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RESEARCH ARTICLE (ORIGINAL)

Translation and validation of the European Portuguese version of the Baby Pediatric Symptom Checklist

Tradução e validação da versão portuguesa europeia da Baby Pediatric Symptom Checklist

Traducción y validación de la versión en portugués europeo de la Baby Pediatric Symptom Checklist

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Abstract

Background: Social-emotional and behavioral problems experienced in childhood are related to developing disorders in adulthood, negatively impacting relationships with their families and peers. Early detection of these difficulties contributes to ensuring healthy child development. The Baby Pediatric Symptom Checklist (BPSC) is an easy and reliable screening tool to identify social-emotional and behavioral problems in 1–18-month-old children.
Objectives: This study aims to translate, adapt and validate the BPSC to the European Portuguese context and analyze sociodemographic differences.
Methodology: A quantitative, cross-sectional, and instrumental study was conducted on 185 Portuguese parents of 1–18-month-old children. Data were collected using a self-applied questionnaire and subject to confirmatory factor analysis.
Results: In the Portuguese version, the fit indices of the original three-factor measure presented adequate values (χ^2/df =1.83, IFI = 0.91, RMSEA = 0.07, CFI = 0.91, AIC = 147.29).
Conclusion: This Portuguese translation can be used in 1–18-month-old children in Portugal, with good diagnostic accuracy in assessing children's social-emotional adjustment.

Keywords: behavioral problems; confirmatory factor analysis; infant; psychometrics; emotional adjustment

Resumo

Enquadramento: Os problemas socio-emocionais e comportamentais das crianças estão relacionados com o desenvolvimento de transtornos na vida adulta e afetam negativamente as relações com a família e os pares. É importante detetar precocemente estes problemas para o desenvolvimento saudável da criança. A *Baby Pediatric Symptom Checklist* (BPSC) é um instrumento simples e fiável para a avaliação de crianças de 1 aos 18 meses.
Objetivos: Este estudo tem como objetivo traduzir, adaptar e validar culturalmente a versão portuguesa europeia do BPSC, e analisar as diferenças sociodemográficas.
Metodologia: Participaram 185 pais portugueses de crianças de 1 aos 18 meses através do preenchimento de um questionário, num estudo quantitativo, transversal, e instrumental, com recurso à análise fatorial confirmatória.
Resultados: Na versão portuguesa, os índices de ajuste da escala original com três fatores apresentaram valores adequados (χ^2/gl = 1,83; IFI = 0,91; RMSEA = 0,07; CFI = 0,91; AIC = 147,29).
Conclusão: Esta tradução para a língua portuguesa pode ser utilizada em crianças de 1 a 18 meses em Portugal, mantendo a sua precisão diagnóstica.

Palavras-chave: análise fatorial confirmatória; lactente; psicometria; problemas de comportamento; ajustamento emocional

Resumen

Marco contextual: Los problemas socioemocionales y de comportamiento a los que se enfrentan los niños están relacionados con el desarrollo de varios trastornos en la edad adulta y afectan negativamente sus relaciones con la familia y los compañeros. La detección temprana de estas dificultades es importante para garantizar un desarrollo infantil saludable. La Baby Pediatric Symptom Checklist (BPSC) es una herramienta fácil y fiable para la detección de problemas socioemocionales y de comportamiento en niños de 1 a 18 meses.
Objetivos: El objetivo de nuestro estudio fue traducir, adaptar y proceder a la validación cultural de la versión en portugués europeo de la BPSC y analizar las diferencias sociodemográficas.
Metodología: Se recogieron datos de 185 padres portugueses de niños de 1 a 18 meses con un cuestionario de autoinforme, en un estudio cuantitativo, transversal e instrumental, para el cual se utilizó un análisis factorial confirmatorio.
Resultados: En la versión portuguesa, los índices de ajuste de la medida original de tres factores presentaron valores adecuados (χ^2/df = 1,83, IFI = 0,91, RMSEA = 0,07, CFI = 0,91, AIC = 147,29).
Conclusión: Esta traducción al portugués puede utilizarse para niños de 1 a 18 meses en Portugal, y mantiene su precisión diagnóstica en la medición del ajuste socioemocional de los niños.

Palabras clave: análisis factorial confirmatorio; lactante; psicometría; problemas de conducta; ajuste emocional

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Introduction

Early detection of social-emotional problems in children is beneficial for their development and future well-being (Alakortes et al., 2017; Silva et al., 2019).

The Baby Pediatric Symptom Checklist (BPSC) was designed to be a simple and reliable measure that screens for social-emotional challenges in children aged 1 to 18 months. This measure was created to be both simple and useful in pediatric consultations. Alakortes et al. (2017) and Silva et al. (2019) reinforced that the multiplicity of exposure of children to these risks justifies the construction of scales to measure the contextual elements related to their social-emotional development. This is considered to be predictive measurement with the potential to anticipate exposure factors and identify developmental problems. We selected the BPSC because of its simplicity, clinical validity, and objectivity, however, because it is not adapted to the European Portuguese population, it was translated and validated. Therefore, this study aimed to translate, adapt to the Portuguese population, and analyze the psychometric properties of the European Portuguese version of the BPSC, through using a confirmatory factor analysis (CFA), and its differences between groups concerning their sociodemographic characteristics.

Background

One study involving one year old American children found that 32% of them experienced social-emotional difficulties related to their behaviors, which then interfered with their family activities (Briggs-Gowan et al., 2001). In the United States of America (USA), 35% of children aged between 18 and 22 months experience behavioral difficulties, with 26% of them showing deficits in their social-emotional competencies (Peralta-Carcelen et al., 2017). Parents' perceptions of these difficulties tend to be relatively low, with only 3.5% to 7% of them showing concern for their child's social-emotional/behavioral difficulties (Alakortes et al., 2017; Briggs-Gowan et al., 2001). In one German sample involving four-year-old children, 12.6% of them presented elevated internalizing symptoms, with 44.3% showing moderate ones (Klein et al., 2019). The prevalence of preschool-aged children with behavioral difficulties was found to be 4.8% in Denmark, 8.6% in Germany, and 8.8% in Scotland (Sim et al., 2019). In Spain, some studies have found that, in pediatric primary care consultations, 24% of mothers' concerns were about their children's behavioral difficulties (Nunes & Ayala, 2013).

The BPSC was developed in Boston, USA, and is part of a bigger project called the Survey of Wellbeing of Young Children (SWYC), which is a measurement designed for use in pediatric primary healthcare (Sheldrick et al., 2013). The SWYC is a North American survey that was constructed in 2011 and validated in 2013, which allowed parents to report on their children's development from the ages of one to 60 months old (Sheldrick et al., 2013). This is a simple and freely available questionnaire, which was recognized by the American Academy of Pediatrics for use in analyzing a child's developmental status (Perrin et al., 2016). The construction of this scale is a result of a review of other measures already available in the literature, complemented by clinical experience, and which was revised by both parents and experts in its measuring of children's development across various dimensions. One of its advantages is that it is simple to use and is open access (Moreira et al., 2019; Sheldrick et al., 2013). The BPSC has been translated into 10 languages, including Brazilian Portuguese; however, most of these reports only explain the translation process and not the validation one, except for that by the Brazilian Portuguese translation as presented by Moreira et al. (2019). There wasn't any translation or validation to the European Portuguese population.

The BPSC comprises 12 items, divided into three subscales that measure a child's 'irritability', 'inflexibility,' and 'difficulty with routines'. Each of these subscales have four sub items. The items were rated on a 3-point frequency scale, with: 0 (*not at all*), 1 (*somewhat*), and 2 (*very much*) points. The purpose of the BPSC is to identify social and emotional problems early in very young children to address and analyse these further. A sum of 3 or more on any of the three subscales indicates that a child is 'at risk' and needs further evaluation or investigation (Sheldrick et al., 2013).

The original North American version of the BPSC highlighted the suitability of this measurement in screening children between 1 and 18 months for social-emotional issues, as it has good internal reliability across all three subscales. The internal consistency reliability statistics of the original BPSC scale and the replication sample across subscales were as follows: irritability = 0.75, inflexibility = 0.83, and difficulty with routines = 0.78, and irritability = 0.64, inflexibility = 0.80, and difficulty with routines = 0.74, respectively. The final factor structure displayed an adequate fit for the root mean square error of approximation (RMSEA), Comparative Fit Index (CFI), and the Tucker-Lewis index (TLI) in the original sample (RMSEA = 0.05; CFI = 0.98, TLI = 0.97) and in the replication sample (RMSEA = 0.04, CFI = 0.97, TLI = 0.96). The final model structure and best estimates of the standardised factor loadings were higher than 0.67 (Sheldrick et al., 2013). The Brazilian translation showed a Cronbach alpha of 0.58 for irritability, 0.54 for inflexibility, and 0.57 for difficulty with routines. Despite the differences compared to the original North American scale, we note that BPSC has an acceptable measurement quality for use among the Brazilian population (Moreira et al., 2019). Rolim et al. (2019) concluded that the BPSC is a useful measurement in the realm of child development analysis, especially for social-emotional and behavioral screenings of young children, with it being an instrument that is usable in large scale studies, is reliable, is low cost, is easy to use, and has a high diagnostic precision.

Methodology

The present study is a quantitative, cross-sectional descriptive empirical study. It is also an instrumental study,

because it aims to assess the psychometric characteristics of a measure (Montero & Léon, 2007).

The BPSC is a brief social-emotional screening instrument for children aged 1–18 months, to be applied to their parents. It comprises a 12-item questionnaire divided into three subscales, with four items each, that measure children's irritability, inflexibility, and difficulty with routines, as described in the previous section. Sociodemographic characteristics were collected with a self-report questionnaire that asked for the following data: the children and parents' ages, their gender, their marital status, their work status, as well as the qualification and educational levels of the participating parents.

In total, 185 parents of children aged 1–18 months from different regions of Portugal agreed to participate in this study. The authorization to use and translate the BPSC scale was obtained directly from its authors (Sheldrick et al., 2013), as well as from the Office of Technology Development from Boston University. To obtain a preliminary Portuguese version of the scale, a forward-backward translation strategy was adopted. The original measurement was translated by one professional English-Portuguese translator and the retroversion by one native Portuguese-English translator, with minimal differences resolved by consensus. During the translation and retroversion processes, appropriate procedures (e.g., avoiding item bias or differential item functioning) were followed. The final version was then presented to a panel of five participants with the sample criteria given to them to assess for any errors or difficulties in using this instrument.

The sample was selected for convenience using the snowball method. Snowball sampling is a non-probability sampling method. Two steps were used: The first author identified potential subjects using social networks. After that the first participants were asked to recruit other people (and then ask those people to recruit). Participants were informed that they do not have to provide any other names. The first author asked the recruited participants to contact other potential respondents that they may know of. The final dataset collected consisted of a total of 185 respondents. Data collection took place online, with Google Forms, during the month of May 2020. The study was approved by the Ethics Committee of ARS Algarve I.P.. Parental informed consent was previously obtained from all the participants who had agreed to collaborate in this study. Participation was voluntary and no compensation was offered.

The data were analyzed using SPSS and AMOS software (v.20 IBM SPSS Inc. Chicago, IL.). First, a descriptive analysis of the sociodemographic variables was performed, which revealed the overall sample size, percentages, means, and standard deviations according to each type of variable. The factor structure of the Portuguese version of the BPSC was assessed using a CFA with the Maximum Likelihood (ML) method. Fit indices were then calculated, including the following analysis: chi-square/degrees of freedom (χ^2/df) with desirable values between 1 and 2. Regarding the incremental fit index (Bollen's IFI), values that exceeded 0.90 were regarded as acceptable. Furthermore, a RMSEA was used with a desirable value being set as one that is below 0.05 and which was acceptable until a value of 0.08. Additionally, Bentler's CFI was utilized with an acceptance value of 0.90 or greater (Abad et al., 2011). We also used the Akaike information criterion (AIC) to select the models with the lowest expected discrepancy between the true and hypothesized models (West et al., 2012).

The BPSC's internal structure was then analyzed using descriptive statistics, Cronbach's alpha, and Pearson's correlation values between the items and factors. Finally, an independent samples t test and Pearson's correlation analysis were conducted with the sociodemographic variables and the scale. The homogeneity of variances was analyzed using the Levene test.

Results

Regarding the sociodemographic characteristics, most of the participants were mothers (88.10%) and married (85.40%), and between 21 and 47 years of age ($M = 34.52$; $SD = 5.09$). Among the children, 46.50% were boys and 53.50% were girls aged between 1 and 18 months ($M = 10.82$; $SD = 9.07$). Regarding the educational levels of the parents, 72.40% had completed university studies, 23.80% had finished high school, and 3.80% had finished primary school. Most parents were employed (78.40%). Our first step in assessing the psychometric properties of the Portuguese version of the BPSC in the referred sample of parents was to analyse each item of the instrument as a unifactorial instrument using CFA operating with the ML method. We subsequently conducted a CFA again using the original three-factor structure proposed for this instrument. CFA was performed on the 12 items of the BPSC (Figure 1).

Figure 1

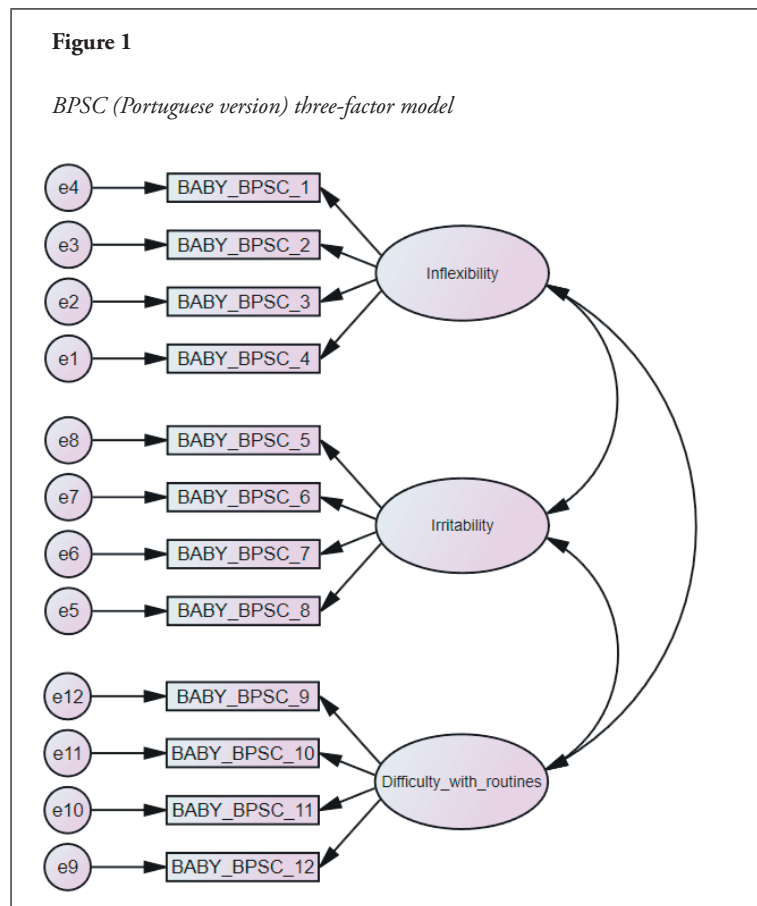*BPSC (Portuguese version) three-factor model*

Table 1 shows the CFA performed on the 12 items of the BPSC, with all standardised loadings. Despite the presence of some small values, there is not sufficient motive to modify the original scale. Thus, we considered the goodness of the Model Fit, with further details, and identified the relevance of the content of the question. No modification indices were considered to improve the measurement model.

Table 1

Standardized factor loadings of the three-factor for BPSC

	Item	Question	Loadings
Inflexibility	1	Does your child have a hard time being with new people?	0.83
	2	Does your child have a hard time in new places?	0.39
	3	Does your child have a hard time with change?	0.28
	4	Does your child mind being held by other people?	0.54
Irritability	5	Does your child cry a lot?	0.76
	6	Does your child have a hard time calming down?	0.70
	7	Is your child fussy or irritable?	0.56
	8	Is it hard to comfort your child?	0.55
Difficulty with Routines	9	Is it hard to keep your child on a schedule or routine?	0.32
	10	Is it hard to put your child to sleep?	0.67
	11	Is it hard to get enough sleep because of your child?	0.70
	12	Does your child have trouble staying asleep?	0.76

Table 2 shows the goodness of fit for the different model indices tested. The original three-factor model reveals adequate goodness compared to the one-factor model, based on appropriate goodness-of-fit indices, and shows results similar to previous recommendations. The model does not justify changes in this initial scale, with χ^2/df between 1 and 2, IFI above 0.9, RMSEA below 0.08, CFI above 0.9, and AIC improved in the three-factor model (Table 2).

Table 2

Goodness of Fit Indices for Different ML Models of BPSC

BPSC	χ^2/df	IFI	RMSEA (90% CI)	CFI	AIC
One-factor Model	30.72	0.68	0.12 (0.10 -0.14)	0.68	248.81
Three-factor Model	10.83	0.91	0.07 (0.05 -0.09)	0.91	147.29

Note. ML = maximum likelihood; χ^2/df = chi-square/degrees of freedom; *IFI* = incremental fit index; *RMSEA* = root mean square error of approximation*; CFI* = Bentler's comparative fit index*; AIC* =Akaike information criterion; *CI* = confidence interval.

About the BPSC internal structure, Pearson correlations were used to analyse the associations between scale variables. Table 3 shows the Pearson correlations between the total BPSC and its three factors. We see that the results are positively related. However, the subscale, inflexibility has a weak correlation with irritability and no relation with difficulty with routines. The correlation between irritability and difficulty with routines showed a positive good magnitude. The correlation item-total of the dimensions of the BPSC were all above the recommended value of .50. Skewness and kurtosis showed univariate and multivariate normal distributions, respectively. Most of the values for inflexibility and difficulty with routines illustrate acceptable values lower than 1. The factor irritability displays skewness and kurtosis slightly above 1 (Table 3).

Table 3

Correlations Subscales-Total

	Inflexibility	Irritability	Difficulty with Routines	BPSC Total
Inflexibility	-			
Irritability	0.21**	-		
Difficulty with Routines	0.12	0.50**	-	
BPSC_Total	0.56**	0.79**	0.80**	-
M	5.76	5.13	6.10	17.00
SD	1.33	1.42	1.75	3.28
S	0.57	1.54	0.56	0.98
K	-0.21	2.37	-0.44	0.84

Note. M = mean; *SD* = standard deviation; *S* = skewness; *K* = kurtosis; *-p < 0.05*; **-p < 0.01.

As Table 4 illustrates, the Cronbach's alpha for the total instrument and the three subscales had internal consistency. The subscales irritability and difficulty with routines show alphas above 0.70 as recommended, and the subscale inflexibility = 0.55, which is not acceptable but tolerable, despite all its values being lower than those in the original scale.

Table 4

BPSC Cronbach's Alpha, Mean Inter-Item Correlation, Corrected Item-Total Correlation Range

	N of Items	α	MIIC	CITCR
BPSC_Total	12	0.74	0.19	0.10 - 0.56
BPSC_1 Inflexibility	4	0.55	0.24	0.21 - 0.52
BPSC_2 Irritability	4	0.73	0.41	0.46 - 0.60
BPSC_3 Difficulty with routines	4	0.70	0.36	0.26 - 0.60

Note. BPSC = baby pediatric symptom checklist; α = Cronbach's alpha; *MIIC* = mean inter-item correlation; *CITCR* = corrected item-total correlation range.

In Table 5, the inter-item correlations for each factor show satisfactory values for most items. With respect to descriptive statistics, the skewness and kurtosis of most items show an acceptable range, while items 7 and 8 exhibit higher values.

Table 5

BPSC Pearson correlation matrix and descriptive statistics

	Factor 1 - Inflexibility				Factor 2 - Irritability				Factor 3 - Difficulty with routines			
Items	1	2	3	4	5	6	7	8	9	10	11	12
BPSC_1	-											
BPSC_2	0.33**	-										
BPSC_3	0.23**	0.12	-									
BPSC_4	0.45**	0.19*	0.12	-								
BPSC_5	0.13	-0.06	0.13	0.12	-							
BPSC_6	0.04	0.07	0.15*	0.14	0.52**	-						
BPSC_7	0.16*	0.01	0.21**	0.13	0.41**	0.39**	-					
BPSC_8	0.09	0.22**	0.04	0.07	0.40**	0.48**	0.29**	-				
BPSC_9	-0.00	0.08	0.01	0.00	0.27**	0.24**	0.24**	0.20**	-			
BPSC_10	-0.00	-0.05	0.06	0.01	0.42**	0.40**	0.26**	0.22**	0.32**	-		
BPSC_11	0.04	-0.08	0.14	0.19*	0.38**	0.23**	0.24**	0.10	0.18*	0.41**	-	
BPSC_12	0.10	-0.08	0.19*	0.15*	0.38**	0.24**	0.28**	0.14	0.14	0.50**	0.60**	-
M	1.42	1.18	1.49	1.67	1.51	1.29	1.20	1.13	1.25	1.54	1.77	1.55
SD	0.51	0.39	0.51	0.61	0.60	0.49	0.44	0.35	0.46	0.57	0.70	0.65
S	0.47	1.65	0.16	0.33	0.71	1.37	2.08	2.59	1.51	0.48	0.36	0.79
K	-1.47	0.72	-1.69	-0.64	-0.45	0.81	3.62	5.99	1.14	-0.74	-0.94	-0.44

Note. *M* = mean; *SD* = standard deviation; *S* = skewness; *K* = kurtosis; *-p < 0.05; **-p < 0.01.

The correlations between BPSC and parents' age show no significant association (for BPSC inflexibility, r = -0.09 and p = 0.201; for BPSC irritability, r = -0.03 and p = 0.651; for BPSC difficulty with routine, r = 0.01 and p = 0.865). Similar lack of association can be seen for the correlations between BPSC and the children's ages (for BPSC inflexibility, r = -0.06 and p = 0.413; for BPSC irritability, r = -0.03 and p = 0.730; for BPSC difficulty with routine, r = -0.03; p = 0.662). Additionally, no differences are found between marital status of the parents and their education levels. In the subscale difficulty with routines, fathers score significantly higher than mothers, and unemployed parents score higher than the others (Table 6).

Table 6

Differences between sociodemographic variables and BPSC

Parent´s gender	Male (N = 22)	Female (N = 163)	t(df)	p	d
BPSC Inflexibility	5.87 (1.55)	5.75 (1.31)	0.379 (183)	0.705	0.08
BPSC Irritability	5.14 (1.55)	5.13 (1.41)	0.023 (183)	0.981	0.01
BPSC Difficulty with Routine	6.91 (1.77)	5.99 (1.72)	2.345 (183)	0.020	0.53
Marital State	**Married (N = 158)**	**Single (N = 23)**	*t(df)*	*p*	*d*
BPSC Inflexibility	5.81 (1.30)	5.52 (1.47)	0.976 (179)	0.331	0.21
BPSC Irritability	5.07 (1.42)	5.35 (1.30)	-0.885 (179)	0.378	-0.21
BPSC Difficulty with Routine	6.03 (1.67)	6.57 (2.19)	-1.135 (25.85)	0.267	-0.28
Level of Education	**High School or less (N = 51)**	**University (N = 134)**	*t(df)*	*p*	*d*
BPSC Inflexibility	5.76 (1.39)	5.76 (1.32)	0.016 (183)	0.987	0
BPSC Irritability	5.14 (1.40)	5.13 (1.44)	0.044 (183)	0.965	0.01
BPSC Difficulty with Routine	5.96 (1.68)	6.15 (1.78)	-0.653 (183)	0.515	-0.11
Employment Situation	**Employed (N = 145)**	**Unemployed (N = 24)**	*t(df)*	*p*	*d*
BPSC Inflexibility	5.83 (1.37)	5.63 (1.17)	0.683 (167)	0.495	0.16
BPSC Irritability	5.04 (1.41)	5.50 (1.44)	-1.472 (167)	0.143	-0.32
BPSC Difficulty with Routine	6.01 (1.71)	6.96 (1.94)	-2.476 (167)	0.014	0.04
Child´s gender	**Male (N = 86)**	**Female (N = 99)**	*t(df)*	*p*	*d*
BPSC Inflexibility	5.58 (1.38)	5.92 (1.28)	-1.727 (183)	0.086	-0.26
BPSC Irritability	5.17 (1.54)	5.09 (1.33)	0.397 (183)	0.692	0.06
BPSC Difficulty with Routine	6.09 (1.72)	6.10 (1.79)	-0.031 (183)	0.975	-0.01

Note. t = t test; *df* = degrees of freedom; *p* = probability; *d* = d cohen.

Discussion

Considering the study of Sheldrick et al. (2013), we aimed to translate the 12-item BPSC into Portuguese. We performed a structural validity and internal consistency analysis of the Portuguese version of the BPSC in a given sample of parents. The CFA confirmed that the Portuguese version of the BPSC three-factor scale revealed acceptable psychometric properties without original scale modification.

The internal structure of the BPSC (Portuguese version) showed lower values than the original Sheldrick et al. (2013) scale in the inflexibility subscale, with α = 0.55, which is much lower than the α = 0.83 in the original scale. The other subscales showed similar alpha scores, presenting α = 0.73 in the irritability subscale and α = 0.73 in the difficulty with routines subscale, near the recommended minimum Cronbach's alpha of 0.70 (Nunnally & Bernstein, 1994). Despite being lower than the original, this study's scores were higher than the Brazilian version of α = 0.54, α = 0.58, and α = 0.57 in the inflexibility, irritability, and difficulty with routines subscales,

respectively (Moreira et al., 2019). Regarding the internal structure analysis, the correlation scores between the BPSC subscales revealed that children with irritability were related with difficulty with routines of the parents ($r = 0.50$). Furthermore, irritability was positively related with inflexibility ($r = 0.21$). Adequate homogeneity was present between the items, as the mean inter-item correlations fell within the recommended value range of 0.15–0.50 (Clark & Watson 1995). With respect to the corrected item-total correlation range, most of our results were above the minimum recommended value of .20 for each factor (Nunnally & Bernstein, 1994).

The differences between the BPSC subscales and sociodemographic variables revealed that fathers had greater difficulty with routines compared to mothers ($t(df) = 2.345$ (183); $p = 0.020$), as did unemployed parents ($t(df) = 2.476$ (167); $p = 0.014$). No other differences with respect to sociodemographic characteristics were observed. Sheldrick et al. (2013) in order to ensure the validity of the use of the measure in different contexts, considering parent education (high school education or less versus education beyond high school), ethnicity (Hispanic versus

not), race (white versus non-white), child gender (male versus female), child age (18 months – 3 years versus >3 years), and enrolment site (primary care versus referral clinic), however it wasn´t reported the relation between them and the BPSC.

The present study has some limitations. First, the sample was collected by a snowball method, and may not be representative of the general population, which has different sociodemographic characteristics from the Portuguese population. This study indicates the differences in the factors based on the participants' gender (as seen with mothers), and the education level of the sample, as the majority exhibits a superior level of education. Second, the size of the sample (n = 185), although enough to conduct the validity analysis of the instrument, may be relatively small for an accurate study of child behaviour for children between 1–18 months. Thus, future studies should consider a larger research sample. Third, questions about the children's behaviour may underestimate the collected information or not present a holistic view of socially desirable responses. Fourth, the cross-sectional nature of this study does not allow for the examination of temporal stability and analysis of test–retest. Last, the data were collected during a period of confinement during the coronavirus disease (COVID-19) pandemic. Since many people were in a state of lockdown at home, there is a possibility that the perception of children's behaviour has been misrepresented. The early detection of social-emotional problems in children are detected by this measure, however appropriate intervention strategy is not discussed or suggested, which could be taken in consideration in future studies. Although there are good psychometric properties of the BPSC, and the reliability analyses suit this questionnaire conducted on a sample of the Portuguese population, future studies should aim to retest the Portuguese version of the BPSC in a real primary health care consultation environment, with a larger and more heterogeneous sample.

Conclusion

Our findings support the viability of using the Portuguese version of the BPSC in Portugal, since it reveals acceptable psychometric properties. The second aim of this study was to analyse the differences between sociodemographic characteristics and the BPSC subscales. No differences were found between the groups, except with respect to the parents' gender, for which it was found that fathers and unemployed parents tend to have greater difficulty with routines with their children.

In short, the BPSC has been demonstrated to be an easy and reliable screening measure in pediatric primary healthcare in gauging the social-emotional and behavioural characteristics of children between 1–18 months. Thus, the use of the BPSC can be a predictive measure for anticipating developmental difficulties in young children, and with this study it is now suitable to be use in Portugal, which can be a huge benefit to children´s evaluation in a pediatric consultation and in future studies.

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