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Taxometric Analysis of the Reduced Brazilian Adult Attachment Scale (EBRAPEG-A)

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ABSTRACT

The literature on attachment is unclear regarding the most appropriate level of measurement for this construct. This study aimed to assess the measurement level of the EBRAPEG-A scale. As a secondary objective, the original 93-item EBRAPEG-A was reduced using data-driven methods and this new reduced version was compared to a 34-item version identified in the literature. A total of 808 Brazilians aged between 18 and 67 years, 82.4% of whom were women, participated in this study. The data-driven reduction method produced a 27-item scale, with factor scores showing a strong correlation with the 34-item version. Taxometric analysis of the 34-item version suggested a slight tendency towards a dimensional model, while the analysis of the 27-item scale was inconclusive. The study discusses how both reduced versions of the EBRAPEG-A can be used to assess the attachment construct as a dimensional variable and outlines expectations for future research.

Keywords: attachment theory; adult attachment; testing; assessment; psychometric properties.

RESUMO – Análise Taxométrica da Escala Brasileira Reduzida de Apego-Adulto (EBRAPEG-A)

A literatura sobre o apego não é clara em relação ao nível de mensuração mais apropriado para apego. Este estudo tem como objetivo avaliar o nível de medida da EBRAPEG-A. Como objetivo secundário, a versão original escala com 93 itens foi reduzida via "data-driven", essa nova versão reduzida foi comparada com outra versão de 34 itens. Participaram deste estudo 808 brasileiros com idades entre 18 e 67 anos, sendo 82,4% mulheres. O método de redução gerou uma escala reduzida com 27 itens, com escores fatoriais correlacionando fortemente com a versão de 34 itens. A análise taxométrica da versão de 34 itens mostrou uma pequena tendência para um modelo dimensional, mas para a escala de 27 itens foi inconclusiva. Discutimos como ambas as versões reduzidas da EBRAPEG-A podem ser usadas para avaliar o construto do apego como uma variável dimensional e o que esperar de estudos futuros.

Palavras-chave: teoria do apego; apego adulto; testagem; avaliação; propriedades psicométricas.

RESUMEN – Análisis Taxométrico de la Escala Reducida de Apego Adulto Brasileño (EBRAPEG-A)

La literatura sobre el apego no es clara en cuanto al nivel de medición más apropiado. Este estudio tiene como objetivo evaluar el nivel de medida de la escala EBRAPEG-A. Como objetivo secundario, la versión original de la escala con 93 ítems fue reducida utilizando métodos basados en "data-driven", y esta nueva versión reducida fue comparada con otra versión de 34 ítems. Participaron en este estudio 808 brasileños con edades entre 18 y 67 años, con un 82,4% mujeres. El método de reducción generó una escala reducida con 27 ítems, cuya puntuación factorial se correlacionó fuertemente con la versión de 34 ítems. El análisis taxométrico de la versión de 34 ítems mostró una ligera tendencia hacia un modelo dimensional, pero la escala de 27 ítems resultó inconclusa. Discutimos cómo ambas versiones reducidas de la EBRAPEG-A pueden ser utilizadas para evaluar el constructo del apego como una variable dimensional y qué esperar de futuros estudios.

Palabras clave: teoría del apego; apego adulto; pruebas; evaluación; propiedades psicométricas.

People, due to their human nature and as part of the mammal class, tend to become attached to other individuals. Attachment can be defined as a deep and lasting emotional bond that connects one person to another, and the attachment theory hypothesizes that different individuals have different ways of bonding with others (Rocha et al., 2017). In addition, attachment theories also propose that parental relationships and the negative effects of early separation of children and adolescents from their parents/caregivers have effects on how

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these individuals will behave as adults (Bowlby, 1951). Attachment therefore became the object of study as it is related to several mental health variables, including depression (Conradi et al., 2018), emotional regulation (Eloranta et al., 2017), family support, low self-esteem (Bolaños et al., 2021), and complex traumas (Karatzias et al., 2021).

Due to its impact in childhood and adulthood, this construct has become the target of interest in various contexts; from parental relationships, intimate and affective relationships, to broader social relationships such as the work environment (Cowley, 2020). With the expansion of interest about this phenomenon, there is also the need for the development of instruments and methods that can assess it (Ravitz, et al., 2010). Although there are already some scales developed to measure attachment, there is still a large gap in the literature, particularly regarding whether attachment is a dimensional or categorical measure? For a long time, this issue has remained inconclusive for various constructs and measures (Ruscio, 2014).

A categorical measure can offer advantages by explicitly classifying individuals into an attachment class, allowing operationalization and clinical interventions based on the specific category (Shi, et al., 2014). An example of this is the classification by Hazan & Shaver (1987), which has been widely disseminated. Although traditional three-factor attachment assessment methods are commonly used, they may not fully capture other variations of insecure attachment, such as preoccupied, fearful, and dismissive attachment styles. In this context, we refer to the differences between the models proposed by Hazan and Shaver and those by Griffin and Bartholomew (1994). It is important to highlight that Bowlby formulated the theory and identified possible patterns. Griffin and Bartholomew attempted to systematize Bowlby's work, while Hazan and Shaver sought to systematize the patterns identified by Mary Ainsworth for adult relationships. Consequently, there are some differences and discussions between the models (Bretherton, 1992).

However, some authors indicate a greater tendency for the dimensional measurement (e.g. Roisman et al., 2007; Van IJzendoorn & Bakermans-Kranenburg, 2014; Fernández & Dufey, 2015; Lubiewska & Van de Vijver, 2020), which makes sorting into a single attachment pattern problematic. The distinction between category and dimension is fundamental given that the level of measurement affects how scores, standards and predictive applications of the instrument would be made in the most appropriate way.

Another important issue related to attachment is that cultural variations have been found in relation to its expression (Van Ijzendoorn & Kroonenberg 1988; Keller, 2013; Behrens, & Jones-Mason 2020). This is an important fact, since the scales in Brazilian Portuguese are adaptations of scales developed in an international context (Rocha et al., 2017; Vilar et al., 2017). Therefore, Tartaro and Baptista (2021) and Tartaro (2021) identified the need to create an originally Brazilian scale, developing the Brazilian Adult Attachment Scale (Escala Brasileira de Apego-Adulto - EBRAPEG-A).

The EBRAPEG-A is a self-report instrument initially composed of 93 items divided into four factors established based on the theoretical and conceptual definitions of Griffin and Bartholomew (1994), which, by tendency, presents a dimensional understanding of attachment. The factors of this scale are: Secure, Fearful, Dismissing and Preoccupied, where the secure factor corresponds to attachment security and the other factors correspond to patterns of insecure attachment ranging from avoidance to anxiety, with Fearful representing greater avoidance; Dismissing representing an affective attitude of disdain; and Preoccupied corresponding to anxiety for acceptance and proximity (Tartaro, 2021).

There exists a reduced version of the EBRAPEG-A, with 34 items, which were selected based on factor loadings and the theoretical model (Tartaro, 2021). In contrast, data driven procedures (also known as exploratory or empirical) have been shown, in many cases, to be more appropriate to discover the real structure of psychological instruments (e.g., Golino & Epskamp, 2017). Therefore, the main objective of the present study was to test whether the attachment construct in the EBRAPEG-A scale is better represented as a categorical or dimensional variable. As a secondary objective the original 93-item EBRAPEG-A version was shortened using data-driven methods and compared to the original 34-item reduced version.

This reduction was made to enhance the efficiency of the instrument, making it quicker and easier for respondents to complete without compromising the reliability and validity of the assessment. Additionally, the shorter format facilitates its inclusion in protocols alongside other longer tests, thereby reducing the overall length of the protocols and mitigating respondent fatigue. Ultimately, this study hypothesizes that a shortened version of the instrument can be developed, maintaining robust psychometric qualities.

Method

Participants

The study included 808 Brazilians aged between 18 and 67 (M=28.8; SD=10.1) years from different regions of Brazil, with a prevalence from the Southeast region (81.0%). The sample was collected based on convenience, with inclusion criteria requiring respondents to be over 18 years old and have access to the internet or a device to complete the digital questionnaire. Concerning gender, 82.4% of respondents were women. Regarding marital status, the sample had a higher frequency of

single people (69.6%). Considering education, 53.2% reported having completed higher education, while 45.2% reported having completed high school. All data was used in all analyses and none participant was excluded at any step.

Instruments

The Brazilian Adult Attachment Scale (EBRAPEG-A; Tartaro, 2021) is a scale that was developed in Brazil and assesses the attachment construct. Initially, it was composed of 93 items, assessed with a pilot sample and evaluated by judges regarding its adequacy to the underlying theory. After applying Exploratory and Confirmatory Factor Analysis procedures (EFA and CFA, respectively), theoretical considerations guided the content and distribution of items to develop a 34-item version of the scale. These items were determined through exploratory and confirmatory factor analyses. The instrument is answered using a 4-point Likert-type scale, in which 1 is the code for "Completely Disagree" and 4 is the code for "Completely Agree".

The scale is based on John Bowlby's Attachment Theory and the separation into the 4 attachment styles proposed by Griffin and Bartholomew (1994) as its theoretical foundation, comprehending the division between the Self and Other, which denominates the perception from caregivers over the initial years of life, with the factors: Secure, Preoccupied, Fearful and Dismissing. In the original study of its internal structure (i.e., Tartaro, 2021), the scale presented internal consistency (in terms of Cronbach's α) ranging from .83 to .89 and also acceptable fit indices through EFA (RMSEA=.036; CFI=.925 and TLI=.918) and CFA (RMSEA=.065; CFI=.920 and TLI=.914).

In the present study we used a data-driven method to select, from the original 93 items, a smaller set of items. This used this procedure to use a falsifiability approach to validate the reduced scale. The reasoning for this analysis is as follows: if the data-driven method indicates that four factors are ideal and, for each factor, the same items of the 34-items version should be included, then, our factor structure is more reliable. However, if a different number of factors and a different set of items are chosen, then we can conclude that our factor structure for the reduced version of the EBRAPEG-A is not stable and the instrument has some problematic validity issue.

Procedure

Considering ethical procedures, the project was submitted to the research ethics committee, and approved under CAAE: 20056019.1.000.5514. The volunteers were invited through social networks, where they responded to the study remotely using the Google Forms platform, data collected from August 2019 to August 2020. The application of the form consisted of the presentation of the consent form followed by the application of the EBRAPEG-A.

Data analysis

To assess the dimensionality and metric property of the latent variable of the EBRAPEG-A, we used six statistical procedures, in the following order: 1. Exploratory Graph Analysis (EGA; Golino & Epskamp, 2017), EGA is a two step procedure: first, the regularized partial correlations of the items are estimated; then, a community detection clustering procedure is used to identify the number of groups of items. Therefore, EGA has as it results the number of factors to be estimated, as well as an indication of what items should be part of what factor; 2. data-driven reduction of subscales using the jackknife reduction procedure; 3. application of the EGA with the reduced scale to verify whether the structure was maintained after scale reduction; 4. Latent Class Analysis (LCA; Nylund-Gibson & Choi, 2018); 5. graded response Multidimensional Item Response Theory modeling (MIRT; Reckase, 2009); and (vi) taxometric analysis (Ruscio, 2007).

All these analyses were conducted through the R software (R Core Team, 2022), using the following packages: EGAnet (Golino et al, 2021); psych (Revelle, 2024); lavaan (Rosseel, 2012); polCA (Linzer & Lewis, 2011); and RTaxometrics (Wang & Ruscio, 2017). Exploratory Graph Analysis is a procedure based on network psychometrics used to identify the dimensionality of psychological instruments. The jackknife reduction procedure is based on previous proposals in the literature (Larwin & Harvey, 2012; Rensvold & Cheung, 1999) and consists of two steps. First, an Item Factor Analysis (IFA; Wirth & Edwards, 2007) is performed for each subscale and a one-sample t-test is conducted on the factor loadings of the items. If the result is significant, the item with the lowest factor loading for each subscale is removed. This process is repeated until the t-test is no longer significant. Then, an IFA is performed again for each subscale and it is verified whether the item with the lowest communality in each subscale is above or below a threshold. If it is below, the item is removed and the process is repeated. If it is above, the procedure is finished. Therefore, in order to maintain the greatest possible consistency between the items of each subscale, but also the interpretability of the subscales, we used .75 as the desired mean factor loading and .50 as the minimum communality.

After using the jackknife reduction procedure to reduce the size of the subscales, the EGA was again applied to ensure that the initial structure was still identifiable in the data. This led to the fit of other two models. First, an LCA model with two categories. Then, a MIRT model, separating the items according to the dimensionality identified by the EGA. The MIRT model was used instead of Confirmatory Factor Analysis (CFA) for two reasons. The first reason refers to the fact that MIRT models and CFA models estimated with the WLSMV

estimation method are mathematically equivalent (Takane & De Leeuw, 1987) and, therefore, the results should not be dependent on the method used. The second reason is due to the fact that the MIRT model allows the estimation of respondents' true scores with less bias than Factor Analysis procedures.

The classes and latent scores generated by the LCA and MIRT models were used to perform a taxometric analysis (Ruscio et al., 2018). Taxometric analysis is a set of methods used to assess whether the assumed latent variable causes a set of observed variables to be most likely generated as a categorical or continuous measurement level. To decide which level of measurement was the most likely in the present study, we used the Comparison Curve Fit Index (CCFI). The CCFI has been shown, in simulation studies (e.g., Ruscio et al., 2018), to be the most appropriate procedure to correctly identify the level of measurement of the latent variable. The CCFI ranges from 0 to 1, with values below .40 indicating that the latent variable is dimensional and values above .60 indicating that the latent variable is categorical. Values between .40 and .60 are considered insufficient to make a decision.

Results

The first procedure of the analysis involved the use of the EGA to estimate the dimensionality of the original instrument, with the initial 93 items. This analysis showed that the scale was composed of four factors. From this result, the original scale was reduced using a data-driven procedure. The data-driven procedure, called the jackknife sampling procedure, resulted in a scale with 27 items. A second application of the EGA showed that these 27 items were still grouped into the same 4 factors that were identified in the complete scale. This version with 27 items was compared to a version with 34 items based on the content validity of the items (Tartaro, 2021).

After evaluating the semantic content of the items in the 27-item and 34-item versions, the factors were named according to the factor structure expected in the literature, as shown in Table 1, namely: Factor 1 was named "Preoccupied Attachment"; Factor 2 "Secure Attachment"; Factor 3 "Fearful Attachment"; and Factor 4 "Dismissing Attachment".

After reducing the scale, LCA and MIRT models were created for both the 27-item and the 34-item versions. The general fit indices are presented in Table 2. Regarding the fit of these models, the values of the Log-Likelihood (LL), the Bayesian Information Criterion, (BIC; Schwarz, 1978), and the number of parameters in each model (Npar) are presented. To assess the quality of the models, it is enough to find which model has the lowest BIC for the same scale. Therefore, it is possible to observe that the MIRT models fit the data better than the LCA models. However, it is necessary to consider that, in the same dataset, it is mathematically expected that models with more parameters fit the data better.

Table 1
Item distribution by factor for the scales with 34 and 27 items

Factors	34-item scale	27-item scale
Preoccupied	EBRAPEG_006	EBRAPEG_006
	EBRAPEG_013	EBRAPEG_013
	EBRAPEG_016	
		EBRAPEG_040
	EBRAPEG_047	
	EBRAPEG_052	EBRAPEG_052
	EBRAPEG_065	EBRAPEG_065
	EBRAPEG_081	EBRAPEG_081
	EBRAPEG_083	EBRAPEG_083
		EBRAPEG_088
Secure		EBRAPEG_017
	EBRAPEG_025	
	EBRAPEG_027	
	EBRAPEG_029	
	EBRAPEG_032	EBRAPEG_032
	EBRAPEG_041	
	EBRAPEG_049	
		EBRAPEG_063
	EBRAPEG_082	EBRAPEG_082
		EBRAPEG_087
	EBRAPEG_089	EBRAPEG_089

Table 1 (continuation)
Item distribution by factor for the scales with 34 and 27 items.

Factors	34-item scale	27-item scale
Fearful	EBRAPEG_001	
	EBRAPEG_002	EBRAPEG_002
	EBRAPEG_005	
	EBRAPEG_007	EBRAPEG_007
	EBRAPEG_008	EBRAPEG_008
	EBRAPEG_015	EBRAPEG_015
	EBRAPEG_036	
	EBRAPEG_050	
	EBRAPEG_059	
		EBRAPEG_077
	EBRAPEG_079	EBRAPEG_079
		EBRAPEG_084
		EBRAPEG_094
Dismissing	EBRAPEG_033	
	EBRAPEG_034	EBRAPEG_034
	EBRAPEG_042	
	EBRAPEG_058	EBRAPEG_058
	EBRAPEG_064	EBRAPEG_064
	EBRAPEG_069	EBRAPEG_069
	EBRAPEG_072	
		EBRAPEG_086
	EBRAPEG_095	

Note. EBRAPEG=Escala Brasileira de Apego (Brazilian Attachment Scale)

Table 2
General fit indices of the LCA and MIRT models for the scales with 27 and 34 items

Model	LL	BIC	Npar	MAMBAC	MAXEIG	L-Mode	Mean CCFI
LCA27	–23,662.12	48,416.87	163	.791	.643	.427	.620
MIRT27	–20,962.09	42,648.12	190				
LCA34	–30,089.48	61,553.12	205	.688	.595	.410	.565
MIRT34	–27,099.47	55,110.57	239				

Note. The numbers 27 and 34 in the models' names indicate to which scale the model belongs to. LL=Log-Likelihood. BIC=Bayesian Information Criterion. Npar=Number of parameters. MAMBAC=mean above minus below a cut. MAXEIG=maximum eigenvalue. L-Mode=latent mode. CCFI=Comparison Curve Fix Index

For the 27-item version, the mean CCFI suggests a categorical measure. For the 34-item version, the mean CCFI was inconclusive.

Table 2 also presents the CCFI values for three taxometric analysis models (Ruscio et al., 2018): mean above minus below a cut (MAMBAC); maximum eigenvalue (MAXEIG); and latent mode (L-Mode). The last column of Table 2 shows the mean CCFI value, taking into account the other three adjusted models. Each model was adjusted to both the 27-item scale dataset and the 34-item scale dataset. From these values, it is not possible to conclude what the measurement level model is for the latent variable of attachment. For the dataset with 27 items, the mean CCFI was slightly above .60, which would indicate evidence in favor of the categorical measurement level, although very close to the inconclusive value. However, for the dataset with 34 items, the mean CCFI was below .60 and above .40, indicating a lack of evidence to conclude which measurement level is most appropriate.

Complementing the results presented in Table 2, the correlations presented in Table 3 allow the equivalence between the two scales and between the scores and latent classes to be evaluated. First, in bold, it can be observed that the correlations between equivalent factors of the two scales are quite high. The correlation between the Preoccupied Attachment factors was .981,

between the Secure Attachment factors .828, between the Fearful Attachment factors .923, and between the Dismissing Attachment factors it was .949. It is also possible to observe that the tetrachoric correlation between the latent classes of the two datasets was .930, which allows us to conclude that both datasets basically result in the same latent categories, perhaps being possible to use them as parallel measures.

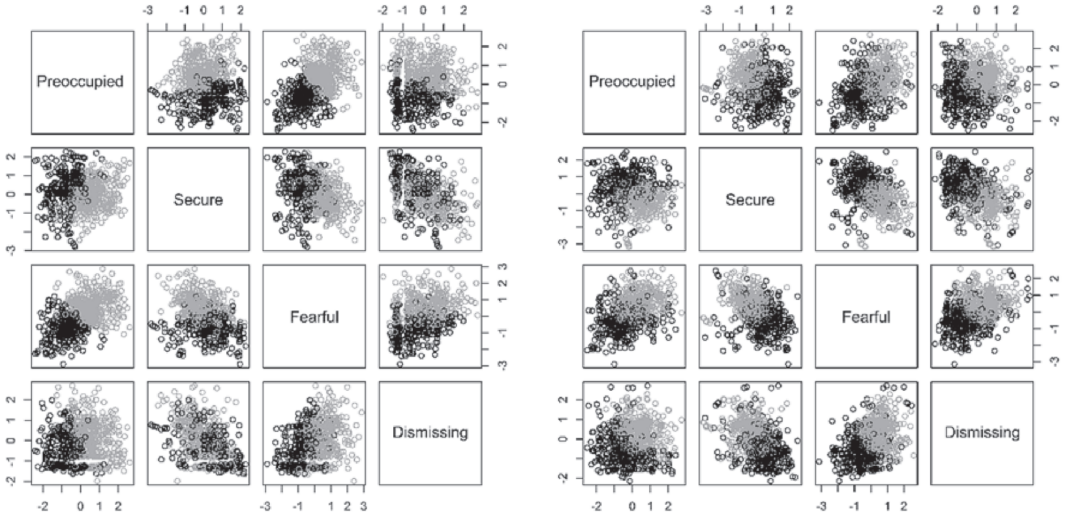
Table 3
Correlations between scores and latent classes

	C-27	C-34	P-27	S-27	F-27	D-27	P-34	S-34	F-34	D-34
C-27	1.000									
C-34	.930	1.000								
P-27	-.682	-.460	1.000							
S-27	.316	.548	.040	1.000						
F-27	-.777	-.771	.499	-.309	1.000					
D-27	-.441	-.694	.006	-.477	.323	1.000				
P-34	-.695	-.491	**.981**	.008	.503	.033	1.000			
S-34	.352	.601	-.094	**.828**	-.370	-.398	-.127	1.000		
F-34	-.685	-.755	.372	-.351	**.923**	.355	.384	-.358	1.000	
D-34	-.415	-.708	-.008	-.466	.317	**.949**	.017	-.388	.344	1.000

Note. C=latent classes; P=Preoccupied; S=Secure; F=Fearful; D=Dismissing. There were high correlations between the factor scores of the different versions. Values in bold represent correlations between equivalent factors of the two versions of the EBRAPEG-A

The relationships between classes and dimensional measures presented in Table 3 can be more clearly explored in Figure 1. In this figure, 24 scatter plots are presented, with the 12 in the lower triangular matrices equivalent to those in the upper triangular matrices. These scatter plots represent the relationships between the factors of the 27-item (left in the figure) and 34-item (right in the figure) versions of the EBRAPEG. The same pattern of relationships can be observed in both sets of graphs, shown by the spatial arrangement of the points and their corresponding colors. Accordingly, it can be concluded that the individuals who are part of the group represented by the black color have: 1. lower scores in the Preoccupied factor; 2. higher scores in the Secure factor; 3. lower scores on the Fearful factor; and 4. lower scores in the Dismissing factor. For individuals who are part of the group represented by the gray color, the scoring trends are in the opposite direction.

Figure 1
Scatterplots of the EBRAPEG factors for the 27-item (left) and 34-item (right) versions.



Note. Individuals who are part of the group represented by the black color have: 1. lower scores in the Preoccupied factor; 2. higher scores in the Secure factor; 3. lower scores on the Fearful factor; and 4. lower scores in the Dismissing factor. For individuals who are part of the group represented by the gray color, the scoring trends are in the opposite direction

Discussion

The main aims of this study were to test whether the attachment construct measured on the EBRAPEG-A scale is better represented as a categorical or dimensional variable and to reduce the 93-item scale with data-driven methods, comparing the reduced version of 27 items with the original version of 34 items.

Through the analyses conducted, it was possible to reduce the items observing the same factorial structure obtained in the study of internal validity evidence for the 34-item version of the EBRAPEG-A (Tartaro, 2021). The reduction of scales is important for the improvement of the instrument, enabling the selection of items that best correspond to the construct, thus collaborating with the metric and with the response process. It should be emphasized that the version consisting of 27 items used empirical methods to select the items, therefore, this presents some validity in favor of the theory used to categorize the items.

The benefit of having two equivalent versions of the EBRAPEG-A scale, even with different numbers of items, is that this enables the assessment and reassessment of adult attachment in research, clinical interventions and the like, possibly reducing the learning effect, given that both are highly correlated and with a modest variety of dissimilar items. There is still a need for further discussions, especially regarding the main question of the study (dimension vs. category), given that the model with more items presented less evidence in favor of the categorical model, which could be expected due to the scheme that served as the basis for the construction of the scale (Griffin & Bartholomew, 1994). Data related to the results for the 27-item version must be interpreted with care, as larger scales allow better measurement of continuous latent variables, this means that the most favorable evidence for the categorical measurement level may be statistical artifacts generated due to the scale reduction (Haslam et al., 2012).

It is possible that the dimensionality or categorization depends on the concept and theoretical foundation of the instrument. Therefore, the impasses regarding a definitive or even inconclusive answer becomes understandable (Ruscio, 2014), since, as seen, there is an indication of the construct as dimensional (Lubiewska & Van de Vijver, 2020; Fraley et al., 2015; Shi et al., 2014). It should be highlighted that it is possible that the disposition between categorical and dimensional depends on the relationship that the instrument assesses, with the possibility that attachment varies in relation to the context (e.g., specifically intimate relationships) and may or may not be better represented by a category (Shi et al., 2014) or dimension (Lubiewska & Van de Vijver, 2020).

Therefore, it is important to consider the nature of the construct. The expression of attachment can also vary depending on the figure to whom it is directed, with people possibly having different representations for specific individuals (as considered in the study by Rocha et al., 2017), so that for a person in a fraternal relationship there may be projections of security or insecurity while in parental or romantic relationships this may be the opposite, an example commonly seen in the clinical practice. Accordingly, some instruments choose to assess attachment directed toward specific figures and contexts (e.g. parental relationships, father and mother figure separately) which would allow for a categorical solution, since by comprehending a broad aspect of attachment, it is possible that the subjects range from security to insecurity (Rocha et al., 2017; Fraley et al., 2015). In this sense, a two-stage assessment may be feasible, that is, the first with a general measure and the second, if necessary, with a measure directed toward the objective of the psychotherapy (e.g. maternal attachment or romantic attachment). Also, as Fraley et al., (2015) highlighted, variation in attachment is best modeled with dimensions rather than categories, and categorization can result in the risk of reducing measurement accuracy and limiting the assessment of the attachment.

Finally, it is important for new studies related to the 27-item version to assess its relationship with other variables correlated with the 34-item version. In relation to the construct, interventional actions may be of great interest to the field of mental health, as the literature highlights this variable as an important pillar of human development (Conradi et al., 2018; Eloranta et al., 2017; Karatzias et al., 2021).

Overall, this article has contributed to the literature in several ways. Although inconclusive, there seems to be some tendency for attachment measures to assess the construct in a dimensional and non-categorical way, which would offer a more complex view of the phenomenon itself, especially from a clinical point of view. In addition, more robust statistical analyses were used in order to provide further evidence of internal structure for the EBRAPEG, as there were combinations of several methods to determine its exploratory and confirmatory structure. This is probably the first time that an attachment instrument, with diverse validity evidence, has been systematically developed in a Latin American country, including the possibility of the use of the parallel forms.

Further evidence of validity should be tested in the future, specifically that based on relationships with other variables (e.g. other attachment scales and related measures) as well as specific samples (e.g. depressed patients, physically abused individuals, and those living in shelters). Also, the application of the EBRAPEG in other cultures could provide useful information about the invariance of the measure, and it could become a promising scale in the evaluation of this construct, which is so important from a clinical perspective.

Limitations

Recent research on attachment styles in diverse cultural contexts provides significant insights into understanding the psychological and sociocultural dynamics of migrants and immigrants. Studies like Polek (2008) reveal that attachment structures can vary significantly across cultures, directly influencing psychological and sociocultural adjustment. For instance, while secure attachment generally facilitates better adjustment, styles such as fearful and preoccupied attachment are often associated with significant adaptation challenges, particularly in contexts of cultural transition, as observed among immigrants in the Netherlands.

Furthermore, investigations such as those by Vonk et al. (2023) explore how cultural factors can influence not only attachment styles among individuals but also attachment relationships between humans and animals. Eastern cultures, for example, tend to exhibit a higher prevalence of anxious and avoidant attachment styles, which can manifest in different interactions with pets. These findings highlight the complexity of cultural influences on the formation of attachment styles and their practical implications.

Transcultural studies like those conducted by Wang et al. (2022) emphasize the importance of considering not only differences between cultures but also generational changes within the same culture. The evolution of attachment styles over time and across different generations reflects changes not only in parenting practices but also the impacts of globalization and new social dynamics. These studies not only expand our understanding of the cultural determinants of attachment but also underscore the need for psychologically sensitive approaches that account for cultural and historical diversity.

Moreover, new studies in the Latin American population may provide further insights into how the attachment process unfolds and compares with Western populations, considering sociocultural variables such as parenting standards, cultural needs, and specific socioeconomic conditions of the region. Additionally, the study has other limitations that should be acknowledged, including the use of a non-standardized sample, potential issues related to age and gender balance, and the need for further validation evidence such as associations with other variables. Future research could benefit from applying the EBRAPEG-A in other Latin American cultures beyond Brazilian contexts to enhance the generalizability and robustness of findings across diverse cultural settings.

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Authors' contributions

We declare that all authors participated in the preparation of the manuscript.

Availability of data and materials

All data and syntax generated and analyzed during this research will be treated with complete confidentiality due to the Ethics Committee for Research in Human Beings requirements. However, the dataset and syntax that support the conclusions of this article are available upon reasonable request to the principal author of the study.

Competing interests

The authors declare that there are no conflicts of interest.

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