness the child experiencing negative emotions (unwillingness subscale) and the parent's inability to effectively manage parental reactions to their child's affect (inaction subscale). The PAAQ showed construct validity but low internal consistency values ($\alpha < .70$) and moderate temporal stability.

Second, a group of researchers developed a questionnaire to assess parental psychological flexibility within the context of children's chronic pain (e.g., Wallace et al. 2015). The Parent Psychological Flexibility Questionnaire included 17 items organized into four dimensions (emotional acceptance, pain acceptance, pain willingness and value-based action) and showed general adequate internal reliability and convergent validity.

Finally, Burke and Moore (2015) recently developed the Parental Psychological Flexibility Questionnaire [PPFQ], a self-report measure designed to assess psychological flexibility in the context of parenting pre-adolescents and adolescents (10–18 years). The PPFQ comprises 19 items assessing three dimensions: acceptance, cognitive defusion and committed action. The PPFQ scale showed good indicators of construct and convergent validity as well as reliability. Despite important contributions to the field, these measures had limitations, either because they were completely based on general measures of psychological flexibility that do not capture the specificities of the parenting context (e.g., Brassell et al. 2016; Cheron et al. 2009) or because they did not include items assessing all of the six-core processes of psychological flexibility (e.g., Burke and Moore 2015; Cheron et al. 2009). Moreover, some of these measures targeted specific groups (e.g., parents of children with chronic pain, Wallace et al. 2015; parents of pre-adolescents/adolescents, Burke and Moore 2015), leaving a gap in the assessment of this construct among parents of younger children.

To overcome such limitations, Greene et al. (2015) developed the Parental Acceptance Questionnaire [6-PAQ] in an attempt to adequately measure the six processes of psychological flexibility in the parenting context, particularly in parents of younger children. The development of the 6-PAQ instrument comprised a series of sequential phases, including the development of an initial pool of items by a group of experts, the assessment of the items' content adequacy and face validity, and preliminary analyses of its psychometric properties to derive the final version of the questionnaire. The final version of the 6-PAQ comprises 18 items organized into six dimensions that correspond to the six core processes of the Hexaflex model applied to the parenting context (Acceptance, Defusion, Being Present, Self as Context, Values and Committed Action) that load on a higher-order construct of

Parental Psychological Flexibility. The psychometric properties of the preliminary and final versions of the 6-PAQ were tested in a sample of 176 parents of children under 12 years old and showed evidence of its construct validity through confirmatory factor analysis, supporting the six-dimensions of the scale. Items showed strong loadings on its dimensions ($> .60$) and the dimensions also loaded strongly in the higher-order construct of Parental Psychological Flexibility. Concerning internal consistency, the 6-PAQ total score showed good internal consistency ($\alpha = .88$). However, three of the six dimensions of the scale (Acceptance, Self as Context and Committed Action) showed internal consistency values below the acceptable threshold of $.70$, although this may have been influenced by the fact that Cronbach's alpha values are sensitive to the number of items in the scale (the 6-PAQ subscales are comprised of three items each). No evidence of convergent validity was provided (Greene et al. 2015). More recently, two adaptations of the 6-PAQ scale were conducted, respectively in the Korean (Kim and Park 2017) and in the Spanish (Flujas-Contreras et al. 2020) population, with both studies failing to replicate the original factorial structure of the scale. Specifically, in the Korean version of the instrument, the authors conducted a study in a sample of 197 parents of children between 3 and 12 years old and performed an exploratory factor analysis that determined a 15-item (three items were eliminated) four-factor structure (Defusion, Values, Being Present and Self-as-context) of the questionnaire, being renominated as K-4-PAQ. The Korean version of the questionnaire showed adequate reliability and convergent validity (Kim and Park 2017). In the Spanish version of the questionnaire, a study was conducted with 426 parents of children between 3 and 16 years old, and a three-factor solution (Open, Aware and Active) with 16 items obtained a better adjustment to data than the original six-factor structure and the unidimensional structure. The Spanish version of the scale also showed evidence of good internal consistency and validity in relation to other measures (Flujas-Contreras et al. 2020).

The Current Study

The present study aimed to contribute to the cross-cultural validation of the 6-PAQ scale in a different culture (Matsumoto 2003), i.e., to ascertain if the 6-PAQ scale can be meaningfully applicable and equivalent for use in different cultures (Huang and Wong 2014), such as the Portuguese culture. Cross-cultural validation may not only contribute to establish the psychometric robustness of the questionnaire, but also to allow the development of cross-cultural studies targeting the assessed construct (parental psychological flexibility). Furthermore, the increased availability of ACT-based specific measures such as the 6-PAQ in different cultural backgrounds also allow to better examine the Psychological Flexibility model from a cultural perspective (Sabucedo 2017).

The first goal of this study was to examine the factor structure of the 6-PAQ scale in a sample of Portuguese parents of children (1–11 years) from the general community, considering that the original six-factor factor structure failed to be replicated in other adaptations of the scale (Kim and Park 2017; Flujas-Contreras et al. 2020). Specifically, we aimed to test the adequacy of computing a total score of parental psychological flexibility and/or computing the 6-PAQ subscale scores. To do so, we compared the hierarchical model (proposed by Greene et al. 2015) with a bifactor model, which allows the investigation of multidimensional constructs and can separate the unique contributions of the dimensions from the effects of the general construct (Chen et al. 2006). This model approach (see Fig. 1) examines whether an instrument comprises a general factor accounting for the commonality shared by the dimensions or subscales (parental psychological flexibility) as well as multiple domain-specific factors (the six dimensions of the 6-PAQ) accounting for the unique influence of the specific dimension over and above the general factor (Chen et al. 2006; Reise et al. 2013a, b). Moreover, we examined the reliability indices of the 6-PAQ scale.

The second goal of this study was to gather some validity evidence of the 6-PAQ scale in relation to other variables (general psychological flexibility, mindful parenting, parenting stress and parenting styles). Specifically, and grounding on the existing evidence, lower levels of parental psychological flexibility were expected to be moderately associated with higher levels of parenting stress and less adaptive parenting practices (e.g., less frequent use of authoritarian style and more frequent use of an authoritarian and/or permissive style of parenting) (Burke and Moore 2015; Sairanen et al. 2018; Shea and Coyne 2011). Moreover, and although no prior studies have directly explored this relationship, lower levels of parental psychological flexibility were expected to be strongly associated with lower levels of mindful parenting, as parental psychological flexibility and mindful parenting share the acceptance and being present dimensions (i.e., the ability to pay intentional and non-judgmental attention to the child and to the parenting experience; Duncan et al. 2009). Finally, we expect that lower parental psychological flexibility may be associated with lower general psychological flexibility (Flujas-Contreras et al. 2020), although the context-dependent nature of these processes did not allow the establishment of hypotheses concerning the strength of the association.

Methods

Participants and Procedure

Inclusion criteria to participate in the study were a) being a parent of a child between the ages of 1 and 11 years old; b)

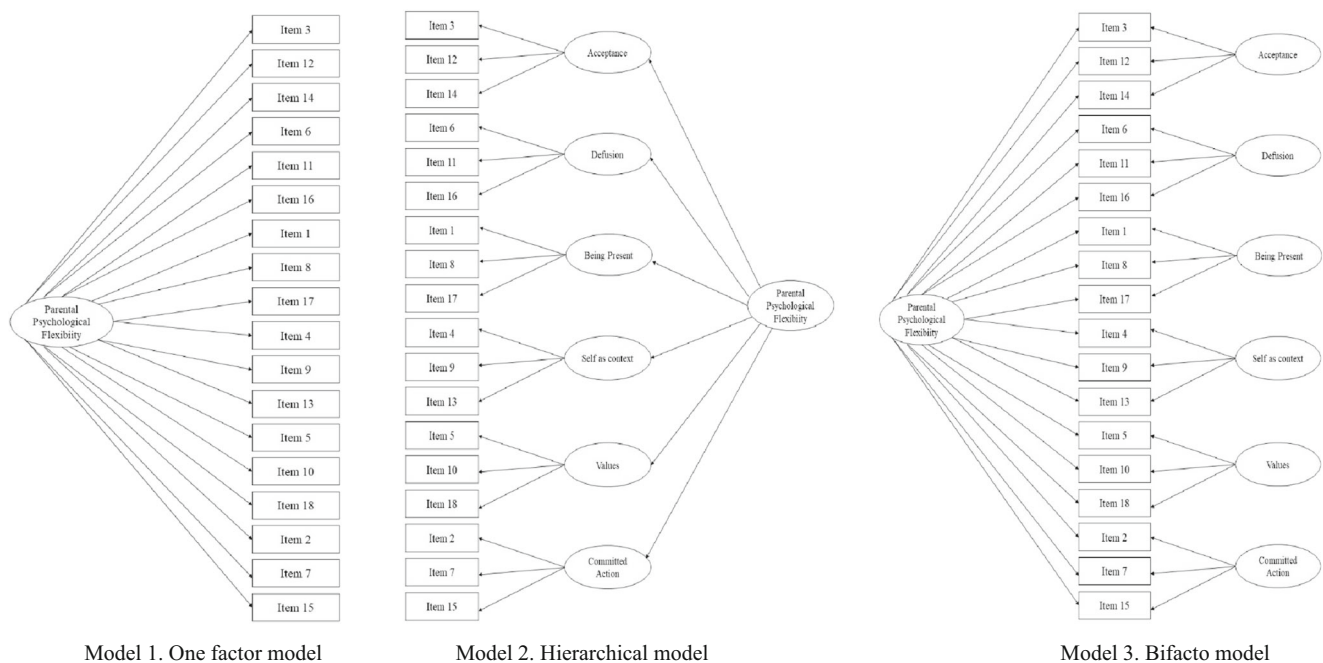


Fig. 1 Parental Acceptance Questionnaire: Bifactor model

being 18 years or older; and c) being able to read and understand Portuguese. The sample comprised 390 parents of children aged between one and 11 years. The sample was collected online ($n = 304$, 77.9%) and in one public basic education school in the central region of Portugal ($n = 86$, 22.1%). The sociodemographic characteristics of the sample are presented in Table 1. Concerning mental health, 14.1% of parents ($n = 55$) self-reported history of mental health problems (e.g., anxiety or depressive disorders) and 7.9% ($n = 31$) reported that their child had a mental problem (e.g., hyperactivity, anxiety or depressive disorder).

No significant differences in the 6-PAQ total scores were found as a function of type of recruitment (online vs. in-person). Moreover, the sample recruited online and the sample recruited in-person presented similar sociodemographic characteristics (data not shown), with exception of educational level ($\chi^2 = 31.36$, $p < .001$). Participants recruited online had a higher education level than participants recruited in-person.

Sample collection occurred between December 2017 and April 2018. Participants recruited online were invited to participate in a study about parental psychological flexibility through social networks (e.g., Facebook®). The online survey was hosted by Limesurvey®. Before starting the survey, participants received information about the study's goals and about the ethical issues underpinning the study (e.g., voluntary participation, guarantee of confidentiality and anonymity). Those who provided informed consent (by clicking on the option "I understand and accept the conditions of the study") were given access to the assessment protocol.

Concerning in-person recruitment, after authorization from the board of directors of the school, teachers from the classes

were invited to collaborate by assisting the researchers in explaining and distributing the assessment batteries to parents. Parents received, through their children, a letter explaining the study, an informed consent form, and an envelope with the assessment protocol to be completed at home and returned a week later. Research assistants collected the questionnaires at the school on a date agreed upon with the class teachers. This study was approved by the Ethics Committee of Faculty of Psychology and Educational Sciences, University of Coimbra.

Regardless of the recruitment method, parents who had more than one child were instructed to focus on one of their children (between one and 11 years old) when answering the questionnaires. Specifically, participants recruited online were instructed to think on their younger child when answering the questionnaires, while participants recruited in-person were instructed to focus on the child that has received the questionnaires at school.

Measures

Sociodemographic Form

Sociodemographic (e.g., age, marital status, number of children, educational level, professional situation, income, and residence) and child data (e.g., gender, age, frequency of school) were collected through a self-report form.

Parental Acceptance Questionnaire [6-PAQ]

The original version of the 6-PAQ comprises 18 items answered on a 4-point Likert Scale (from 1 = *Strongly*

Table 1 Sociodemographic characteristics of the sample

	Total sample (N = 390)
Sociodemographic characteristics	
Age, <i>M</i> (<i>SD</i>)	37.55 (5.47)
Sex, <i>n</i> (%)	
Male	56 (14.4)
Female	334 (85.6)
Marital status, <i>n</i> (%)	
Married/living together	335 (85.9)
Single	18 (4.6)
Divorced/Separated	35 (9.0)
Widow	2 (0.5)
Number of children	
1 child	167 (42.8)
More than 1 child	223 (57.2)
Education level, <i>n</i> (%)	
Basic education (5th–9th grade)	35 (9.0)
High school (10th–12nd grade)	114 (29.2)
Higher education	241 (61.8)
Professional status, <i>n</i> (%)	
Employed	347 (89.0)
Unemployed/Other	43 (11.0)
Monthly Income, <i>n</i> (%)	
Less than 500€	3 (0.8)
500€ - 1000€	61 (15.6)
1001–1500€	104 (26.7)
1501–2000€	100 (25.6)
2001–2500€	57 (14.6)
2501–3000€	36 (9.2)
More than 3000€	29 (7.5)
Residence, <i>n</i> (%)	
Rural	158 (40.5)
Urban	232 (59.5)
Child's characteristics	
Child's gender, <i>n</i> (%)	
Male	214 (54.9)
Female	176 (45.1)
Child's age, <i>M</i> (<i>SD</i>)	5.41 (2.73)
Child's age, <i>n</i> (%)	
Toddler (1–3 years)	120 (30.8)
Preschooler and scholar (4–11 years)	270 (69.2)
Child's frequency of school, <i>n</i> (%)	
Not in school	31 (7.9)
Kindergarten	175 (44.9)
Basic school	184 (47.2)

Disagree/Never to *4 = Strongly Agree/Almost Always*) and organized into six dimensions, each including three items: Acceptance (e.g., “I avoid taking my child to the store for fear of how they will behave”), Defusion (e.g., “If someone

criticizes my parenting, I must be a bad parent”), Being Present (e.g., “When interacting with my child, I focus on our time together”), Self as context (e.g., “I get upset if things don't go my way when I interact with my child”), Values (e.g., “I can clearly state my values related to parenting”) and Committed Action (e.g., “My parenting behaviors are based on what matters to me as a parent rather than how I feel in the moment”). The psychometric properties of the original version were previously described.

The Portuguese version of the 6-PAQ (see Appendix 1) was developed through a forward-backward translation procedure after obtaining authorization from the authors of the original version to translate the questionnaire. First, two authors of this study (AF and HM) fluent in Portuguese and English and familiar with terminology of the area covered by the questionnaire independently translated the items. The two translated versions were compared and discussed to obtain the first Portuguese version. This preliminary version was back-translated into English by another researcher in psychology who was fluent in English and who was not familiar with the questionnaire. Finally, the original and back-translated versions were compared. Translation disparities were analyzed and resolved between the translators, and one of the authors of the original version of the instrument assessed the accuracy of the back-translated version. The Portuguese version of the instrument was piloted in a sample of parents ($N = 5$), but no additional suggestions concerning clarity or comprehensibility were made.

Acceptance and Action Questionnaire-II [AAQ-II]

The Portuguese version of the AAQ-II (Pinto-Gouveia et al. 2012) was used to measure general psychological inflexibility. The AAQ-II comprises 7 items (e.g., “I'm afraid of my feelings”) answered on a 7-point Likert scale (from 1 = *Never True* to 7 = *Always True*). Higher scores are reflective of greater psychological inflexibility. The Cronbach's alpha value of the Portuguese version of the AAQ-II (.90) was indicative of an excellent estimate of internal consistency (Pinto-Gouveia et al. 2012). In the present sample, Cronbach's alpha was .93.

Interpersonal Mindfulness in Parenting Scale [IM-P]

The Portuguese version of IM-P (Moreira and Canavarro 2017) was used to assess mindful parenting (i.e., a parental approach characterized by bringing nonjudgmental, compassionate and present-centered awareness into parent-child interactions) and contains 29 items answered on a 5-point Likert scale (from 1 = *Never True* to 5 = *Always True*). The IM-P scale is organized into five dimensions: Listening with Full Attention (e.g., “I pay close attention to my child when we are spending time together”), Compassion for the Child (e.g., “I try to be understanding and patient with my child when he/she

is having a hard time”), Non-Judgmental Acceptance of Parental Functioning (e.g., “When I do something as a parent that I regret, I try to give myself a break”), Self-Regulation in Parenting (e.g., “In difficult situations with my child, I pause without immediately reacting”), and Emotional Awareness of the Child (e.g., “I can tell what my child is feeling even if he/she does not say anything”). Higher scores are indicative of higher levels of mindful parenting. The Portuguese version of the instrument showed construct validity, adequate internal consistency for the total score (.89) and correlated as expected with measures of self-compassion ($r = .53$) and parenting stress ($r = -.42$), evidencing convergent validity (Moreira and Canavaro 2017). In the current study, the Cronbach’s alpha for the total score was .89 and ranged from .60 (Emotional Awareness of the Child) to .86 (Listening with Full Attention) for the dimensions.

Parenting Stress Scale [PSS]

The Portuguese version of the PSS (Mixão et al. 2010) was used to assess the distress associated with the parental role. The scale is composed of 18 items (e.g., “Caring for my child sometimes takes more time and energy than I have to give”), answered on a 5-point Likert scale (from 1 = *Strongly Disagree* to 5 = *Strongly Agree*). Higher scores indicate higher levels of parenting stress. The Portuguese version of the PSS showed good psychometric properties, namely good internal consistency for the total score ($\alpha = .76$) and convergent validity (Mixão et al. 2010). In the current study, Cronbach’s alpha was .72.

Parenting Styles and Dimensions Questionnaire [PSDQ]

The Portuguese version of the PSDQ (Pedro et al. 2015) was used to assess parenting styles. The PSDQ comprises 32 items answered on a 5-point Likert response scale (from 1 = *Never* to 5 = *Always*). The PSDQ is organized into three dimensions of Baumrind’s typology: Authoritative (e.g., “I explain the consequences of the child’s behavior”), Authoritarian (e.g., “I use physical punishment as a way of disciplining my child”), and Permissive (e.g., “I find it difficult to discipline my child”). The Portuguese version of the instrument showed construct validity and good internal consistency levels for the Authoritative and Authoritarian style dimensions (values of .86 and .75, respectively), although reliability levels below the threshold of adequacy for the Permissive style ($\alpha = .63$; Pedro et al. 2015). In the present study, the Cronbach’s alpha values were .88 (Authoritative style), .78 (Authoritarian style) and .57 (Permissive style). Considering the non-acceptable values of internal consistency for the Permissive style, only the Authoritative and Authoritarian styles were used in the present study.

Data Analysis

Statistical analyses were performed with the Statistical Package for the Social Sciences (SPSS, version 22.0; IBM SPSS, Chicago, IL) and with the Mplus program, version 7 (Muthén and Muthén, 1998–2017). Descriptive statistics were computed for sample characterization.

Confirmatory factor analyses (CFAs) were performed to examine the best-fitting model for the 6-PAQ using the Weight Least Square Mean and Variance Adjusted (WLSMV) estimation method. Three alternative models were tested: a) the one-factor model, where all the items load on a single factor of Parental Psychological Flexibility; b) a hierarchical second-order model, as proposed in the original validation study (Greene et al. 2015), in which items are organized into six dimensions (Acceptance, Defusion, Being present, Self as context, Values and Committed Action) and in a second-order factor of Parental Psychological Flexibility; and c) a bifactor model. The bifactor model was defined as the following: a) all items loaded on a general factor (Parental Psychological Flexibility); b) each item had a nonzero loading on the factor that it was designed to measure, and zero loadings on the other factors; c) the domain-specific factors were uncorrelated with each other; and d) error terms associated with each item were uncorrelated (Chen et al. 2006; Reise et al. 2013a, b).

Goodness-of-fit indices were used to ascertain model fit: chi-square index (χ^2), Comparative Fit Index (CFI), and Root-Mean-Square Error of Approximation (RMSEA). A non-significant chi-square is indicative of good model fit. However, the chi-square is sensitive to sample size and tends to reject reasonable models if the sample is large (Van de Schoot et al. 2012). A good model fit is indicated when CFI values are $\geq .95$ (acceptable if $\text{CFI} \geq .90$) and $\text{RMSEA} < .06$ (acceptable if $< .08$) (Hu and Bentler 1999). Comparison between competing models was made based on chi-square difference tests (significant $\Delta\chi^2$) and by comparing the goodness-of-fit indices of each model (Hu and Bentler 1999; Kline 2016).

The magnitude of the factor loadings in each model was interpreted according to Tabachnick and Fidell’s (2007) guidelines (factor loadings equal to or above .32 were considered meaningful). The factor loadings of the one-factor model were compared with the factor loadings of the general factor in the bifactor model. Lower factor loadings of the general factor in the bifactor model when compared to the one-factor model indicate that the dimensions have considerable influence on the items’ variance, pointing to multidimensionality, while similar factor loadings in both models are suggestive of unidimensionality. Furthermore, the factor loadings of the domain-specific factors in the bifactor model were compared with the factor loadings of the hierarchical model. Lower factor loadings in the bifactor model indicate a

high influence of the general factor, pointing to unidimensionality (Zwaanswijk et al. 2017).

To examine the degree of unidimensionality of the total score of Parental Psychological Flexibility, the explained common variance (ECV) and the Percent of Uncontaminated Correlations (PUC) were calculated. ECV represents the percentage of common variance that can be attributed to the general factor in a bifactor model (relative strength of the general factor). It is calculated by dividing the common variance explained by a general factor by the total common variance (explained by a general and domain-specific factors). Higher ECV values indicate little common variance beyond the variance accounted for by the general factor and are suggestive of unidimensionality (Reise et al. 2013a, b; Rodriguez et al. 2016b). The PUC represents the percentage of covariance terms that only reflect variance from the general dimension (Rodriguez et al. 2016b). Higher values of PUC suggest that the parameter estimates in a unidimensional model are less likely to be biased. When ECV and PUC values are greater than .70, the common variance can be regarded as essentially unidimensional (Rodriguez et al. 2016a).

The model-based reliability indexes omega (ω) and Omega hierarchical (omegaH; (McDonald 1999) were also computed for the general and domain-specific factors. Omega is a ratio of a measure's estimated true score variance (i.e., variance due to general or domain-specific factors) to the total score variance and corresponds to internal consistency (Hancock and Mueller 2001). OmegaH is an index used to estimate the amount of systematic variance in the total (or subscale) score that can be attributable to individual differences in the general (or domain-specific) factor (Hancock and Mueller 2001; Reise et al. 2013a, b). OmegaH is a direct index of factor strength. An OmegaH value greater than .50 and, preferably, closer to .75 is suggestive of factor strength (Reise et al. 2013a, b). When OmegaH for the general factor is high (>.80), total scores can be considered essentially unidimensional (Rodriguez et al. 2016a). Relative Omega (OmegaH/Omega) was also computed to ascertain the percentage of reliable variance in the multidimensional score that is due to the general factor (for the total score) and the percentage of reliable variance in the subscale scores that is independent from the general factor.

Two additional indices – Factor Determinacy (FD) and Construct Replicability (H index) – were computed to ascertain the adequacy of the multidimensional model. FD (i.e., the correlation between factor scores and the factor) ranges from zero to one, with higher scores providing a strong indicator that observed individual differences in factor scores are indicative of true individual differences on the factor. Factor scores should be considered when FD is greater than .90. The H-index (i.e., how well a set of items represents a latent variable) is a measure of construct replicability. High H-index values

(>.80) suggest a well-defined latent variable, which is more likely to be stable across studies (Rodriguez et al. 2016a).

Pearson bivariate correlations between the 6-PAQ total and subscale scores and between the 6-PAQ scores and other variables expected to be associated with parental psychological flexibility were computed. Effect sizes for the correlation analyses were interpreted (small: $r = .10$; medium: $r = .30$; large: $r = .50$) (Cohen 1988). Fisher r -to- z transformations were computed to compare the relative strengths of the correlation coefficients. Finally, comparison analyses (independent samples t -test for the total score and multivariate analysis of variance [MANOVA] for the dimensions) were conducted to examine gender differences in the levels of Parental Psychological Flexibility.

Results

Descriptive Analyses of the Items

The mean scores of the items ranged from 1.43 (item 6) to 3.32 (item 5) and the standard deviations ranged from .574 (item 2) to .945 (item 15). Skewness (ranging from $-.441$ [item 1] to 1.554 [item 14]) and Kurtosis (ranging from $-.774$ [item 15] to 2.658 [item 6]) values showed that the items did not reveal severe violations to a normal distribution (Kline 2016).

Construct Validity: (Uni) Dimensionality of the 6-PAQ

Three models were initially tested to examine the construct validity of the 6-PAQ: the one-factor model, the hierarchical model and the bifactor model.

The unidimensional model presented a poor fit to the data ($\chi^2(135) = 859.97$, $p < .001$; CFI = .85; RMSEA = .117, 90% CI [.110, .125], $p < .001$). The hierarchical model did not present a good fit to data ($\chi^2(129) = 598.19$, $p < .001$; CFI = .90; RMSEA = .097, 90% CI [.089, .104], $p < .001$). Moreover, an inspection of the modification indices suggested that the correlation between two pairs of latent constructs (pair 1: Defusion and Self as Context; pair 2: Values and Committed Action) would significantly improve the model fit ($\chi^2(126) = 386.53$, $p < .001$; CFI = .95; RMSEA = .074, 90% CI [.066, .083], $p < .001$), suggesting particularly high correlations between those two pairs of constructs. In fact, while the correlation estimates ranged between .43 and .78 for the remaining pairs of latent constructs, they were higher than .97 for the pairs Defusion and Self as Context and Values and Committed Action. Finally, when performing the bifactor model, the model was found to be unidentified; multicollinearity is also a common cause of this problem. As suggested by Byrne (2010), one approach to address these types of multicollinearity problems is to combine the

measures as indicators of a single construct. Therefore, and as the hierarchical model suggested the high correlations between two pairs of latent constructs, items from the Values and from the Committed Action dimensions were combined into a single factor (Values & Committed Action; 6 items), and items pertaining to the dimensions Defusion and Self as Context were also combined into a single factor (Defusion & Self as Context; 6 items). Both models (the hierarchical and the bifactor) were rerun and compared.

The hierarchical four-factor model presented an acceptable fit to the data ($\chi^2(131) = 476.22$, $p < .001$, CFI = .93; RMSEA = .082, 90% CI [.074, .090], $p < .001$) and the bifactor model presented a good fit to data ($\chi^2(118) = 382.95$, $p < .001$, CFI = .95; RMSEA = .07, 90% CI [.067, .084], $p = .001$). The chi-square comparison test between the hierarchical and the bifactor model ($\Delta\chi^2(13) = 93.27$, $p < .001$) suggested that the bifactor model has a significantly better fit to data.

Table 2 presents the standardized factor loadings of the one-factor model, the hierarchical model and the bifactor model.

In the bifactor model, all the standardized item loadings were significant ($p < .001$) and ranged between .437 and .769, suggesting meaningful loadings on the general factor (Tabachnick and Fidell 2007), with the exception of item 15 (with a non-significant loading on the general factor). The factor loadings of the general factor in the bifactor model were mostly similar in magnitude to the factor loading of the one-factor model (differences ranged between .01 and .19; see Table 2). When considering the domain-specific factors, the standardized factor loadings of the Acceptance and Being Present dimensions were all significant ($p < .05$), although most of the items loaded strongly on the general factor than on the domain-specific factor. Moreover, all items of the Values & Committed Action factor had significant loadings on the domain-specific factor ($p < .001$), and four of the six items composing this dimension loaded more strongly on the domain-specific factor than in the general factor. Conversely, half of the items in the Defusion & Self as Context factor presented non-significant loadings on the domain-specific factor, suggesting that a greater part of the item variance was explained by a general factor. Globally, a relevant drop in the factor loadings' magnitude of the domain-specific factors when controlling for the general factor was found, particularly for the Defusion & Self as Context dimension. This suggests that a significant part of the shared variance of the items may be explained by the general factor of Parental Psychological Flexibility.

The index of the degree of unidimensionality (ECV) of the general factor was .59 and the PUC was .77. These results indicate that the general factor explained a relatively large proportion of the variance of the items (approximately 60% of the common variance). An ECV value below .70 is

generally suggestive of the existence of enough multidimensionality in the data to warrant modeling it (Rodriguez et al. 2016a). However, other indicators – including the pattern of factor loadings and reliability indicators – should also be considered.

Table 3 presents the correlation between the 6-PAQ subscale scores and the total score. The 6-PAQ subscale scores were largely correlated with the total score. In fact, three of the four subscales have a correlation greater than .70 with the total score, which can suggest an overlap between the subscales and the total score.

Reliability Indices for the Bifactor Model

Table 2 presents the reliability coefficients for the general factor and for the domain-specific factors. The Omega index was .93 for the general factor and ranged between .77 and .88 for the domain-specific factors, suggesting good reliability for the general factor and acceptable to good reliability for the domain-specific factors. The OmegaH for the general factor was .81, which is above the threshold of .80 from which the total scores can be considered essentially unidimensional (Rodriguez et al. 2016a). The Relative Omega suggests that the general factor accounted for 87.0% of the reliable variance in the total score, being suggestive of the strength of the general factor.

The OmegaH values for the domain-specific factors were all below the threshold of .50 and explained less than half of the variance of the subscale scores, except for the Values & Committed Action factor (accounting for 57.7% of the reliable variance in the subscale score).

Taken together and in line with the tentative benchmarks (PUC < .80, ECV > .60, OmegaH > .70) proposed by Reise et al. 2013a, b for interpreting data as essentially unidimensional, the unidimensionality indexes and the Omega reliability indexes suggest that the general factor (parental psychological flexibility) explained a relevant proportion of the common variance and that there was a great proportion of individual variance in total scores that could be attributed to differences in the general factor. Therefore, the presence of some multidimensionality did not seem to be severe enough to disqualify the interpretation of the instrument as primarily unidimensional. Congruently, acceptable values of FD were found for the general factor (see Table 2) and the H-index for the general factor (.91) was the only with a value above the threshold of .80.

Validity Evidence of the 6-PAQ Scores in Relation to Other Variables

The correlations between the 6-PAQ scores and other variables (general psychological flexibility, mindful parenting, parenting stress and parenting styles) are presented in Table 4.

Table 2 Standardized factor loadings of the one-factor, hierarchical and bifactor models

Item	One-factor	Hierarchical model				Bifactor				
	Parental Psychological Flexibility [General]	Acceptance	Defusion & Self as context	Being Present	Values & Committed Action	Parental Psychological Flexibility [General]	Acceptance	Defusion & Self as context	Being Present	Values & Committed Action
3	.472***					.461***				
		.567***					.277***			
12	.716***					.741***				
		.903***					.281***			
14	.537***					.494***				
		.640***					.817***			
4	.442***					.483***		-.039		
			.491***					.660***		
6	.595***					.563***				
			.658***					-.006		
9	.609***					.653***				
			.671***					.101		
11	.735***					.769***				
			.804***					.107*		
13	.705***					.735***				
			.769***					.227***		
16	.700***					.703***				
			.769***							
1	.570***					.578***				
				.69-5**					.19-1**	
8	.638***					.601***				
				.78-2**					.49-7***	
17	.562***					.499***				
				.68-5***					.63-7***	
2	.692***				.785***	.643***				
										.328***
5	.638***				.712***	.483***				
										.561***
7	.538***				.611***	.437***				
										.327***
10	.601***				.672***	.447***				
										.544***
15	.117*				.174**	-.009				
										.327***
18	.687***				.776***	.497***				
										.645***
					Omega	.932		.883		
							.803		.770	.821
					OmegaH	.811		.106		
							.318		.296	.474
					Relative Omega	.870		.120		
							.397		.384	.577
					Factor Determina- cy	.941		.982		
							.920		.776	.851

Lower parental psychological flexibility was significantly and moderately associated with lower general psychological flexibility and with less frequent authoritative and more

frequent authoritarian parenting styles and was largely and significantly associated with higher levels of parenting stress and lower levels of mindful parenting. In fact, the association

Table 3 6-PAQ total score and subscale scores: Descriptives and Pearson's Bivariate Correlations

	M (SD)	Range	1	2	3	4	5
1. 6-PAQ – Total score	36.63 (6.26)	22–59	–				
2. 6-PAQ – Acceptance	4.69 (1.55)	3–12	.713***	–			
3. 6-PAQ – Defusion & Self as Context	11.33 (2.93)	6–24	.858***	.532***			
4. 6-PAQ – Being Present	6.18 (1.65)	3–12	.639***	.335***		–	
5. 6-PAQ – Values & Committed Action	11.27 (2.56)	6–18	.716***	.356***	.51- 5***	.292***	–
					.37- 3***		

6-PAQ – Parental Psychological Flexibility. Higher scores are indicative of lower parental psychological flexibility

*** $p < .001$

between parental psychological flexibility and mindful parenting was significantly stronger ($p < .001$) than the remaining associations.

Finally, no significant gender differences were found in the total score of parental psychological flexibility ($t_{388} = -.105$, $p = .917$), nor in its dimensions (Pillai's Trace = .005, $F_{4,385} = 0.468$, $p = .759$).

Discussion

The results of the present study represent an important contribution to the cross-validation of the 6-PAQ in different cultures and, in a broader sense, they pave the way for the examination of the construct of parental psychological flexibility from a cultural perspective, which is particularly relevant given the well-recognized role of sociocultural variables in the parent-child relationship (e.g., Bornstein 2012).

The main goal of this study was to examine the factor structure of the 6-PAQ to provide further evidence of the

construct's (uni) dimensionality, and consequently to support the adequacy of computing the total score and/or the subscale scores. This is of importance since the 6-PAQ was developed with the aim of capturing the six-core processes of psychological flexibility applied to the parenting context (Greene et al. 2015), which was presented as an innovative contribution in comparison with other measures aiming to assess the same construct. In addition to the unidimensional and hierarchical models, we used an innovative approach, the bifactor model, which allowed us to examine whether the subscale scores provide unique information above and beyond the total score of parental psychological flexibility (Chen et al. 2006). Our results supported the bifactor model and revealed two important findings.

First, although the factorial structure of the original version of the 6-PAQ included six distinct processes, replicating the theoretical model of psychological flexibility (Hayes et al. 2006) that grounded the scale development, our study found higher multicollinearity between two pairs of latent variables (Defusion and Self as Context, and Values and Committed

Table 4 Pearson's Bivariate Correlations between 6-PAQ total score and other variables

	6-PAQ Total score
AAQ – General Psychological Flexibility	.464***
Mindful parenting – Total score	-.749***
Mindful parenting – Living with Full Attention	-.587***
Mindful parenting – Emotional Awareness of the Child	-.405***
Mindful parenting – Self-Regulation in Parenting	-.667***
Mindful parenting – Non-judgmental Acceptance of Parental Functioning	-.535***
Mindful parenting – Compassion for the Child	-.555***
Parenting Stress	.559***
Parenting style – Authoritative style	-.498***
Parenting style – Authoritarian style	.435***

6-PAQ – Parental Psychological Flexibility. Higher scores are indicative of lower parental psychological flexibility

*** $p < .001$

Action), leading to the combination of items pertaining to each pair as indicators of single constructs (Byrne 2010). In fact, although hypothesized as distinct processes, both of these pairs seem to be conceptually related. On the one hand, Defusion and Self as Context dimensions are particularly related to the role of language and verbal rules for one's behavior. These two dimensions share the same feature of targeting the way one relates to inner experiences (thoughts, feelings and bodily sensations), either by considering that these inner experiences are unquestionable truths and reasons for action or inaction (cognitive fusion) and whose content defines one's sense of self (attachment to conceptualized self) or by distancing from the literal products of language and cognitions (to see them for what they are) and by taking perspective and developing a sense of a noticing self (Hayes et al. 2006; Hayes et al. 2012). When applied to the parenting context, higher Defusion and Self as Context were found when parents recognize that their emotions and thoughts are not literally in control of their parenting-relating actions or decisions and do not define their sense of self as parents (Greene et al. 2015).

On the other hand, the Values and Committed Action dimensions are both grounded in the important concept of values (what one believes it is important in their different life domains) and the ability to pursue behaviors in service of the person's values (Hayes et al. 2012). When applied to the parenting context, this means the ability to clearly identify parenting values and to act in accordance with such values rather than to be driven by avoidance of negative thoughts and emotions (Greene et al. 2015). In fact, these two pairs of dimensions also showed the highest correlations in the original version of the 6-PAQ (correlation of .87 between Defusion and Self as Context and of .89 between Values and Committed Action), which taken together with the poor internal consistency of some of these dimensions (Self as Context and Committed Action dimensions presented internal consistency values below .70; Greene et al. 2015) may be suggestive of multicollinearity problems between these constructs in the original version of the scale.

Second, the results of our study are globally supportive of the use of a total score of parental psychological flexibility for the Portuguese version of the 6-PAQ and not of the domain-specific factor scores. In fact, when jointly considering the indices of the degree of unidimensionality (ECV and PUC) and the reliability indices (OmegaH and Relative Omega), the general factor of parental psychological flexibility seems to explain a relatively large proportion of systematic variance of the total score. This interpretation is in line with other indicators (e.g., small differences in factor loadings, reliability indices, factor determinacy and construct replicability indices) (Reise et al. 2013a, b; Rodriguez et al. 2016a), as well with the strong correlations found between the domain-specific factors and the total score of parental psychological flexibility.

Moreover, although some indicators (ECV below .70, significant loadings of some items in the domain-specific factor) may point to some multidimensionality in the data (Rodriguez et al. 2016b), these values also suggest that the existent multidimensionality is not enough to distort the unidimensional model. Congruently, the domain-specific indices (e.g., OmegaH is below .50 and H-index is below .80 for all the domain-specific factors) are also supportive of the poor strength of the domain-specific factors and therefore discourage the use of observed dimension scores. In particular, the results found for the Defusion & Self as Context dimension (accounting of only 12.0% of the reliable variance of the subscale score and showing a strong correlation with the total score) are suggestive that this dimension may have poor added value beyond the general factor of parental psychological flexibility. Of note, in the original version of the 6-PAQ, both these dimensions showed strong loadings ($< .84$) on the general factor of parental psychological flexibility (Greene et al. 2015), also pointing to some overlap between these constructs.

Concerning the scale's reliability, the model-based omega was used as an alternative and more sensitive estimate of internal consistency for the total and dimension scores (Deng and Chan 2017). The Omega indices suggested good reliability for the general factor and acceptable to good reliability for the dimensions. However, once we accounted for the general factor, the reliability (OmegaH) of the subscales dropped significantly, which is supportive of the presence of a strong general factor of parental psychological flexibility that accounts for the reliable variance in individuals' scores and therefore advises against the interpretation of the subscale scores.

Although the development of the 6-PAQ scale was grounded on a theoretical model (hexaflex model applied to the parenting context), these results support the unidimensionality of the Portuguese version of the scale. Moreover, some of our findings (e.g., multicollinearity between latent constructs) raise some important questions about the psychometric properties of the questionnaire, highlighting also some problems of the original version of the scale. These results are suggestive of the need of conducting further research to better clarify the psychometric robustness of the questionnaire and to revise the measure in order to more accurately guarantee the representation of the six core processes of parental psychological flexibility. Of note and following the recent trends in the development of measures to assess constructs based on the psychological flexibility model (Rolfes et al. 2018), it would be important to consider the interrelated but distinct nature of the processes of parental psychological flexibility and inflexibility.

On the other hand, the correlations between the total score of parental psychological flexibility and other related measures were found to occur in the hypothesized directions. In fact, and congruently with prior research, lower parental

psychological flexibility was associated with lower general psychological flexibility (Brassell et al. 2016), and with higher parenting stress (Sairanen et al. 2018). Furthermore, lower parental psychological flexibility was associated with low levels of mindful parenting and authoritative parenting and higher levels of authoritarian parenting behaviors, which is suggestive of ineffective parenting practices and congruent with prior research (Burke and Moore 2015). Although parental psychological flexibility and mindful parenting may share some similar features (e.g., non-judgmental acceptance of the parenting experiences), further studies including other measures of parental psychological flexibility are needed to ascertain the convergent validity of the 6-PAQ. Finally, and congruently with the results of Greene et al. (2015), no gender differences were found in the levels of parental psychological flexibility.

Some noteworthy limitations of the study should be mentioned. First, due to the lower proportion of male participants, invariance analyses to inspect the model adjustment for both mothers and fathers was not performed. Due to similar reasons, invariance analyses as a function of the presence of psychological problems (in the parent and/or in the child) were also not performed. Second, although the use of both recruitment methods aimed to maximize sociodemographic diversity, the sample was still mainly composed of married, highly educated and employed mothers, thus limiting the generalization of our findings. Moreover, although the 6-PAQ scores did not differ as a function of recruitment method, the samples were not similar in terms of educational level, as the participants recruited online showed higher educational levels than the participants recruited in-person. Third, the sample consisted of parents in the general community, which limits the generalization of the findings to clinical samples (e.g., parents experiencing high levels of parenting stress/distress). Fourth, due to the limited sample size, we were not able to test the measurement invariance of the scale across different groups (e.g., parents recruited online vs. in person; parents of toddlers vs. mothers of preschool and school age children). Finally, the test-retest reliability of the scale was not determined, because the assessment protocol was administered only once.

In sum, although the 6-PAQ contains items assessing all six-core processes defined within the ACT model (Greene et al. 2015), for the Portuguese version of the scale only the computation of a total score of parental psychological flexibility is currently supported and advised. Further studies with the Portuguese version of the 6-PAQ should be conducted to overcome the study's limitations, but also to clarify the (uni)dimensional structure of the scale, to ascertain its validity and reliability across different population groups, and to gather evidence that may allow the further refinement of the scale. Nevertheless, the availability of the scale for the Portuguese population will allow further research to expand the ACT model into the parenting context.

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Data Availability Data will be available upon request to the first author.

Compliance with Ethical Standards

Conflict of Interest The authors declare no conflict of interests

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The project was approved by the Ethics Committee of Faculty of Psychology and Educational Sciences, University of Coimbra.

Informed Consent Informed consent was obtained from all the individual participants that were included in the study.

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