

Collins and Read Revised Adult Attachment Scale (RAAS) validity evidences

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Abstract

This study aimed to find validity evidence of different versions of the Revised Adult Attachment Scale (RAAS) that measures adult attachment style and have been translated into Portuguese, in order to obtain a final version of the instrument for application in a Brazilian sample. We used the original version of the RAAS and its recent variations. Four independent studies were held, with a total of 1436 participants, mostly young adults from the states of São Paulo and Bahia. Exploratory and confirmatory analyses corroborated the validity of the three-factor structure (secure, anxious and avoidant) from the scale, with satisfactory indexes for Brazilian data. We found differences in frequency of attachment styles between sexes, confirming evolutionary hypotheses of intersexual variation. The scales showed satisfactory evidence of validity, and it is advised to use its latest version to measure adult attachment.

Keywords: adult attachment; scale validation; relationship style.

Evidências de validade da Escala de Apego Adulto de Collins e Read (RAAS)

Resumo

Este estudo teve o objetivo de encontrar evidências de validade de diferentes versões da Revised Adult Attachment Scale (RAAS) que aferem o estilo de apego adulto e que foram traduzidas para a língua portuguesa, a fim de buscar uma versão final do instrumento para aplicação em uma amostra brasileira. Usou-se a versão original da RAAS e suas variações recentes. Realizamos quatro estudos independentes, com um total de 1436 participantes, sendo majoritariamente adultos jovens dos estados de São Paulo e da Bahia. Análises exploratórias e confirmatórias corroboraram a validade da estrutura de três fatores (seguro, ansioso e evitativo) da escala, apresentando índices satisfatórios para os dados brasileiros. Diferenças na frequência entre os sexos em relação aos estilos de apego foram encontradas, confirmando hipóteses evolucionistas de variação intersexual. As escalas apresentaram evidências satisfatórias de validade, e aconselhamos o uso da versão mais recente.

Palavras-chave: apego adulto; validação de escala; estilo de relacionamento.

Evidencias de validez da Collins and Read Revised Adult Attachment Scale (RAAS)

Resumen

Este estudio tuvo como objetivo encontrar evidencia de validez de las diferentes versiones de la Escala Revisada de Apego Adulto (RAAS), que son una medida del estilo de apego de adultos y han sido traducidas al portugués, a fin de buscar una versión final del instrumento para su aplicación en una muestra brasileña. Se llevaron a cabo cuatro estudios independientes, con un total de 1436 participantes, en su mayoría jóvenes de los estados de São Paulo y Bahía. Se corroboró la validez de la estructura de tres factores de la escala (seguro, ansioso y evitador), con índices satisfactorios para los datos brasileños. Se encontraron diferencias en la frecuencia de estilos de apego entre los sexos, lo que confirma las hipótesis evolutivas de variación intersexual. Las escalas mostraron evidencia satisfactoria de validez, y se recomienda utilizar la última versión.

Palabras clave: apego adulto; validación de escala; estilo de relación.

Attachment is a term coined by the English psychiatrist John Bowlby to refer to the affective bias that a child develops toward an attachment figure (caregiver), that aims to maintain a proximity to this figure, constantly changing the individual's behavior to adequate it to the environment, especially in face of a stressing event. The first caregivers would be attachment figures chosen especially due to their strength and/or intelligence, fundamental aspects of the infant's survival during human evolutionary history (Dalbem & Dell'Aglia, 2005).

The function of attachment in childhood is to guarantee physical proximity between the baby and the caregiver, which contributes to the baby's safety and learning of a way to develop relationships, an internal functioning model. This model refers to a cognitive representation of how an individual develops relationships with other people along the individual's life, both in terms of social interaction and in terms of intimate relationships (Bowlby, 2002).

Attachment is an adaptation to deal with dangers of infancy, to survive in a small group of people, with many social challenges. Attachment theory is a major middle-level theory, through which we can derive hypothesis and predictions. One is that there are stable patterns of behavior in response to stress, while there are individual-difference in which attachment style will be adaptive in certain environments (Simpson & Belsky, 2008).

The adult attachment style is not a simple continuation of child attachment but is developed throughout the individual's life history, suffering hormonal and psychological changes (Konrath, Chopik, Hsing, & O'Brien, 2014). There are developmental switch points before adulthood, one important is in middle childhood, where it might happen a sex-specific reorganization, with insecure boys shifting toward avoidance and insecure girls toward ambivalence, due to adrenal androgens changes. This shift is part of the stress response system, that is affected by stressful events, and contributes to individual differences. Attachment is related to this system, and each style develops a different stress response system activation (Del Giudice, Ellis, & Shirtcliff, 2011). Stressful events during development also alter adult attachment, Bryant et al (2017), for example, founded that short time separations and trauma exposures were related to last effects on attachment's security, raising avoidance.

Schooling increases the number of people with whom children make bonds and in the adolescence, the relationship starts to become more symbolic, including fantasies. Teenagers start to direct the

attachment behavior toward other adults and move it away from the parents, starting relationships marked by sexual attraction. With time, those young adults develop an adult attachment, defined as the use of the internal functional model to establish bonds with other important people, these being necessary in face of fear and stress (Dalbem & Dell'Aglia, 2005).

Adult attachment might be an exaptation of the childhood bond, used to strength the romantic bond in adulthood, and facilitate offspring care and protection. This is more manifest in the context of human infant neoteny, and its fragility (Feldman, Monakhov, Pratt, & Ebstein, 2016; Fletcher, Simpson, Campbell, & Overall, 2015; Fraley, Brumbaugh, & Marks, 2005).

In both child and adult attachment two styles are identified: secure and insecure. Interactions in which the individual feels protected in a predictable environment are usually associated with a secure attachment style. Emotionally unpredictable environments or environments with cold and rejecting attachment figures are usually related to the development of a style of insecure attachment (Dalbem & Dell'Aglia, 2005; Tamaki & Takahashi, 2013). Regarding the insecure style, it can be divided into avoidant and anxious. The first is characterized by people that avoid relationships, show more promiscuity, more sexual coercion, little commitment and few social abilities (Tamaki & Takahashi, 2013). The anxious is characterized by immaturity, high dependency and greater susceptibility to yield to sexual coercion (Del Giudice, 2016). Both insecure styles are associated with early onset of sexualized behavior and early puberty (Del Giudice, Ellis, & Shirtcliff, 2011).

Adult attachment can be measured using categorical or dimensional self-report questionnaires. According to Fraley e Hefferman (2015), dimensional models of attachment style may be better suited for conceptualizing and measuring individual differences across multiple levels of analysis, but this doesn't imply that scales such as RAAS cannot be used. Collins suggests that instead of using attachment style categories, conducting regression analyses with continuous attachment dimensions, Close and Depend, would be more appropriated (Collins & Read, s/d).

Bartholomew e Horowitz (1991) created four categories to analyze adult attachment, depending on the perception of self and of others: secure (positive view of self and others), insecure and anxious (positive view of others, negative of self), fearful avoidant (negative view of others and self), and rejecting avoidant (positive view of self, negative of others). Collins and Read scale, that we use here, also uses categories, discussed above.

Other scales use a dimensional questionnaire, as ECR-R, translated and validated to the Brazilian population (Shiramizu, Natividade, & Lopes, 2013; Natividade & Shiramizu, 2015). It has two dimensions, anxiety and avoidance, and this way there is less loss of information. Despite this, categorical scales are still used and find important results about adult attachment, which justify the goal to validate its use.

The Adult Attachment Scale of Collins and colleagues (AAS – Collins & Read, 1990; Collins, 1996) has been used to evaluate the style of adult attachment in Brazilian samples. However, validation studies of the scale were not found in Brazil. On the other hand, several investigations (Ferreira, 2013; Teixeira, 2015) have been using a translation done by Bussab and Otta (2005) of the Revised Adult Attachment Scale (RAAS; Collins, 1996). Its adaptation to Portuguese was presented by Santos (2006) in a congress. Until now, such version does not rely on studies on the evidence of the measure's validity.

Originally, the AAS was developed from three studies (N=406; 118; 142) and reformulated in a fourth study in 1996 (RAAS), in which items to refer to “close” relationships rather than “romantic” relationships. This way other relationships, such as friendships, could be addressed, other than only sexual relationships. This reinforces adult attachment working model as part of social perception (Collins, 1996).

The RAAS has 18 self-evaluated items in 5-Likert scale (1=“not at all characteristic of me”; 5=“very characteristic of me”) (Collins & Read, 1990). The items are distributed into three factors, each one with six items: ANXIETY ($\alpha=0.72$) evaluates the anxiety in relationships, such as the fear of being abandoned or not being loved; DEPENDENCE ($\alpha=0.75$) evaluates the degree in which the person trusts others and their availability, and CLOSENESS ($\alpha=0.69$) evaluates the discomfort with closeness and intimacy. These factors show modest correlations between DEPENDENCE and CLOSENESS ($r=0.38$), weak between ANXIETY and DEPENDENCE ($r=-0.24$) and none between ANXIETY and CLOSENESS ($r=-0.08$) (Collins & Read, 1990).

The category of attachment style is provided from the interaction of the scores of the three factors, which allows characterizing in general how individuals form and establish their relationships. This is also the way to evaluate the convergent validity of the measure. After inverting some items and performing a sum, the constructs of ANXIETY, DEPENDENCE, and CLOSENESS are acquired. By means of a Cluster analysis, three attachment styles are created: secure,

avoidant insecure and anxious insecure, as previously described (Collins & Read, 1990). People with high CLOSENESS, low ANXIETY, and low DEPENDENCE are categorized as belonging to the secure attachment. Those with low CLOSENESS, high ANXIETY, and high DEPENDENCE would have an anxious attachment style. And those with low CLOSENESS, low DEPENDENCE, and high ANXIETY would have the avoidant attachment style (Collins & Read, 1990; Collins, 1996). This characterization into three factors instead of two (secure/insecure) is more sensitive to the attachment styles and decreases the chances of false positives, i.e., people with the insecure attachment style being characterized as belonging to the secure attachment (Collins & Read, 1990).

Previous research reported good adequacy of the statistical indices of the RAAS for Chilean (Fernández & Dufey, 2015) and Portuguese (Canavarro, Dias, & Lima, 2006) samples. Working with samples of Chilean university students (N=420), Fernández and Dufey (2015) conducted two studies aiming to validate the tool. In the first, the reliability of the dimension DEPENDENCE was low ($\alpha=0.62$) and the factorial analysis did not reach the convergent adjustment in the DEPENDENCE dimension. In the second study, the items were reformulated, making the factorial structure to present an adequate adjustment and increased the internal consistency with the new writing ($\alpha=0.73$ for all dimensions). The categorical analysis of the dimensions showed a larger number of participants in the category secure attachment (221), followed by the category anxious (67) and finally the category avoidant (40).

Canavarro, Dias, and Lima (2006) reported two studies for the Portuguese validation. The first study included the participation of 192 individuals (150 women and 42 men) and presented reliability indices between 0.688-0.759. However, it excluded the items 1 and 14. Later, the author conducted a new study adding more participants to the initial sample and presenting a total of 434 individuals with a mean age of 25 years (DP=8.75), 83.2% being female and 16.8% male. In this second study, the authors found low reliability in the dimensions DEPENDENCE ($\alpha=0.54$) and CLOSENESS ($\alpha=0.67$), while the dimension ANXIETY showed high reliability ($\alpha=0.81$). The procedures of the Cluster analysis confirmed the categories that were originally proposed by the authors of the tool, 46% in the category of secure attachment, 35% as avoidant and 19% as anxious.

In view of this question, this work aimed to find evidence of the validity of the translated versions of the RAAS in four different studies based on the Brazilian

Portuguese version of Bussab and Otta (2005). In order to test the scale's ability to differentiate groups according to attachment from the clusters provided by RAAS, we worked with the hypothesis of differences between the sexes regarding the establishment of attachment styles. In stable ecological conditions, both men and women would develop a secure attachment. On the other hand, in conditions of moderate stability, the sexes would differ, establishing different styles of insecure attachments, these being adjusted to the differences in the short-term sexual strategies of each sex during adulthood (Del Giudice, 2016).

The resulting intersexual difference of this adjustment would lead to a predominance of an avoidant insecure attachment in men (which is more directly related to the male strategy pattern, more oriented toward short-term strategies, with low commitment and parental investment) in relation to the establishment of long-lasting relationships and resulting affective/emotional engagement. Women, in turn, would present a higher predominance of the anxious attachment, characterized by the strategy of optimizing the closeness of partners and family, in order to increase the time of bond establishment and raise more support and investment of these individuals. This strategy could also serve as a counter-strategy in face of an avoidant partner. In conditions of extreme environmental instability, however, it is predicted that both sexes establish strategies of avoidance, a result of the establishment of a short-term sexual strategy and a resulting reduction in parental investment (Del Giudice, 2016).

Method

In this work, we present data of four studies that composed different data collections by the authors and that indicated the need of standardization and search for validity evidence of the RAAS tool that has been used in Brazil.

Participants

The first study was composed of data from three different samples, the first being of 237 participants from the city of São Paulo (SP), with ages that varied from 18 to 30 years ($M=22.07$; $DP=2.71$ years), 95 being males (40.1%) and 142 females (59.9%). The second sample was composed by 150 participants from the city of Salvador (BA), with ages that varied from 20 to 45 years ($M=29.30$; $DP=6.18$ years), all of which were women. A third sample included 64 participants, also from São Paulo (SP), with ages between 18 and 45 years ($M=30.89$; $DP=7.09$), 32 being men (50%) and 32, women (50%).

The second study included the participation of 308 individuals from the city of São Paulo (SP), with ages varying from 18 to 35 years ($M=21.13$; $DP=3.55$), 126 being men (40.9%) and 182 women (59.1%). In the third study, 174 individuals from São Paulo (SP) took part, having ages between 18 and 45 years ($M=29.57$; $DP=7.35$), 75 being men (43.1%) and 99 women (56.9%). Finally, the fourth study included 503 individuals with ages between 18 and 72 years ($M=29.59$; $DP=7.59$ years), 158 being men (31.4%) and 345 being women (68.6%). People from the fourth study were from different states of Brazil since the data collection occurred online.

Questionnaires

In Study 1 and Study 2, we applied the original version, from 1996, of the RAAS, translated into Brazilian Portuguese by Bussab and Otta (2005). We used the 18 items of the original scale distributed in the three proposed factors: CLOSENESS (items 1, 6, 8, 12, 13, 17); DEPENDENCE (items 2, 5, 7, 14, 16, 18); and ANXIETY (items 3, 4, 9, 10, 11, 15). In Study 1, the items were evaluated in 5-Likert scale (1=not at all characteristic of me, 5=very characteristic of me), while in Study 2 they were evaluated in a scale of 11 points (0=not at all characteristic of me; 10=very characteristic of me), since in the literature we find discussions regarding the use of the Likert scales with a higher number of points as a way to allow an improvement in the mathematical characteristics, such as reliability, allowing these scales to be treated as metric variables (Dawes, 2008). The calculation of the scores was performed from the sum of the items regarding each dimension, with the previous inversion of items 2, 7, 8, 13, 16, 17, 18.

In Study 3, the items were again evaluated in 5-Likert scale. We adapted the items 2 and 5, which contained the word "depend", and changed it to "support" after a discussion between the authors and after a suggestion by Fernandez and Dufey (2015) due to Spanish and Portuguese languages. The item 2, "I find it difficult to allow myself to depend on others" was changed to "I find it difficult to support myself on others", while the item 5, "I am comfortable depending on others", was changed to "I am comfortable supporting myself on others".

In Study 4, we used the tool suggested by Collins and Read (n.d.), a more recent version of the RAAS. We started from the translated scale applied to the Study 3 and the followed modifications were performed: in items 3, 9, 11 and 17, replacing "romantic partners" with "people". The purpose of the modifications, suggested by Collins and Read (n.d.), was to allow the

items to address not only romantic relationships but also close relationships with other people. The item 13 also suffered reformulation by the authors, from “I do not like when” to “I feel uncomfortable”, in order to be more faithful to the original scale.

In all studies, in addition to the scale, we applied a sociodemographic questionnaire containing questions regarding sex and age of the participant.

Ethical and data collection procedures

All studies were approved by the Committees of Research Ethics of the universities in which the studies were conducted (Universidade de São Paulo, Universidade Federal da Bahia, and Universidade Federal do Espírito Santo – online collection). All participants agreed with the Informed Consent.

We worked with a convenience sample in the four studies. In the first one, the participants selecting process and the questionnaire application happened in the years 2008, 2010 and 2012 from a teaching institution in the city of São Paulo and the personal contacts of the researchers in the state of Bahia; in the second study, it happened in the years of 2011 and 2012 from an institution of higher education in the city of São Paulo; in the third study, it was conducted in 2012 from a health center in the city of São Paulo; and in the fourth study it happened in the year of 2013 from invitations in social networks to participate in the research.

The collection happened through different methods, as it follows: In Study 1, we used the collection methods (a) collective in a classroom by a self-applied questionnaire in paper and (b) individual by interview. The second method also occurred in the third study. In the second study, we used (c) individual collection in a teaching institution by a self-applied electronic questionnaire; in the fourth study, we used (d) an online self-applied form.

Data analysis

In the current studies the sample size was based in the criteria of a minimum of 5 subjects per factor in the EFA and 10 in the CFA (Hair et al., 2009). When possible, although the WLSMV estimation method show to be robust with small samples in obtaining accurate factor loadings, we tried to establish a sample size bigger than 200 or 300 participants in total, to guarantee a better accuracy of the test and the parameters, as suggested by Moshagen and Musch (2014). Only the sample from the study 3 (N=174) doesn't achieve all the criteria.

Aiming to verify the adequacy of the data to the three factors proposed by Collins and Read (1990),

we performed, in all studies, a principal component analysis with the method of oblique rotation (PROMAX), following the procedure originally performed by the authors, which assumes a correlation between the resulting factors (Marôco, 2014). Complementarily, with the purpose of better estimating the scale's dimensionality and searching for alternative models, we used the method of parallel analysis. After confirmation of the adequacy of the factors, in order to test their internal consistency, we calculated the indices of the reliability of Cronbach's Alpha to each of the independent factors. These factorial analyses were performed by means of the software FACTOR version 10.3.01 and the calculation of the reliability indices by means of the software SPSS version 21.

In a subsequent analysis, we tested the adequacy of the data to the structural model according to Collins and Read (1990) through a confirmatory factor analysis (CFA) with the estimation method Weighted Least Squares Mean- and Variance-adjusted (WLSMV). The WLSMV was designed specifically for noncontinuous data that may not be multivariately normal. The quality of the global adjustment of the factorial model was verified according to the indices and their respective reference values [(a) χ^2 (Chi-square) – goodness of fitness index; (b) Comparative Fit Index (CFI) – comparative indicator concerning goodness of fit of models (values above 90 are recommended); (c) Tucker-Lewis Index (TLI) or Non-Normed Fit Index (NNFI) – relative fit indices that compare the target model with the null model (values above 90 are recommended); and (d) Root Mean Square Error of Approximation (RMSEA) – large sample residual analysis indicator (values below .08 with a confidence interval of 90% are recommended); (e) Weighted Root Mean Square Residual (WRMR) – average differences between the sample and estimated population variances and covariances (values below 1.0 are recommended)] suggested by Marôco (2014). These analyses were performed by means of the software MPLUS, version 7.4. This sequence of analyses was also used in the other studies, with the exception of study 2, which due to the use of a Likert scale of 11 points and consequently limitation of the WLSMV in relation to the maximum number of categories by variable, needed an adjustment of the confirmatory factor analysis to the estimation method Robust Maximum Likelihood (MLR), the evaluation indices of the quality of global adjustment remaining the same as in the other studies, using instead of WRMR the Standardized Root Mean Square Residual (SRMR) – average standardized differences between the observed and predicted covariance matrices.

We also presented the convergent validity analysis in addition to the analysis of Validity and Reliability Evidence. Following Collins (2008) citation and suggestions we determine the four attachment styles (secure, preoccupied, fearful, dismissing) based on Bartholomew e Horowitz (1991), first by calculating the CLOSEDEPENDENCE dimension, based on the sum and average of the reversed scores of CLOSENESS and DEPEND dimension, and second by classifying the subjects based on their score on CLOSEDEPENDENCE and ANXIETY dimensions. Subjects with scores lower than the midpoint of the used Likert scale (“3” for the studies 1, 3 and 4 and “5” for the study 2) were classified as having a low level of CLOSEDEPENDENCE and Anxiety and those with scores higher than the midpoint were classified as having a high level of these dimensions. Subjects with a high score on CLOSEDEPENDENCE and low on ANXIETY were classified as having a “secure” attachment style, those high on both were classified as preoccupied, low on both as dismissing and low on CLOSEDEPENDENCE and high on ANXIETY as Fearful. With this new variable, we performed a chi-square analysis in order to test the evidence of discriminant analysis of the RAAS from the differences between the sexes in the frequency of establishing the attachment styles. An independent sample T-test comparing the original scores between sexes was performed and also an ANOVA was performed using the attachment styles as an independent variable and the age as the dependent variable.

Results

Study 1

The data showed adequacy to the factors [KMO=0.829; Bartlett’s sphericity test: $\chi^2(153, N=451)=2740.455$; $p<0.001$]. We found five factors with eigenvalues above one: 4.36, 3.30, 1.53, 1.06 and 1.00. The parallel analysis suggested a tridimensional solution as the most parsimonious, agreeing with the original model (Collins & Read, 1990). The analysis with the extraction of the three factors showed a total of 51.12% of explained variance. Regarding the configuration, only the item 16 did not follow the pattern of Collins and Read (1990). Originally belonging to the DEPENDENCE factor, it showed a superior factor loading in the ANXIETY factor. The factor loadings varied between 0.37 and 0.85 and communalities between 0.17 and 0.72. The correlations between factors were: ANXIETY \times DEPENDENCE ($r=-0.09$); ANXIETY \times CLOSENESS ($r=0.08$); DEPENDENCE \times CLOSENESS ($r=0.58$). The re-

liability indices were adequate (**Table 1**) to studies in humanities (Marôco, 2014). In the CFA, with the original configuration, the indices resulting from the analyses showed to be adequate, except for RMSEA, which showed values above the acceptable. Seeking to improve the adjustment of the model, we analyzed the modification indices (MI) in order to identify suggestions of correlation between the error (residue) parameters of pairs of items, or the existence of crossed loadings, with indices that showed values above 11 being analyzed. An elevated MI was found in the relationship ANXIETY – Item 16=137.37. The control of this parameter allowed us to make a better adjustment and adequacy of the model (**Table 2**).

Study 2

The data showed adequacy to the factors [KMO=0.793; Bartlett’s sphericity test: $\chi^2(153, N=451)=1867.5$; $p<0.001$]. We found five factors with eigenvalues above 1, those being respectively 4.33, 2.94, 1.55, 1.31 and 1.12. The parallel analysis suggested a quadridimensional solution as the most parsimonious, which is not supported by the original study. We performed a forced analysis with the extraction of three factors, which resulted in a total of 49.11% of explained variance. The item configuration followed the pattern previously observed by Collins and Read (1990). The factor loadings varied between 0.35 and 0.85 and the communalities between 0.19 and 0.69. The correlations between the factors were: ANXIETY \times DEPENDENCE ($r=-0.36$); ANXIETY \times CLOSENESS ($r=-0.11$); DEPENDENCE \times CLOSENESS ($r=0.32$). The reliability indices were adequate (**Table 1**) to studies in humanities (Marôco, 2014). In the CFA, with the original configuration, the indices resulting from the analyses showed values below the acceptable for CFI and TLI and above the acceptable for RMSEA.

TABLE 1
Total Percentage of the Explained Variance and Reliability Indices of the Factors

Factor	% Explained Variance			
	Study 1	Study 2	Study 3	Study 4
CLOSE	8.48	8.65	7.66	15.46
ANXIETY	18.37	24.09	23.70	7.07
DEPEND	24.28	16.37	13.89	33.16
	Cronbach's Alpha			
	Study 1	Study 2	Study 3	Study 4
CLOSE	0.80	0.68	0.54	0.75
ANXIETY	0.75	0.83	0.67	0.88
DEPEND	0.80	0.73	0.70	0.78

TABLE 2
Summary goodness-of-fit statistics in determination of the 4 studies models for the three-factor structure of the RAAS

Model	χ^2	gl	CFI	TLI	RMSEA	RMSEA 90% IC	WRMR/ SRMR*
Study 1							
1. Collins Original 3 Factor Model	518.368	132	.929	.917	.081	.073-.088	1.518
2. Model 1 with the crossed loading of the item 16 with factor Anxiety	396.223	131	.951	.943	.067	.060-.075	1.283
Study 2							
1. Collins Original 3 Factor Model	475.649	132	.750	.711	.092	.083-.101	.091*
2. Model 1 specifying error covariance (Items 2 and 16)	443.656	131	.773	.735	.088	.079-.097	.090*
3. Model 2 specifying error covariance (Items 3 and 9)	424.795	130	.786	.748	.086	.077-.095	.088*
Study 3							
1. Collins Original 3 Factor Model	221.220	132	.920	.907	.059	.044-.073	.906
Study 4							
1. Collins Original 3 Factor Model	757.847	132	.929	.918	.097	.090-.104	1.750
2. Model 1 with the crossed loading of the item 1 with factor Dependence	655.517	131	.941	.931	.089	.082-.096	1.578
3. Model 2 specifying error covariance (Items 2 and 5)	585.380	130	.949	.940	.083	.077-.090	1.479
4. Model 3 with the crossed loading of the item 15 with factor Dependence	520.442	129	.956	.948	.078	.071-.085	1.369
5. Model 4 with the crossed loading of the item 5 with factor Anxiety	473.579	128	.961	.953	.073	.066-.080	1.281

χ^2 – Chi-square; df – Degrees of freedom; χ^2/df – Ratio chi-squared by degrees of freedom; GFI – Goodness of Fit Index; CFI – Comparative Fit Index; RMSEA – Root Mean Square Error of Approximation; IC 90% RMSEA – Confidence Interval of 90%; WRMR – Weighted Root Mean Square Residual; SRMR – Standardized Root Mean Square Residual.

Seeking improvement, we analyzed the MI. High MI were found in: e2 – e16 = 32.747, e3 – e9 = 26.685. The control of the parameters was performed gradually following their descending order of magnitude followed by the verification of the adjustment of the model's parameters. After the control, however, the model remained inadequate as seen in **Table 2**.

Study 3

The data showed adequacy to the factors [KMO = 0.792, Bartlett's sphericity test: $\chi^2(153, N = 174) = 727.4$; $p < 0.001$]. We found five factors with eigenvalues above 1, those being respectively 4.17, 2.36, 1.3, 1.16 and 1.09. The parallel analysis suggested a bidimensional solution as the most parsimonious, which is not considered unstable (Collins & Read, n.d.). Thus, we performed a forced analysis with the extraction of three factors, which resulted in a total of 43.55% of explained variance. The item 17 was best represented by the factor DEPENDENCE and the item 1 presented factor loading below 0.30, not being well represented by the factors. The items presented factor loadings varying between 0.37 and 0.83 and communalities between 0.13 and 0.60. The correlations between the factors were: ANXIETY \times DEPENDENCE ($r = -0.40$); ANXIETY \times CLOSENESS ($r = -0.12$); DEPENDENCE \times CLOSENESS ($r = 0.39$). The reliability indices were adequate (**Table 1**) to studies in humanities (Marôco, 2014), with the exception of the

CLOSENESS factor, which showed a low value. In the CFA, the resulting indices of the analysis supported the adequacy of the model of three factors to the original configuration pattern (**Table 2**).

Study 4

The data showed adequacy to the factors [KMO = 0.898; Bartlett's sphericity test: $\chi^2(153, N = 503) = 3784.647$; $p < 0.001$]. We found four factors with eigenvalues above 1: 5.97, 2.78, 1.27, 1.02. The total of explained variance was 61.38%. The parallel analysis suggested a tridimensional solution as the most parsimonious, agreeing with the original model (Collins & Read, 1990). After performing a new analysis with the extraction of the three factors we observed a total of 55.69% of explained variance. Regarding the configuration, item 1 was better explained by the DEPENDENCE factor, item 7 showed a higher and more negative loading in the ANXIETY factor, item 14 showed moderate loading in the DEPENDENCE and low and negative loading in ANXIETY factors, and item 18 showed moderate loading in the DEPENDENCE factor and moderate, positive in the DEPENDENCE factor and negative loading in the ANXIETY factor. The items showed factor loadings varying between 0.31 and 0.90 and communalities between 0.32 and 0.70. The factors presented low and moderate correlations between themselves: ANXIETY \times DEPENDENCE ($r = -0.56$); ANXIETY \times CLOSENESS ($r = -0.25$);

DEPENDENCE \times CLOSENESS ($r=0.48$). Once more, the reliability indices were adequate (**Table 1**) to studies in humanities (Marôco, 2014). In the CFA, with the original configuration, the indices resulting from the analyses were adequate, except for RMSEA, which presented values above the acceptable. Seeking improvement, we analyzed the MI. Higher MI were found in: the relation DEPENDENCE – item 1=118.39, e2 – e5=73.78, DEPENDENCE – q15 and ANXIETY – q5=41.94. The control of these parameters allowed a better adjustment and adequacy of the model (**Table 2**).

Discriminant Validity

After defining the attachment styles (**Table 3**) the complementary analysis was done. It is possible to see differences between the prevalence of adult attachment styles.

The chi-square analyses showed significant results in the association between the sex of the participants and the final attachment style for Study 1 ($\chi^2(3)=28.096$; $p<.001$; Cramer's $V=.251$) and Study 2 ($\chi^2(3)=27.508$; $p<.001$; Cramer's $V=.306$), but not for Study 3 ($\chi^2(3)=3.828$; $p=0.281$; Cramer's $V=0.154$) and Study 4 ($\chi^2(3)=5.863$; $p=.118$; Cramer's $V=.114$). In Study 1, males were more associated to the secure style and females to the dismiss style. In Study 2, males were more associated to the dismiss and secure styles and females to the preoccupied and fearful styles.

The independent sample T test showed in the Study 1 a significant mean difference between sexes and CLOSENESS ($t(449)=5.289$; $p<.001$; $d=.59$), in the Study 2, of CLOSENESS ($t(307)=2.123$; $p=.035$; $d=.24$) and ANXIETY ($t(307)=4.152$; $p<.001$; $d=.48$), in the Study 3, of closeness ($t(172)=2.765$; $p=.006$; $d=.41$) and ANXIETY ($t(172)=2.524$; $p=.013$; $d=.39$). In the Study 4 we can see only a tendency of mean difference of ANXIETY ($t(501)=1.820$; $p=.069$; $d=.18$). In the Study 1, CLOSENESS was higher for men ($M=3.55$; $SD=.77$) comparing to women ($M=3.00$; $SD=1.07$). In the Study 2 CLOSENESS was

higher for women ($M=6.85$; $SD=1.43$) comparing to men ($M=6.47$; $SD=1.61$) and ANXIETY was higher for women ($M=4.56$; $SD=1.92$) comparing to men ($M=3.60$; $SD=2.11$). In the Study 3 CLOSENESS was higher for women ($M=4.32$; $SD=0.72$) comparing to men ($M=3.93$; $SD=1.13$) and ANXIETY was higher for women ($M=2.81$; $SD=1.18$) comparing to men ($M=2.37$; $SD=1.06$). In the Study 4 ANXIETY tend to be higher for women ($M=2.80$; $SD=0.83$) comparing to men ($M=2.65$; $SD=0.78$).

The ANOVA showed a significant mean difference among the styles in relation to the age in the Study 1 ($F(3,409)=34.978$; $p<.001$; $\chi^2=.20$), in the Study 2 ($F(3,290)=5.229$; $p=.002$; $\chi^2=.05$), in the Study 3 ($F(3,157)=3.312$; $p=.022$; $\chi^2=.06$) and in the Study 4 ($F(3,444)=3.105$; $p=.026$; $\chi^2=.02$). In the Study 1 those classified as dismiss ($M=29.2865$; $SD=06.3478$) are older comparing to those classified as secure (Bonferroni, $p<.001$; $M=23.645$; $SD=40.5278$), preoccupied (Bonferroni, $p<.001$; $M=23.615$; $SD=40.978$) and fearful (Bonferroni, $p<.001$; $M=23.9265$; $SD=40.2278$). In the Study 2 those classified as preoccupied ($M=192.0365$; $SD=10.5278$) are younger comparing to those classified secure (Bonferroni, $p=.009$; $M=22.3465$; $SD=30.6578$) and fearful (Bonferroni, $p=.001$; $M=21.265$; $SD=30.728$). In the Study 3 those classified as dismiss ($M=312.654$; $SD=60.784$) are older comparing to those classified secure (Bonferroni, $p=.045$; $M=27.658$; $SD=60.718$). In the Study 4 those classified as secure ($M=302.615$; $SD=80.078$) are older comparing to those classified preoccupied (Bonferroni, $p=.047$; $M=28.165$; $SD=70.6078$).

Discussion and Conclusion

In this work, we aimed to find evidence of the validity of the translation of the RAAS to the Brazilian sample based on data from four different studies that had differences in the items, evaluation scale and application form. Except for Study 2, all other studies showed an adequate factor structure. Studies 1 and 4 showed total explained variance

TABELA 3
Frequency and percentage of occurrence of attachment styles by study

Attachment Style	Study 1 n (%)	Study 2 n (%)	Study 3 n (%)	Study 4 n (%)
Secure	189 (42.3)	38 (12.9)	72 (44.7)	244 (54.1)
Preoccupied	66 (14.8)	29 (9.9)	24 (14.9)	90 (20.0)
Dismiss	147 (32.9)	49 (16.7)	35 (21.7)	40 (8.9)
Fearful	45 (10.1)	178 (60.5)	30 (18.6)	77 (17.1)

above 50%. Regarding factor reliability, only Study 4 showed moderate to high reliability (above 0.75 – Marôco, 2014) for all factors. As shown in previous research (Canavarro et al., 2006; Fernandez & Dufey, 2015), the category analysis of the three factors presented in Study 4 shows relevant elements to the construction of bond styles that are consistent with the Adult Attachment Theory (Collins & Read, 1990; Collins, 1996) and our sample also showed a higher percentage of participants in the secure attachment style (Canavarro et al., 2006; Fernandez & Dufey, 2015).

Data collection did not occur simultaneously in the four studies, so that one study may serve as a pre-test for a later study, allowing tool adequacy. Thus, both Study 1 and Study 2 had the same structure in terms of items. However, there was an adaptation in Study 2 regarding the 11-Likert Scale that ended up not being adequate to the increase in variance generated by several factors, such as the increase in the score scale, as well as possible problems regarding the interpretation of items by the subjects (Dawes, 2008). The indication of a scale having more fragility in application and interpretation made us decide to maintain the original Likert scale (5 points) and adapt the items of the following studies.

We performed two adaptations of the items, one in Study 3 (items 2 and 5) and another in Study 4. Originally the items 2 and 5 were translated literally from English with the word “depend”. Culturally, dependence in Brazil is regarded as a term with a derogatory sense (“to be subordinated to someone or to some circumstance” (Michaelis On-Line, 2017), thus, the word “depend” was changed to “support” as in the scale applied in Chile (Fernandez & Dufey, 2015) and favored the statistical adequacy of the scale. Furthermore, the increase in the measurement of the relations measured by the tool, proposed by Collins and Read (n.d.) and incorporated in Study 4, allowed indices with evidence of measurement validity. As an explaining hypothesis to this occurrence, we can raise the fact that, by increasing the measured relations, the scale allowed people to answer questions regarding their attachment style even when they are not engaged in romantic relationships.

Additionally, the version presented in Study 4 highlighted the convergent validity of the measure by identifying three different clusters according to the proposal of Collins and Read (1990) and Collins (1996): secure, avoidant insecure and anxious insecure attachment styles. These styles also confirm differences between the sexes reported in the literature

(Del Giudice, 2016), showing men with a higher frequency of the avoidant style and women with a higher frequency of the anxious style.

We consider a limitation of the results the fact that the four studies were performed using different forms of data collection self-applied *versus* interview, face-to-face *versus* online. This multiplicity of application is a disadvantage in the standardization of the tool. We suggest new studies to consider the indication of the original study of Collins and colleagues (Collins & Read, 1990; Collins, 1996) regarding the self-applied character of the tool in order to test this feature.

On the other hand, the multiplicity of collection forms also allowed the participation of people from different sociodemographic realities. Despite our samples being composed mostly by young people (51.5% of the subjects were up to 25 years old), we still had a good representation of adults (48.5%) that showed several characteristics of scholarship and income, which does not limit the evidence to a single group of the population. The sample, however, does not encompass inhabitants of all regions of Brazil, most of them being from the states of São Paulo and Bahia. Despite the cultural differences between the different Brazilian regions, we indicate that the language of the scale is clear, which should not compromise its understanding and consequent validity in the different regions. Variations found between the attachment scale and other variables will be related to individual and ecological variations of the sample.

As to sex, the best versions were from studies 1 and 2. As we saw, males were more associated with the secure style and females to the dismiss style. There were also differences in the dimensions scores. Those findings suggest that, depending on your selected variable, using versions 1 and 2 might be more reliable. The variations found between the results of the discriminant validation may be the result of uncontrolled ecological variations in those studies and thus indicate that future studies are carried out with greater control over the ecological dimensions highlighted in the literature.

We conclude that the studies provided an adaptation of the measurement to the Brazilian sample, showing a tool with important validity evidence and adequate factor structure. The measurement presented 18 items evaluated in 5-Likert scale distributed in the three factors originally proposed by the works of Collins and colleagues (Collins & Read, 1996). Further studies are necessary to contribute to the standardization of the application and increase of the sample.

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