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Assessing Childhood Attachment: Psychometric Adaptation of the "Attachment in Friendship Relationships" Scale with Visual Aids

Avaliando o Apego Infantil: Adaptação psicométrica da escala "Apego nas Relações de Amizade" com Recursos Visuais

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Abstract: Psychometric tools for assessing attachment are pivotal in psychology, playing a vital role in shaping social relationships, decision-making processes, and individual self-concept. Despite their importance, scales specifically designed to evaluate children's attachment in the Brazilian context still need to be explored, particularly those incorporating features that enhance item comprehension. This study sought to adapt the "Apego nas Relações de Amizade" (ARA) – in English "Attachment in Friendship Relationships" (AFR) by integrating illustrative drawings to enhance item comprehension. The adapted scale, the "Attachment in Friendship Relationships for Children" (AFR-C/ARA-C), alongside the Empathy Scale for Adolescent Children, was administered to 244 state school children aged 7 to 12. Results revealed a two-dimensional structure in the AFR-C/ARA-C, capturing the dimensions of Anxiety and Avoidance. The observed psychometric properties were consistent with the original instruments, demonstrating that incorporating illustrations significantly improved item comprehension, particularly for children with challenges in semantic interpretation. The adapted scale holds promise for future research, providing an effective tool for assessing friendship-based attachment in children and advancing the understanding and application of attachment theory in diverse educational contexts.
Keywords: attachment, anxiety, avoidance, childhood, friendship, visual aids.

Resumo: Ferramentas psicométricas para avaliar o apego são essenciais na psicologia, desempenhando um papel vital na formação de relacionamentos sociais,

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processos de tomada de decisão e autoconceito individual. Apesar de sua importância, escalas especificamente projetadas para avaliar o apego de crianças no contexto brasileiro permanecem escassas, particularmente aquelas que incorporam características que melhoram a compreensão dos itens. Este estudo buscou adaptar o questionário "*Apego nas Relações de Amizade" (ARA)*
– em inglês "*Attachment in Friendship Relationships" (AFR)* integrando desenhos ilustrativos para melhorar a compreensão dos itens. A escala adaptada, intitulada *"Apego nas Relações de Amizade para Crianças" (ARA-C)*, juntamente com a "Escala de Empatia para Crianças Adolescentes", foi administrada a uma amostra de 244 crianças de escolas públicas com idades entre 7 e 12 anos. Os resultados revelaram uma estrutura bidimensional no AFR-C/ARA-C, capturando as dimensões de Ansiedade e Evitamento. As propriedades psicométricas observadas foram consistentes com os instrumentos originais, demonstrando que a incorporação de ilustrações melhorou significativamente a compreensão dos itens, particularmente para crianças com dificuldades na interpretação semântica. A escala adaptada é promissora para pesquisas futuras, fornecendo uma ferramenta eficaz para avaliar o apego baseado em amizade em crianças e avançando a compreensão e a aplicação da teoria do apego em diversos contextos educacionais.
Palavras-chave: apego, ansiedade, evitação, infância, amizade, recursos visuais.

John Bowlby's seminal work in 1958 established the foundational principles of attachment theory, which describes the deep emotional bond between a caregiver and a child. Bowlby proposed that this bond is crucial for the child's psychological development and well-being. More than six decades later, Bowlby's theory remains a cornerstone in developmental psychology, profoundly shaping our understanding of child development and the dynamics of attachment relationships. Bowlby's theory underscores that the quality of early attachment relationships fundamentally shapes an individual's emotional, social, and cognitive trajectories.

Building on Bowlby's foundational theory, Mary Ainsworth's groundbreaking research in the 1970s significantly advanced the understanding of child-caregiver bonding by systematically developing the attachment styles framework. Ainsworth et al. (1978) identified three primary attachment styles: Secure, Avoidant, and Ambivalent/Anxious. These classifications illuminate the spectrum of children's interpersonal behaviors, ranging from those who show resilience and security within the proximity of their caregivers (Secure Attachment), to those who either shun intimacy (Avoidant Attachment) or exhibit heightened levels of separation anxiety (Ambivalent/Anxious Attachment).

Avoidant attachment, as described by Main and Solomon (1990), involves behaviors that reject intimacy and emphasize self-reliance, often as a response to perceived inaccessibility or indifference from caregivers. This attachment style is marked by a pronounced preference for emotional independence, manifesting in a reluctance to seek or offer support during distressing circumstances. Conversely, anxious attachment is marked by heightened sensitivity to relational cues, intense fear of separation, and a tendency toward jealousy and emotional distress when faced with perceived abandonment. This style, as detailed by Brenning et al. (2011), is characterized by a pervasive vigilance for signs of rejection and a heightened need for reassurance from attachment figures.

Attachment patterns formed in early childhood are crucial, profoundly influencing behavior and emotional responses across later developmental stages, including childhood, adolescence, and adulthood. These attachment styles play a pivotal role in shaping internal working models—cognitive frameworks that influence interpersonal relationships, decision-making processes, self-concept, and conflict resolution (Bowlby, 1982).

Attachment and its relationship with emotional regulation and decision-making processes

Contemporary research underscores the significant influence of internal working models on personal and social development. Rooted in early attachment experiences, these cognitive frameworks shape how individuals form friendships, select romantic partners, and navigate career paths. Moreover, these models are integral to the formation of self-identity and are particularly influential in decision-making processes, especially when individuals are faced with conflicts or dilemmas (Martínez-Álvarez, Fuertes-Martín, Orgaz-Baz, Vicario-Molina & González-Ortega 2014; Dalbem & Dell'Aglio, 2005).

Research highlights the profound and enduring impact of childhood attachment styles on adult behavior and decision-making. Insecure attachment, in particular, is strongly linked to challenges in emotional regulation. For instance, Guzmán-González et al. (2016) identified a direct correlation between insecure attachment and difficulties in managing emotions effectively. This relationship highlights the enduring influence of

early emotional bonds on adult emotional health. Moreover, high levels of emotional dependence have been linked to insecure attachment styles (Valle & Moral, 2018). This dependency often manifests in heightened needs for approval and support from others, affecting personal and professional relationships. In marital conflicts, attachment styles are predictive of conflict resolution strategies. Individuals with insecure attachment tend to adopt destructive approaches, such as overt competition, hostility, and avoidance, which can jeopardize relationship stability. These tactics include overt competition, hostility towards partners, and avoidance of conflict resolution, which can undermine relationship stability (Scheeren, Zanella Delatorre, Neumann & Wagner, 2015).

Recent theoretical reviews emphasize the multifaceted nature of decision-making, describing it as a fundamental human process that intertwines cognitive, affective, and neuropsychological elements (Morelli, Casagrande & Forte, 2022). This review underscores the complexity of decision-making and the need for further research to unravel the intricate interplay between internal models and decision-making strategies.

Recent studies have highlighted the interplay between internal schemas and external factors, such as cultural norms and social expectations, in shaping decision-making processes. This research points to the dynamic nature of decision-making and the importance of considering both internal psychological constructs and external social factors (e.g., Denis, 2011; Franco & Sanches, 2016; Savioni, Triberti, Durosini, et al., 2023; Truglio-Londrigan, Slyer, Singleton, Worral, 2012).

These findings underscore that internal working models are dynamic structures, continuously shaped by individual experiences and interactions. They serve as the foundation upon which personal and interpersonal behaviors are built, influencing private self-conceptions and public social engagements. By integrating these contemporary insights, we can enhance our understanding of early attachment experiences' profound role in shaping an individual's life course and their capacity to engage with the world around them.

Thus, the internal working models of attachment, as conceptualized by Ainsworth (1989), serve as enduring blueprints that shape an individual’s interactions with new relational partners and their responses to stressors across various life stages.

Secure attachment, established during the formative years of childhood, is associated with enhanced emotional regulation and resilience in later life stages. This foundation of security facilitates adaptive coping mechanisms and a robust sense of self, which are critical for navigating life's challenges. Conversely, insecure attachment styles, characterized by either avoidance or anxiety, may predispose individuals to a host of relational difficulties and emotional dysregulation, potentially leading to a cascade of negative outcomes in personal and social domains (Brenning et al., 2011). Longitudinal research confirms that attachment styles in young adulthood are significant predictors of life satisfaction at age 30 (Blake, Thomas, Pelecanos, et al., 2024). This study underscores the long-term implications of attachment styles, suggesting that confidence and trust in self and others, hallmarks of secure attachment, are integral to achieving a fulfilling life. The findings also highlight the importance of interventions to foster positive internal working models and enhance confidence in interpersonal relationships during adolescence.

The Role of Attachment in Child and Adolescent Development: Impacts on Social, Emotional, and Cognitive Outcomes

Attachment plays a pivotal role in adolescent development, with extensive research highlighting its contribution to fostering prosocial behaviors and enhancing empathy. Secure attachment, characterized by a stable and nurturing bond between adolescents and their caregivers, has been consistently linked to a host of positive developmental outcomes. Building on the foundational studies of Anastácio and Nobre-Lima (2015), Otiz et al. (1993), and Stern et al. (2014), recent research highlights the strong correlation between secure attachment during adolescence, prosocial behavior, and empathy. For instance, Moreira, Pedras, Silva, et al. (2021) conducted a comprehensive analysis revealing that dimensions of attachment, such as communication, trust, and involvement, are significant predictors of well-being in adolescents, even after controlling personality dimensions. This underscores the independent effect of attachment on adolescent development beyond the influence of inherent personality traits.

Delgado, Serna, Martínez, and Cruise's (2022) systematic review emphasizes the strong link between secure parental attachment and high-quality peer relationships during adolescence. This relationship is crucial as it fosters the establishment of affective relationships with peers based on communication, support, intimacy, trust, and quality, which are essential for good psychological adjustment.

Additionally, research by Schoeps, Mónaco, Cotolí and Montoya-Castilla (2020) explores the impact of peer attachment on prosocial behavior, emotional difficulties, and conduct problems in adolescence, with empathy serving as a potential mediator. The findings suggest that strong, healthy emotional bonds with peers are associated with less emotional disorders and conduct problems, further emphasizing the role of attachment in social and emotional development.

Meta-analytic reviews have clarified the strength and direction of the relationship between attachment and empathy, demonstrating that secure attachment strongly predicts higher empathy. Xu, Liu, Gong and Wu (2022) found that empathy is significantly positively correlated with secure attachment, indicating that children and adolescents with high secure attachment tend to exhibit more empathy. This relationship is pivotal as empathy is a channel for health improvement, social adaptation, and moral development.

In light of these findings, it is evident that secure attachment serves not only as a foundation for healthy interpersonal relationships but also as a catalyst for the development of socio-cognitive processes and coping mechanisms in adolescents. The promotion of secure attachment relationships should, therefore, be a key focus in interventions aimed at fostering adolescent well-being and social competence

Adolescents with insecure attachment styles, marked by anxiety or avoidance, are at higher risk of engaging in behaviors detrimental to mental health and well-being. Suárez Colorado and Campo-Arias (2019), and Couto and Tavares (2016), have highlighted the increased susceptibility of these individuals to suicidal behaviors and ideation. This vulnerability stems from the inherent difficulties in forming secure and supportive relationships, which are crucial during the tumultuous adolescent years. Recent research has further elucidated the connection between insecure attachment and maladaptive behaviors. A study by Han, Wang, Jin and Bismar (2022) found that insecure attachment was associated with bulimic behaviors in college women through

a sequence of cognitive-affective pathways, including maladaptive perfectionism, lowered self-esteem, and heightened depression.

A meta-analysis by Kim and Miller (2020) corroborates the link between insecure attachment styles and risky sexual behaviors, synthesizing findings from multiple studies. The analysis found that attachment anxiety has a small effect on having multiple partners and engaging in condomless sex, with the correlation being stronger as the average age of participants increases and when the study population is specifically an at-risk population.

The implications of these findings are profound, as they underscore the potential dangers of insecure attachments in relation to decision-making in intimate relations. Gómez-Zapiain, Barón, and Camarero (2016) documented a clear association between insecure attachment and engagement in risky sexual behaviors, emphasizing the need for targeted interventions to address these attachment-related risks.

Considering these developments, it is evident that the impact of insecure attachment extends beyond the previously understood domains. The association with maladaptive behaviors such as suicidal ideation, self-harm, and risky sexual practices calls for a comprehensive approach to mental health that considers the nuances of attachment styles. Interventions aimed at fostering secure attachments could potentially mitigate the risks and promote healthier behavioral patterns among adolescents and young adults.

The significance of attachment to primary caregivers during childhood is a well-documented phenomenon with far-reaching implications for behavioral outcomes. The nature of these attachments, particularly to maternal figures, plays a crucial role in shaping a child's future interactions and emotional responses (Davis & Carnelley, 2023). Research has consistently shown that boys who develop fragile attachments are predisposed to aggressive and delinquent behaviors, highlighting the importance of fostering secure attachment bonds to mitigate such risks. Similarly, girls with insecure attachments often exhibit social withdrawal, suggesting gender-specific emotional responses to attachment insecurities (e.g., Kouri, Meuwly, Richter & Schoebim, 2024; Nunes, Faraco & Vieira, 2013).

Recent studies have expanded our understanding of the impact of insecure attachment on children's health and development (Da Cruz, Zanon, & Bosa, 2015;

Bahrami Kelishadi, Jafari, Kaveh & Isanejad, 2013). For instance, a systematic review by Santos, Martins, Fernandes, Bost and Veríssimo (2021) has reinforced the link between insecure attachment and obesity in preschool children, suggesting that emotional dysregulation and impulsivity stemming from insecure attachments may lead to overeating as a coping mechanism. This finding underscores the need for early intervention strategies that address attachment-related emotional challenges to prevent obesity.

Secure attachment relationships have been consistently linked to positive cognitive and linguistic development in early childhood (Saur, Bruck, Antoniuk, & Riechi, 2018). For instance, Schore (2001) emphasizes that a secure attachment relationship contributes to proper brain development, which is crucial for affect regulation and infant mental health, laying the foundation for cognitive and linguistic abilities. Moreover, Mares and McMahon (2020) discuss how attachment security influences social and emotional competence, executive functioning, and school readiness, indicating that secure early caregiving relationships are instrumental in a child's overall development.

In light of these findings, it is evident that the quality of early attachment relationships not only influences immediate behavioral patterns but also has long-term effects on a child’s physical health, emotional well-being, and cognitive capacities. Thus, interventions targeting secure attachment have the potential to significantly influence child development, reducing risks such as obesity while enhancing cognitive, linguistic, and social-emotional skills.

Advancing Attachment Theory: Psychometric Innovations in Measurement Tools

The creation of sophisticated psychometric instruments has significantly advanced the study of attachment across life stages. Foremost among these is the Experiences in Close Relationships (ECR) scale, developed by Brennan, Clark, and Shaver in 1998, which serves as a foundational tool in adult attachment research. This seminal tool facilitates detailed evaluations of adult romantic attachment via a 36-item questionnaire that quantitatively gauges two principal dimensions: avoidance and anxiety. The avoidance dimension, boasting a high reliability coefficient (α) of 0.94,

gauges an individual's propensity to maintain distance from close emotional bonds. In contrast, the anxiety dimension, with a reliability coefficient (α) of 0.91, measures the degree of concern and insecurity one feels about a partner's responsiveness.

In the early 2000s, the integration of Item Response Theory (IRT) marked a transformative phase in attachment theory. The seminal work by Fraley, Waller, and Brennan represented a paradigm shift in the measurement of attachment styles. Their rigorous analysis of the Experiences in Close Relationships (ECR) inventory, originally developed by Brennan, Clark, and Shaver in 1998, led to the creation of the ECR-R—a more psychometrically robust and empirically applicable instrument. The ECR-R, reduced from 323 to 36 items, was meticulously refined using IRT metrics to retain only the most discriminative items. This refinement enhanced the instrument's precision in capturing the subtle dimensions of attachment, thereby enriching the toolkit available to researchers delving into the dynamics of close relationships.

In 2006, Fairchild and Finney conducted a comprehensive evaluation of the ECR-R. Their seminal study confirmed the instrument's robust psychometric properties, corroborating earlier findings regarding its effectiveness in assessing attachment behaviors in children. These results are pivotal, as they underscore the ECR-R's capacity to yield consistent and reliable measurements, which are indispensable for both clinical practice and research endeavors within the field of developmental psychology (Fairchild & Finney, 2006).

Fraley, Heffernan, Vicary, and Brumbaugh (2011) expanded on Fairchild and Finney's work, advancing the validation of the ECR-R with a large-scale study encompassing over 21,000 participants. Their large-scale study, which encompassed a diverse sample of 21,000 participants, not only reaffirmed the instrument's robust validity but also illuminated its scalability and applicability across a broad spectrum of populations. The findings from this extensive research endeavor underscore the ECR-R's comprehensive utility in capturing a wide array of attachment styles, thereby solidifying its status as an indispensable tool for psychologists and researchers dedicated to the exploration of interpersonal relationships and attachment dynamics (Fraley et al., 2011).

This landmark study further elucidates the nuanced complexities of attachment theory, demonstrating that the ECR-R can effectively discern subtle variations in

attachment-related behaviors and attitudes across different demographic groups. The research conducted by Fraley and colleagues has been instrumental in expanding the scope of attachment assessments, allowing for a more granular analysis of attachment orientations and their implications for psychological well-being and relational outcomes. These contributions have cemented the ECR-R's reputation as a methodologically rigorous and versatile tool, solidifying its status as a cornerstone in developmental psychology. The ECR-R's ability to offer nuanced insights into attachment processes underscores its profound implications for advancing theory and informing practical applications, including therapeutic interventions and empirical research.

Cross-Cultural Validation and Evolution of the ECR-R: Innovations in Attachment Assessment

ECR-R

The Experiences in Close Relationships-Revised (ECR-R) scale plays a central role in evaluating adult attachment styles, specifically measuring the dimensions of attachment-related anxiety and avoidance. Since its inception, the ECR-R has been subjected to rigorous validation processes across diverse cultural landscapes, affirming its reliability and cross-cultural applicability. In Spain, Alonso-Arbiol, Balluerka, and Shaver (2007) highlighted the robust psychometric properties of the ECR-R, demonstrating its compatibility with Mediterranean cultural contexts. This was paralleled by research in the Netherlands, where Conradi, Gerlsma, van Duijn, and de Jonge in 2006 attested to the scale's relevance within Dutch societal frameworks, thus cementing its place in European psychological evaluations.

The scale's pertinence was further extended to Eastern European contexts, as evidenced by Rotaru and Rusu's 2013 study in Romania, which demonstrated the ECR-R's efficacy in these regions. Concurrently, Sibley, Fischer, and Liu's 2005 research in New Zealand highlighted its utility in the Pacific domain, showcasing the scale's adaptability to diverse population dynamics.

German researchers, including Ehrenthal, Dinger, Lamla, Funken, and Schauenburg in 2009, contributed significant insights into the scale's robustness,

particularly in evaluating attachment styles within German cohorts. This was complemented by Wongpakaran, Wongpakaran, and Wannarit's 2011 study in Thailand, which validated the ECR-R's applicability in Asian contexts, thereby reinforcing its global versatility.

Recent developments include abbreviated ECR-R versions designed to increase its practicality in diverse research and clinical contexts, particularly in German samples. Notably, a 2021 study by Ehrenthal, Zimmermann, Brenk-Franz, et al. (2021) introduced the ECR-RD8, an eight-item version demonstrating satisfactory model fit and reliability within a representative German sample. This iteration allows for efficient assessment while maintaining the scale's integrity. Further refinement was achieved with the ECR-G-10, a 10-item short form developed by Neumann, Rohmann, and Sattel in 2023. This version emerged from a meticulous selection process utilizing ant colony optimization (ACO, following the approach of Schroeders et al., 2016 and Volz et al.) and exhibited good model fit and reliability across multiple samples. Its validation process affirmed the short form's convergent and discriminant validity, making it a valuable asset for both research and clinical practice. The continuous evolution of the ECR-R scale, through these innovative adaptations, underscores its enduring significance in the realm of psychological assessment. The scale's ability to transcend cultural boundaries and adapt to the changing landscape of psychological research exemplifies its foundational role in understanding human attachment behaviors.

The Experiences in Close Relationships–Relationship Structures questionnaire (ECR-RS), introduced by Fraley, Heffernan, Vicary, and Brumbaugh in 2011, represents a major advancement in assessing attachment styles across diverse relational contexts. This instrument, comprising a succinct 9-item format, is specifically designed to evaluate attachment dynamics within interpersonal relationships, encompassing connections with friends and family. The ECR-RS builds upon the foundational principles of the Experiences in Close Relationships-Revised (ECR-R), facilitating its application across a wide array of relational contexts. The instrument's extensive validation across diverse international settings attests to its universal applicability and robust psychometric properties.

In Portugal, Moreira et al. (2014) validated the ECR-RS, confirming its reliability and applicability in the Portuguese context. This was paralleled by findings from

Denmark by Donbaek and Elklit (2014), which affirmed the scale's effectiveness in European contexts. Further validations in Turkey (Karataş & Demir, 2019), Chile (Tay-Karapas et al., 2015), Italy (Hünefeldt et al., 2013), and Japan (Komura et al., 2016) have reinforced the ECR-RS's adaptability and precision in measuring attachment across varied cultural landscapes.

Recent studies continue to support the ECR-RS's validity and reliability. In Brazil, research has provided evidence of the ECR-RS's construct validity and precision, confirming its two-dimensional structure representing anxious and avoidant attachment, which aligns with theoretical expectations (Rocha, Peixoto, Nakano, Motta & Wiethaueper, 2017). Additionally, a study examining the factor structure of the ECR-RS in siblings of children with chronic disorders has demonstrated its psychometric soundness, indicating that the ECR-RS can be used as a reliable measure of relationship anxiety and avoidance in families dealing with chronic illnesses (Fjermestad, Orm, Fredriksen, Haukeland & Vatne, 2024).

These ongoing validations and enhancements of the ECR-RS reflect the dynamic nature of attachment theory and its application in understanding the complexities of human relationships. The tool's ability to adapt to various cultural and situational contexts ensures its continued relevance in the field of psychology, providing valuable insights into the intricate patterns of human bonding and interaction.

In a significant advancement within the field of attachment theory measurement tools, Lafontaine et al. (2015) meticulously selected specific items from the original Experiences in Close Relationships (ECR) scale to create a more concise yet equally reliable version, known as the ECR-12. This concise 12-item questionnaire retains the strong psychometric properties of the original scale, offering accurate assessments of attachment styles across diverse contexts. The ECR-12 was shortened based on IRT analyses and 1,000 nonparametric bootstrap samples to ensure that each item's inclusion is justified by adequate statistical indices, which affirm their efficacy in capturing the essence of attachment dynamics similar to the original ECR. Six items from the Avoidance subscale and six items from the Anxiety subscale were selected to develop the Experiences in Close Relationships-12. The two-dimensional structure of the ECR-12 was well established with confirmatory factor analyses (CFA) with five studies involving diverse populations (French speaking and English-speaking

individuals and heterosexual couples, couples seeking therapy, and same sex relationships). These studies demonstrated that the psychometric properties of the ECR-12 are as commendable as those of the original ECR and superior to those of an existing short form.

The 2007 study by Wei, Russell, Mallinckrodt, and Vogel made a significant contribution to the field of attachment theory by introducing the Short Experiences in Close Relationships (ECR-S) inventory. This condensed instrument, composed of 12 items, is meticulously crafted to measure two fundamental dimensions of attachment: anxiety and avoidance. The development of the ECR-S involved both rational and empirical methods, ensuring that each item selected for the short form was justified through rigorous factor analyses. The ECR-S upholds the psychometric integrity of the original ECR while providing a more expedient approach for evaluating attachment styles in adult populations. This streamlined version facilitates swift assessments without compromising the comprehensive depth required for precise psychological evaluations and research endeavors. Recent advancements in attachment style measurement tools have continued to refine and validate the ECR-S. For example, a study by David, Carter, and Alvarez (2020) assessed various attachment style measures in marketing and found that while relationship-specific measures may perform differently than general interpersonal attachment style measures, tools like the ECR-S are invaluable for their strong psychometric properties and predictive validity. This underscores the ECR-S's relevance and adaptability in diverse research fields beyond its initial psychological assessment context. In summary, the ECR-S maintains the psychometric robustness of the original ECR while offering a more efficient means for assessing attachment styles in adult populations. This adaptation also enables quicker assessments without sacrificing the depth needed for accurate psychological evaluations and research.

In Brazil, numerous instruments have been rigorously validated to capture the nuances of adult attachment. The Adult Attachment Scale, a seminal tool originally conceived by Collins and Read in 1990, underwent a comprehensive process of translation, cultural adaptation, and validation for the Brazilian populace, a task undertaken by Santos and colleagues in 2006. This endeavor ensured that the scale's application was attuned to the unique cultural fabric of Brazil.

Subsequently, the Experiences in Close Relationships Scale – Reduced version (ECR-R-Brazil), another pivotal instrument in the attachment theory landscape, was adapted by Natividade and Shiramizu in 2015. This adaptation was executed with the intent to encapsulate the cultural idiosyncrasies inherent to the Brazilian context, thereby enhancing the scale's precision and relevance.

Furthermore, the Experiences in Close Relationships (ECR) scale itself has been subject to rigorous adaptations for the Brazilian demographic. In 2017, Roazzi, Souza, Nascimento, and Mascarenhas contributed to this effort, followed by the collaborative work of Shiramizu, Natividade, and Lopes in 2013. These scholarly endeavors have been pivotal in ensuring that the ECR scale remains a robust and culturally resonant tool for assessing attachment within the Brazilian sociocultural milieu.

Recent scholarly advancements have continued to refine these tools, expanding their applicability and psychometric robustness. For instance, a study published in 2020 introduced the Brazilian Short Work Attachment Measure (SWAM), which aimed to adapt and collect psychometric evidence for the assessment of adult attachment in the workplace among Brazilian Portuguese speakers (Andrade, Tokumaru & Leiter, 2020). This study involved 450 adults and provided preliminary evidence of the measure's validity, marking a significant step in the exploration of attachment in professional settings.

These developments underscore the dynamic and evolving nature of adult attachment assessment in Brazil, highlighting its growing academic rigor and cultural relevance. The incorporation of recent findings and methodologies enhances the academic rigor and contemporary relevance of attachment assessment tools, offering deeper insights into their implications across diverse life domains.

Assessing Attachment in Early Childhood: Tools, Challenges, and Evolution

Existing research confirms that psychometric tools like the Experiences in Close Relationships (ECR) scale and its variants are well-established; however, their primary standardization for adult and adolescent populations highlights a gap in assessing younger children. This gap underscores the need for age-appropriate tools tailored to

younger children's unique developmental and cognitive characteristics. In the context of childhood, most studies have focused on early childhood attachment using methodologies like Mary Ainsworth's Strange Situation Procedure, developed in 1978. This procedure, designed to assess the quality of attachment between infants and their primary caregivers, remains a cornerstone in attachment research. However, its application is primarily confined to the early formative years.

The study of attachment styles in younger populations, especially anxiety and avoidance dimensions, has garnered significant academic attention. In a seminal study by Brenning, Soenens, Braet, and Bosmans in 2011, the Experiences in Close Relationships Scale-Revised Child Version (ECR-RC) was validated for children and adolescents between the ages of 8 and 14. This study was distinctive in its approach, as it recalibrated the scale's original focus from romantic attachments to the context of parent-child relationships. Such a modification is crucial as it recognizes the distinct dynamics present in the attachment forms of children and their caregivers, which differ markedly from the romantic attachments typically assessed in adult relationships.

Recent research has continued to build upon this foundation, further refining the ECR-RC to better capture the attachment styles of children and adolescents in relation to their parents. For instance, a study published in 2024 examined the factor structure of the Experiences in Close Relationships—Relationship Structures Scale (ECR-RS) in siblings of children with chronic disorders (Fjermestad et al., 2024). This study, conducted with 103 siblings (mean age: 11.5 years), highlighted relationship anxiety and avoidance within family dynamics, showcasing the scale's relevance for at-risk populations.

Moreover, adaptations of the ECR-RC have been made to ensure its relevance and accessibility for younger age groups. A psychometric study tested the 12-item version of the ECR-RC with four different youth samples aged 12 to 1, confirming the scale's two-factor structure representing anxiety and avoidance. Another study aimed to test the psychometric properties of the 12-item ECR-RC for both mother and father forms in a sample of 448 Italian children aged between 8 and 13 years, adapting the response format to be more comprehensible for young children (Marci, Moscardino & Altoè, 2019).

In addition to the Experiences in Close Relationships Scale-Revised (ECR-RC), various tools assess attachment dynamics in children and adolescents. These include (**01) Attachment Security Scale (ASS):** Developed by Kerns, Klepac, and Cole in 1996, this scale assesses the security of attachment relationships in children. Despite its utility, the ASS may not capture the more nuanced aspects of attachment behaviors that emerge in varied social contexts; **(02) Relationship Questionnaire (RQ):** Introduced by Bartholomew and Horowitz in 1991, this instrument categorizes individuals into four attachment styles. While widely used, its broad categories may oversimplify the complex spectrum of attachment behaviors; **(03) Preoccupied and Avoidance Coping Questionnaire (PACQ):** Finnegan, Hodges, and Perry designed this tool in 1996 to explore specific coping mechanisms associated with insecure attachment styles. Limitations include its focus on negative outcomes, potentially overlooking positive adaptive strategies; **(04) Separation Anxiety Test (SAT):** Created by Klagsbrun and Bowlby in 1976, this test evaluates a child's anxiety during separations from caregivers. Although seminal, its application is sometimes criticized for over-emphasizing anxiety to the detriment of assessing other emotions related to attachment. However, these instruments have some limitations.

Each attachment assessment tool has specific limitations that influence its applicability across diverse groups and settings: **(01) Attachment Security Scale (ASS):** While the ASS is effective in measuring attachment security, it does so through a unidimensional approach. This simplification can obscure the rich, multidimensional nature of attachment styles, which include secure, anxious, and avoidant dimensions. This limitation may restrict the tool's ability to fully capture the complexity of attachment as currently understood in the broader research literature; **(02) Relationship Questionnaire (RQ):** The RQ suffers from poor internal consistency, a result of its structural limitations. This affects the reliability of the data derived from this questionnaire, making it less effective in psychological assessments where high precision is crucial; **(03) Preoccupied and Avoidance Coping Questionnaire (PACQ):** The PACQ is tailored specifically for certain age groups, which can limit its generalizability across a broader age range. This specificity, while useful in targeted studies, may reduce its applicability in broader developmental research; **(04) Separation Anxiety Test (SAT):** The SAT utilizes imagery that may not resonate

across different cultural contexts, potentially leading to biases in responses. Furthermore, it focuses primarily on the attachment relationships between parents and children, which may not be as indicative of attachment styles in other relationships or in contexts where other forms of attachment are equally important; **(05) Experiences in Close Relationships-Revised Child Version (ECR-RC):** Similar to the SAT, the ECR-RC is narrowly focused on parent-child dynamics and may not adequately address the wider variety of attachment relationships that exist, especially in multicultural settings where family structures and dynamics can vary significantly.

In Brazil, attachment assessment in children integrates qualitative methods and psychometric tools, offering comprehensive insights into attachment behaviors. Qualitative assessments typically involve observations within interactive contexts, providing nuanced insights into children's attachment behaviors (Sanini, Ferreira, Souza & Bosa, 2008). On the psychometric front, several scales have been adapted and validated for use within the Brazilian context, contributing to a standardized approach to measuring attachment. Regarding the latter, it is possible to cite the **(01) The Maternal Attachment Inventory (MAI):** Originally developed by Muller in 1994, the MAI was adapted for the Brazilian population by Boeckel et al. (2011). This scale assesses the emotional bond between a mother and her child, offering valuable information on the nature of this attachment; and **(02) The Maternal-Fetal Attachment Scale:** Introduced by Cranley in 1981, this scale was translated and validated for a Brazilian audience by Feijó in 1999. It is specifically designed to measure the attachment relationship between a pregnant woman and her unborn child, highlighting the early formation of maternal bonds.

Even though these instruments are available to assess attachment in Brazilian children, however, their limitations warrant attention for proper application and interpretation. The Maternal Attachment Inventory (MAI) and the Maternal-Fetal Attachment Scale specifically measure the affective relationship established by mothers with their young children, thus focusing predominantly on early developmental stages. These scales do not address broader attachment behaviors that manifest beyond early childhood, limiting their applicability to a wider age range. Such limitations underscore the necessity for ongoing development and validation of attachment

assessments that can accurately reflect the diverse and evolving attachment-related behaviors across different stages of childhood.

In Brazil, the "Attachment in Friendship Relationships" (in Portuguese, "Apego nas Relações de Amizade" - AFR/ARA) scale makes a significant contribution to the study of attachment across various age groups. Developed by Roazzi and colleagues (Roazzi, Vermigli, & Roazzi, 2010; and more recently Roazzi, Toni, Di Pentima, Vermigli, Moura, Souza, Nascimento, Roazzi & Savoldi, 2025), the AFR/ARA scale is intricately modeled on the structural and semantic framework of the Experiences in Close Relationships Scale (ECR) established by Brennan, Clark, and Shaver in 1998. The AFR/ARA has been effectively adapted for use not only with adults but also with adolescents and pre-adolescents. This adaptation has been thoroughly discussed and validated in studies by Mascarenhas, Roazzi, Peluso, and Gomes (2013), as well as Mascarenhas, Roazzi, and Silva (2013).

The AFR/ARA instrument is meticulously designed to assess attachment through 36 items exploring the nuances of adolescent friendship relationships. These items are stratified into two distinct dimensions: Avoidance, with a reliability coefficient (alpha) of 0.78, and anxiety, with a reliability coefficient of 0.88. Despite its robust application in older children, the AFR/ARA presents challenges when administered to younger children, particularly those under seven. The format of the scale, which utilizes affirmative statements answered via a Likert scale, may need to align better with this younger demographic's cognitive and linguistic capabilities, potentially complicating the interpretation of their attachment behaviors.

Notably, research into attachment during the latter stages of childhood and early adolescence is critical as attachment patterns evolve significantly during these periods. As delineated in developmental psychology, while early childhood attachment predominantly revolves around parents and primary caregivers, this focus shifts as children grow older. Starting from late childhood into early adolescence, there is a notable transition towards peer relationships. This shift is influenced by the expanding social roles and responsibilities that individuals must navigate during these formative years (Vrtička & Vuilleumier, 2012; Sheinbaum et al., 2015). For instance, during the second and third stages of childhood, as children's social circles widen and they begin to engage more frequently with peers, the nature of attachment behaviors and needs

begins to transform. These stages are characterized by a decrease in parental dependency and an increase in the significance of peer interactions, which play a pivotal role in social development and emotional regulation.

Studies underscore the importance of understanding these dynamics, as the quality of peer relationships during this period can have profound implications for the child's future social, emotional, and cognitive development (Vrtička & Vuilleumier, 2012). Through these interactions, children learn to negotiate, empathize, and establish complex interpersonal dynamics that are crucial throughout life.

Thus, as children progress through different stages of development, particularly as they transition from early childhood into later stages and adolescence, their dependency on parents for emotional support diminishes. Even as dependency diminishes, parents remain a secure base, fostering children's exploration of interpersonal environments and broader social contexts (Bowlby, 1982). This enduring role underscores the importance of the psychological availability of parents rather than their mere physical presence. Psychological availability refers to a parent's emotional and cognitive readiness to respond to a child's needs, even if not physically present. This aspect of attachment becomes increasingly significant as children grow older. It supports them in forming and navigating other social interactions beyond familial boundaries, promoting broader social and emotional development (Brenning, Soenens, Braet, & Bosmans, 2011).

These shifts in attachment dynamics emphasize the importance of parents adapting their support strategies to meet evolving developmental needs. They need to emphasize emotional availability and reassurance, which are critical for the child's ability to engage confidently with a broader social world. This shift is not just critical for fostering independence, but also for ensuring that children develop robust interpersonal skills and emotional resilience, essential for their overall growth and well-being (Sagone, Commodari, Indiana & La Rosa, 2023).

Adaptation and Validation of the Attachment in Friendship Relationships Scale with Visual Illustrations

This study adapts the Attachment in Friendship Relationships (AFR/ARA) scale by integrating illustrative drawings, evaluating its psychometric properties, and

enhancing its accessibility for children. The use of graphic scales featuring representative drawings is recognized as an effective approach for assessing psychological constructs in children, as it accommodates their unique cognitive and developmental needs (Gomes, 2015). Furthermore, research indicates that visual aids improve engagement, comprehension, and response accuracy, especially when tailored with culturally adaptive elements for diverse populations (Cromley & Chen, 2023; Lo & Wang, 2024).

The adaptation process focuses on creating a new child-friendly version of the AFR/ARA scale. This version incorporates illustrative drawings specifically designed to enhance accessibility and relevance for young participants. Graphic scales facilitate comprehension by aligning with recommendations in developmental psychology, which emphasize the importance of visual elements in psychological assessments for children at different stages of development (Gomes, 2015). In addition to supporting developmental appropriateness, visual aids align with universal design principles, fostering inclusivity by addressing diverse learning styles and minimizing comprehension barriers. This is particularly significant for neurodivergent populations and individuals with limited literacy skills (Cardillo, 2016).

The adapted scale's psychometric properties must be validated to ensure reliability and accuracy in measuring friendship-related attachment behaviors in children. Prior research highlights that including culturally relevant visual cues within psychometric tools enhances reliability and increases cross-cultural generalizability (Gonthier, 2022). Using such tailored instruments is crucial for obtaining accurate and culturally relevant data in psychological research, providing insights into the social development of children within specific cultural contexts. Bourdage, Narme, Neeskens, Papma & Franzen, 2024; van Widenfelt, Treffers, de Beurs Siebelink & Koudijs, 2005).

Drawings, often used in projective techniques to capture nuanced emotional dimensions, hold promise for enriching self-report measures by providing non-verbal avenues for expression (e.g., Carvalho, 2015; Carvalho & Justo, 2018). Recent advancements reveal that integrating visual prompts with interactive digital platforms improves engagement, response accuracy, and participant satisfaction, particularly in digitally native populations who benefit from user-friendly interfaces and real-time feedback (Alkhaldi, Hamilton, Lau, Webster, Michie & Murray, 2016). Despite their

widespread use in qualitative assessments, drawings are underutilized in self-report psychological instruments, leaving a gap in understanding how visual aids can quantitatively enrich such measures.

This research addresses a critical gap: evaluating how visual aids can enhance the clarity and depth of responses in self-report measures, particularly for populations with limited literacy or verbal articulation challenges. Integrating visual elements into psychological instruments enhances accessibility and cultural resonance, particularly for populations with limited literacy or verbal articulation challenges. (e.g., Galmarini, Marciano & Schulz, 2024; Mbanda, Dada, Bastable, Ingalill & Ralf, 2021). By offering alternative pathways for emotional expression, these tools provide nuanced insights into psychological states that are often difficult to articulate verbally, fostering equity in psychological assessment across diverse demographic groups. Including visual elements in self-report questionnaires offers a promising approach to deepening the understanding of psychological states, particularly by clarifying complex emotional nuances that are often difficult to articulate verbally. Furthermore, studies on emotional regulation in children highlight the effectiveness of visual metaphors and representational art in bridging verbal and non-verbal expressions, fostering a more comprehensive emotional assessment (Brechet, D'Audigier & Audras-Torrent, 2022; Winner & Drake, 2022).

Method

Sample

The study involved 244 children, comprising 99 males and 145 females, aged 7 to 12 (Mean age = 10.3 years; SD = 1.3). Participants were recruited from two public schools in Petrolina-PE, a city in the northeastern region of Brazil. One school is located in the city's central region, characterized by a higher socioeconomic profile, while the other is situated in a peripheral area with lower socioeconomic conditions. This sample was non-probabilistic as participation was voluntary.

Instruments

Attachment was measured using the Attachment in Friendship Relationships (AFR-/ARA) developed by Roazzi and colleagues (Roazzi, Vermigli & Roazzi, 2010; and more recently Roazzi et al., 2025) based on the semantics and format of the Experiences in Close Relationships – ECR by Brennan, Clark, and Shaver (1998). The AFR-/ARA is a self-report scale composed of 36 items that assess the friendship relationships established by adolescents.

The 36 items of the AFR/ARA scale evaluate two dimensions: Avoidance (α=0.78) and Anxiety (α=0.88). Odd-numbered items correspond to the Avoidance subscale, while even-numbered items correspond to the Anxiety dimension. Participants respond to the AFR-/ARA by reflecting on their past and present experiences of friendship relationships and rating their agreement with each item on a seven-point Likert scale (1 = 'Completely false'; 7 = 'Completely true') (Roazzi et al., 2009, 2025). To enhance the accessibility of the AFR/ARA for younger participants, this study adapted the scale by incorporating a set of images depicting scenes associated with each item. The adaptation included creating distinct sets of illustrations tailored to gender: one set for female children and another for male children. These images were printed on an A4 sheet and were monochrome so that the colors of the drawings would not influence the children.

In addition, empathy was assessed using the 'Escala de Empatia para Crianças e Adolescentes' (EECA - Empathy Scale for Children and Adolescents), which was initially developed as the Index of Empathy for Children and Adolescents by Bryant (1982). The Portuguese version of the scale was adapted and translated by Koller, Camino, and Ribeiro in 2001. The EECA comprises 22 items, with eleven items (specifically items 2, 3, 9, 10, 15, 16, 17, 18, 20, 21, and 22) being reverse-scored. Responses are recorded on a three-point Likert scale (1 = strongly disagree, 3 = strongly agree). The EECA is recognized for its effectiveness in achieving divergent validity, as evidenced by negative correlations between empathy and moral disengagement, as highlighted in various studies (Ouvrein, De Backer, & Vandebosch, 2018; Albertoni, 2018; Chowdhury & Fernando, 2014). Additionally, the EECA has demonstrated robust reliability and validity in prior research (Sampaio & Camino, 2017; Kirst-Conceição & Martinelli, 2014). Overall, it is a versatile and reliable instrument for assessing empathy in children across diverse research contexts.

To reduce the subjectivity associated with the traditional Likert scale, a visual strategy was implemented using three smiley faces to represent the response options: 'Strongly Agree,' 'Neither Agree Nor Disagree,' and 'Strongly Disagree''. Finally, the Free and Informed Consent Form, as well as a sociodemographic questionnaire with questions such as gender, age, education, among others, were used.

Procedures

Adaptation of the AFR-/ARA *scale*

The initial adaptation of the Attachment in Friendship Relationships Scale (AFR/ARA) focused on simplifying the language and modifying terminology to align with the cognitive and linguistic capabilities of the children's age group (see Appendix 01). A panel of experts, including one PhD and two MSc holders, reviewed the items to ensure their alignment with the constructs measured by the original scale. After the review, a designer developed illustrations tailored explicitly for children, featuring characters with unique, expressive traits designed to enhance comprehension and engagement.

The images were further evaluated by three judges, who suggested refinements to the facial expressions and body language to convey the emotional content of each illustration more effectively. The revised illustrations were pilot-tested with a 12-year-old participant, who reported that the visuals were easy to understand and engaging, confirming their potential to improve response accuracy. Figure 01 illustrates the scale's first three items, showcasing the adapted images' child-friendly design.

Figure 01. The first three images from Attachment in Friendship Relationships for Children (AFR-C/ARA-C),

Participant responses were collected using a visually intuitive three-point Likert scale, represented by smiley faces denoting 'Strongly Agree,' 'Neither Agree nor Disagree,' and 'Strongly Disagree'. A pilot group of four children (ages 11-12, three females, one male) validated the emoticon scale by successfully matching the facial expressions to their intended sentiments, confirming its effectiveness in capturing detailed feedback from children.

Figure 02. *Smiley faces illustrating the response options for the three-point Likert scale: 1 = Strongly Agree, 2 = Neither Agree nor Disagree, 3 = Strongly Disagree."*

Application of the instruments

Data collection commenced in schools after obtaining consent from participants' legal guardians through the signed Informed Consent Form (ICF). The scales were administered individually, with the researcher reading the items aloud while participants selected their answers using smiley face images designed to represent their feelings or opinions clearly.

For the AFR-C/ARA-C scale, the researcher read each item aloud while simultaneously displaying the corresponding images, ensuring the children could fully grasp the semantic content of the items. This visual support was intended to help children better comprehend the semantics of the items. The researcher recorded the participants' responses directly on a datasheet during the session. To mitigate potential order effects and ensure unbiased responses, the sequence of administering the AFR-C/ARA-C and empathy scales was randomized.

The study adhered to ethical standards established by the National Health Council under Resolution 510/16. Ethical approval was granted by the Research Ethics Committee of the Federal University of Pernambuco through CAEE number 96346918.5.0000.5208 and report number 3.007.880.

Data Analysis

To assess the psychometric quality of the scales, factor analysis and internal consistency indices (Cronbach's alpha) were calculated for the AFR-C/ARA-C scale as a whole and for each identified factor. Divergent validity was examined through correlational analyses between scales. The Wilcoxon non-parametric test was employed to determine significant differences between the factors found in the scales.

Additionally, the Similarity Structure Analysis (SSA), a multidimensional scaling method emphasizing variable proximity (Roazzi & Souza, 2019), was applied. SSA, increasingly utilized in psychometric instrument validation (Roazzi, Souza, & Bilsky, 2015), effectively addresses statistical limitations associated with factor analysis.

Results

Factor Analysis

To examine the internal structure of the AFR-C/ARA-C, its 36 items were analyzed using exploratory factor analysis (EFA) with principal component analysis and Varimax rotation to clarify the scale's underlying structure. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.743, indicating moderate common variance among items and suitability for factor analysis. Bartlett's test of sphericity was significant ($\chi^2 = 1826.355$, $df = 630$, $p < 0.001$), confirming sufficient inter-item correlations for factor extraction.

The EFA identified thirteen factors from the 36 items, collectively explaining 62.3% of the total variance. This outcome a complex, multidimensional model of attachment styles in children, differing from Bowlby's (1982) original framework, which emphasized a more uniform pattern of attachment development.

The exploratory factor analysis (EFA) of the AFR-C/ARA-C yielded eigenvalues greater than 1 (4.5, 3.8, 1.8, 1.6, 1.5, 1.4, 1.3, 1.2, 1.1, 1.08, 1.04, 1.02, 1.00), suggesting a potential thirteen-factor solution. However, a clear gap between the first two eigenvalues and the subsequent ones indicates that the first two factors predominantly account for the variance in the construct being measured.

The scree plot supports this interpretation, showing a sharp decline after the second factor, underscoring the predominance of a two-factor model. This aligns with psychometric principles, which state that significant factors often account for the majority of the variance in psychological constructs. Subsequent factors likely represent overlapping or less critical dimensions (Chatterjee et al., 1991).

These findings highlight the AFR-C/ARA-C's ability to capture the multidimensional nature of attachment, particularly the constructs of Anxiety and Avoidance. The results reveal the nuanced ways children form and maintain peer relationships, aligning with the theoretical framework of attachment as a complex, multidimensional construct.

Integrating these findings with established attachment theories provides deeper insight into the variability and complexity of attachment styles across developmental stages and cultural contexts. Studies by Cassidy, Jones, and Shaver (2013) and Bowlby (1982) underscore the dynamic nature of attachment, supporting the psychometric identification of diverse attachment expressions (Keller, 2018).

Thus, considering the distribution of the scree plot, the higher eigenvalue values in the first two dimensions, and the fact that the original version of the AFR/ARA scale (Roazzi, Vermigli & Roazzi, 2009; Roazzi et al., 2025) presented only two factors, the exploratory factor analysis was performed again. This analysis reaffirmed the prevalence of two factors, which explained 23.08% of the total variance, underscoring their significant role in capturing the core constructs of the AFR-C/ARA-C (see Table 01).

Table 01 presents the grouping of items by factor loadings, identifying two primary dimensions: Anxious and Avoidance. This classification aligns with the scale’s original theoretical structure. Even-numbered items predominantly load on the Anxious dimension, reflecting concerns about abandonment and emotional dependency. Odd-numbered items, in contrast, primarily load on the Avoidance dimension, which captures tendencies to distance oneself from emotional closeness. This distribution mirrors established patterns in attachment-related scales (Roazzi, Vermigli & Roazzi, 2009; Roazzi et al., 2025; Xu, Liu, Gong & Wu, 2022).

Nevertheless, certain items deviate from these expected patterns. Item 13 ('I get nervous when relationships become too close') demonstrates a moderate loading on

both dimensions (0.344 on Anxious and 0.186 on Avoidance), suggesting it may represent overlapping constructs or transitional states. Similarly, items 10 ('I often wish my friend would like me the same way I like him') and 22 ('I don't worry too much about being left alone') show notable loadings on the Avoidance dimension but were categorized under the Anxious dimension due to their theoretical alignment and prior validation in attachment literature. These divergences reflect the complexity of assessing nuanced attachment behaviors in peer relationships.

The refined analysis identified two distinct factors: (1) Anxious Dimension: This dimension consists of 18 items that address concerns about acceptance, fears of abandonment, and heightened sensitivity to social cues. These traits reflect a tendency toward anxiety in friendships and are consistent with established attachment theories) (2) Avoidance Dimension: This dimension also includes 18 items, focusing on behaviors that avoid intimacy as a protective mechanism against emotional discomfort. These findings align with psychometric models of attachment avoidance (Ainsworth & Bell, 1970).

The reliability analysis of the AFR-C/ARA-C confirmed acceptable internal consistency for the full scale and its two subscales. The overall Cronbach's alpha was 0.73, indicating adequate reliability according to psychometric standards (Pasquali, 2011). When analyzed individually, the Anxious dimension achieved Cronbach's alpha of 0.78, while the Avoidance dimension reported 0.75. These reliability metrics demonstrate that the AFR-C/ARA-C is a robust tool for assessing affective relationships among children, aligning with psychometric criteria in the field.

Further analysis of corrected item-total correlations revealed variability in reliability across the two dimensions: (1) **Anxiety Dimension:** Item-total correlations in the Anxiety dimension ranged from 0.16 (item 16) to 0.53 (item 36), indicating moderate variability. Items 16 and 22 fell below the recommended threshold of 0.20 (Clark & Watson, 1995), suggesting marginal reliability. However, excluding these items did not enhance the scale's internal consistency, supporting their retention based on theoretical relevance and their contribution to the construct; (2) **Avoidance Dimension:** The Avoidance dimension demonstrated more consistent reliability, with item-total correlations ranging from 0.21 to 0.56. These values confirm acceptable

reliability for this dimension and suggest that items in this subscale are more uniformly aligned with the construct being measured.

These findings confirm the robustness of the AFR-C/ARA-C scale in capturing the multidimensional nature of attachment styles in peer relationships. Retaining items 16 and 22 preserves the scale's theoretical framework while maintaining acceptable reliability. These results support the AFR-C/ARA-C as a reliable and valid tool for assessing attachment in children.

Table 01. Factor Analysis of the Attachment in Friendship Relationships for Children (AFR-C/ARA-C).

Items	Factors	
	1 Anxiety	2 Avoidance
36. I get sad when my friend doesn't look for me	0,637	
14. I'm afraid of being without a friend	0,598	
24. I get upset when my friend doesn't show interest in me	0,594	
32. I get sad when I need my friend, and he is not available to help me	0,563	
8. I'm afraid of losing my friend	0,542	
28. I feel anxious and insecure when I can't maintain a deep friendship.	0,539	
30. I feel sad when my friend is not present in the way I would like.	0,504	
34. I get sad when my friend criticizes me	0,477	
26. I think my friend doesn't want to be as close to me as I'd like	0,465	
18. I need to make sure my friend loves me	0,426	
2. I'm afraid of being abandoned	0,419	
20. Sometimes I think I'm forcing my friend to be more dedicated to me and like me more.	0,416	
13. I get nervous when relationships become too close.	0,344	0,186
6. I'm afraid my friend admires me less than I admire him.	0,382	
12. I would often like to have a close relationship with my friend, and this sometimes frightens and alienates him/her.	0,365	
4. I always worry about my relationship	0,311	
16. Sometimes my desire to be close frightens and pushes people away.	0,294	
10. I often wish my friend would like me the same way I like him	0,273	-0.279
22.r I don't worry too much about being left alone	0,200	-0.205
15.r I like to tell my friend what I think and what I feel.		0,680
25.r I tell my friend almost everything.		0,647
29.r I'm comfortable being able to trust my friend.		0,540
23. I'd rather not be too close to my friend		0,468
21. I Can't completely trust my friend		0,468

7. It bothers me when my friend gets too close to me.		0,462
35.r I tend to look to my friend for many things, including comfort and security.		0,452
17. I try not to get too close to my friend		0,439
19.r It's easy to become close to my friend.		0,437
9. I have a hard time opening up to my friend.		0,433
27.r I usually talk to my friend about my problems and concerns.		0,426
11. I'd like to get closer to my friends, but when it's about to happen, I give up.		0,380
31.r I don't mind asking my friend for comfort, advice, or help.		0,374
1. I'd rather not show my friend what I'm feeling		0,360
33.r Help me look for my friend in times of need		0,310
5. When I see that my friends are too close to me, I turn away from them.		0,300
3.r I like it when I get closer to my friend		0,269
% variance explained	12,51%	10,57%
Cronbach's alpha	α = 0,78	α =0,75
Cronbach's Alpha General Scale= 0,73		

Note: Reversed items (r) = 03, 15, 19, 22, 25, 27, 29, 31, 33, 35

Factor Independence and Divergent Validity

The assessment of the AFR-C/ARA-C scale using Spearman's correlation test confirmed the independence of its two primary factors, Anxious and Avoidance behaviors. No significant correlation was observed between these factors ($\rho = -0.028$, $p = .663$), aligning with theoretical expectations that they represent distinct aspects of attachment.

Further analysis of divergent validity demonstrated a significant negative correlation between the Avoidance factor and Empathy measures ($\rho = -0.306$, $p < 0.001$). This finding indicates that children with higher avoidance levels tend to exhibit lower empathic responsiveness, underscoring the scale's ability to differentiate between attachment-related behaviors and other socio-emotional constructs. These results provide critical evidence for the validity of the AFR-C/ARA-C in assessing distinct dimensions of attachment in children.

Multidimensional Scaling: Insights from Similarity Structure Analysis (SSA)

The internal structure of the AFR-C/ARA-C was analyzed using Similarity Structure Analysis (SSA), a multidimensional scaling method designed to examine the proximity and theoretical relationships between variables within a conceptual framework. SSA's visualization of clusters enables the identification of shared

theoretical foundations among variables, reinforcing the validity of the constructs assessed by the tool (Bilsky, 2003; Roazzi, Federicci, & Wilson, 2001).

Compared to traditional Factor Analysis, SSA offers distinct advantages by accommodating variables of varied scales and nonlinear relationships. This flexibility is critical for analyzing complex psychological data where linear methods may fail to capture underlying structures (Guttman, 1954a, 1954b). Through monotonic coefficients, SSA provides a detailed representation of relationships, making it invaluable for exploring constructs in psychological research (Roazzi & Souza, 2019; Roazzi, Souza, & Bilsky, 2015).

For the AFR-C/ARA-C, SSA was particularly useful in examining items with atypical loading patterns, such as Item 13 ('I get nervous when relationships become too close'), Item 22, and Item 10. These items deviate from traditional dichotomies of attachment styles, challenging the assumptions of linear methods like Factor Analysis. By visualizing clusters of items within the Anxious and Avoidance dimensions (see Figure 03), SSA offers a nuanced understanding of these items' relationships, demonstrating their alignment with the broader constructs of attachment.

SSA's multidimensional scaling method builds on Guttman's critique of Factor Analysis, addressing its limitations by moving beyond the linear assumptions of traditional psychometric methods (Guttman, 1954a, 1954b). By offering a spatial representation of data, SSA captures both the magnitude and direction of relationships among variables, making it particularly suitable for complex psychological constructs. This capability allows SSA to accommodate the complexity inherent in psychological constructs, producing theoretically grounded and practically relevant insights across diverse fields (Borg & Lingoes, 1980; Canter, 1983, 1985; Roazzi & Souza, 2019). Applied to the AFR-C/ARA-C scale, SSA highlights the clustering of items within the Anxious and Avoidance dimensions and identifies nuanced relationships that may not conform to traditional dichotomies. As seen in Figure 03, SSA provides an intuitive visual representation of these dynamics, reinforcing the theoretical validity of the scale (Roazzi & Souza, 2019; Canter, 1985).

The internal structure of the Attachment in Friendship Relationships scale (AFR-C/ARA-C) was analyzed using Similarity Structure Analysis (SSA) to explore interrelationships among its 36 items. The uniformity coefficients for the variables

ranged from 9 (Item 3) to 81 (Item 28), confirming their adequacy for this method. An alienation coefficient of 0.176 further validated the interpretative framework, demonstrating the suitability of SSA for the dataset. This analysis utilized the Weak Monotonicity Coefficient (MONCO), a regression-free method that calculates the correlation matrix without relying on linear assumptions (Guttman, 1986). MONCO's effectiveness in uncovering underlying structures ensured the dimensional integrity observed in prior factor analyses while providing additional insights through a nonlinear lens.

SSA organized the AFR-C/ARA-C items into two distinct, well-defined dimensions, corroborating previous factor analytic findings. By avoiding the restrictions of linear associations, SSA revealed complex interactions between items that traditional methods might overlook. The dimensions identified align with the Anxious and Avoidance constructs of attachment theory, further supporting the theoretical validity of the scale. As visualized in Figure 3, the items are spatially arranged in an axial structure within Euclidean space. The figure represents a 1x2 projection of three-dimensional space, enabling a clear and intuitive understanding of how items relate across the identified psychological dimensions. This arrangement highlights nuanced relationships between items, providing a richer interpretation of the data than strictly linear approaches.

As shown in Figure 03, Item 13 occupies a borderline position between the 'Anxiety' and 'Avoidance' dimensions. This placement reflects previous factor analysis findings, where Item 13 loaded strongly on the Anxiety dimension (Factor 1). SSA enhances this understanding by visualizing why the item, despite its association with Avoidance, is situated near Anxiety. Such nuanced positioning is difficult to detect using factor loadings alone, highlighting SSA's advantage in capturing complex inter-item dynamics.

SSA also provides critical insights into Items 16 and 22, positioned at opposite ends of the Anxiety dimension along the first axis. While part of the same construct, these items exhibit correlations below the 0.20 threshold, distinguishing them from other Anxiety items. This unique positioning suggests that Items 16 and 22 capture distinct aspects of the broader Anxiety construct measured by the AFR-C/ARA-C scale.

The visual clarity of SSA affirms the two-dimensional structure originally proposed by Roazzi, Vermigli, and Roazzi (2009), offering both visual and statistical support for the scale's theoretical framework. By revealing nuanced relationships between items, SSA complements traditional factor analysis and validates the AFR-C/ARA-C's constructs more precisely. Unlike factor analysis, SSA's ability to account for nonlinear relationships ensures that subtle yet meaningful item interactions are noticed.

This refined analytical approach has important implications for clinical practice and academic research. The enhanced understanding of childhood anxiety offered by SSA can inform interventions, improve scale development, and contribute to more accurate psychological assessments. Integrating advanced methodologies like SSA underscores the importance of leveraging sophisticated tools to validate psychometric instruments effectively.

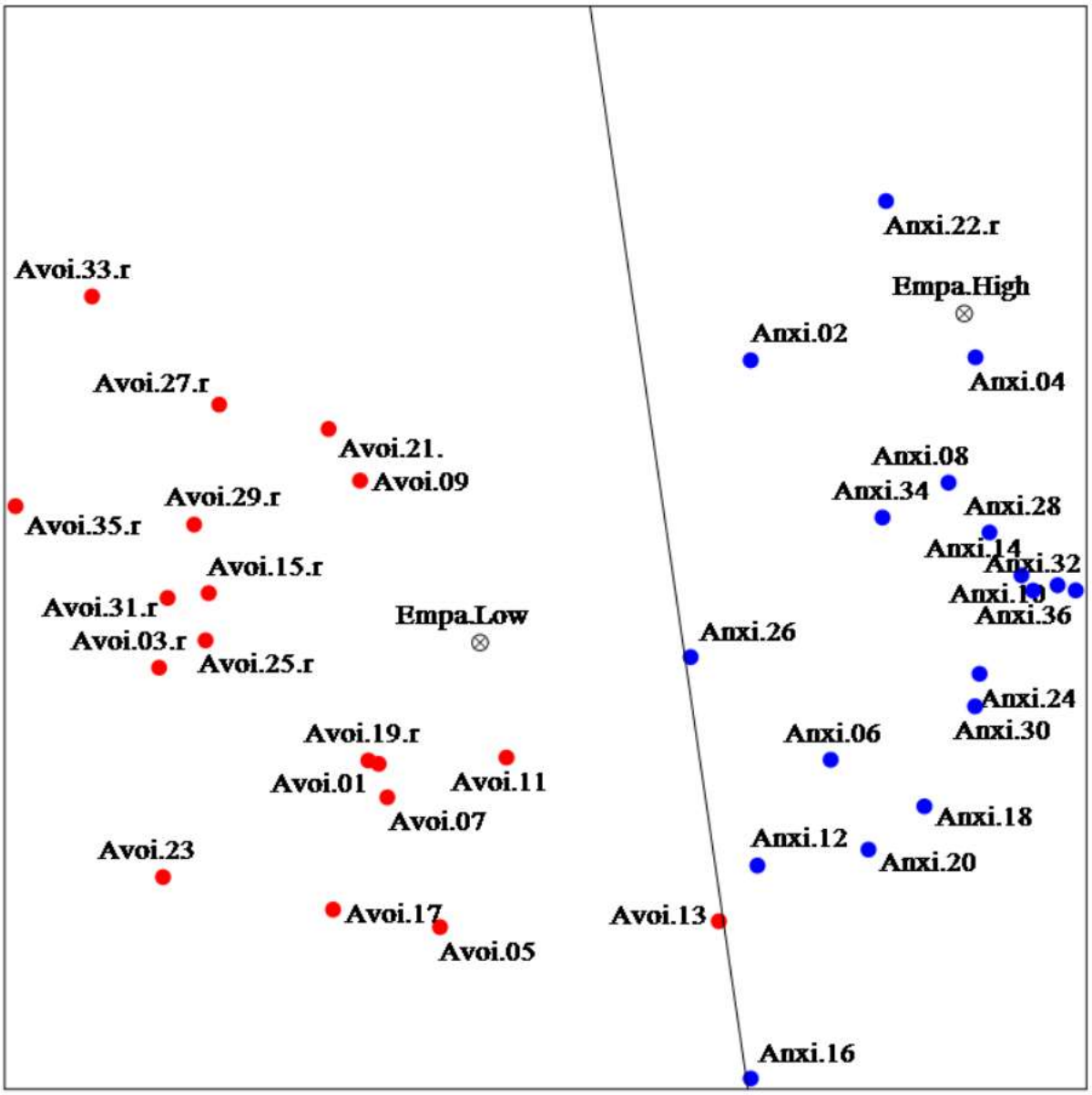

Figure 03. Multidimensional SSA Projection of 36 AFR-C/ARA-C Items considering Empathy Levels (Low and High) as an External Variable (3-D, axis 1 vs. axis 2, Weak Monotonicity, Coefficient of Alienation = 0.176)

Discussion

The primary aim of this study was to culturally adapt the Friendship Relations Scale for Brazilian children by incorporating illustrative drawings. This adaptation addressed developmental and cultural nuances, enhancing the scale's accessibility and comprehensibility. By doing so, the study ensured that children could engage more

meaningfully in the assessment process. Incorporating visual elements aligns with existing research emphasizing the role of visual aids in enhancing engagement and response accuracy in self-report instruments designed for children. The adapted scale was validated using Exploratory Factor Analysis (EFA) and Similarity Structure Analysis (SSA). EFA facilitated the identification of the underlying constructs within the adapted scale, confirming its structural validity. Meanwhile, the SSA offered a visual representation of inter-item relationships, revealing nuanced interactions that complemented findings from traditional factor analysis.

As Roazzi an colleagues (Roazzi, Vermigli & Roazzi (2009; Roazzi et al., 2025) delineated, the adapted Attachment in Friendship Relationships (AFR-C/ARA-C) demonstrated a robust two-dimensional factorial structure, assessing attachment regarding anxiety and avoidance. This structural assessment aligns with previous foundational studies by Brennan, Clark, and Shaver (1998) and subsequent adaptations by Roazzi, Nascimento, Souza, and Mascarenhas (2017), which also identified similar dimensions in the Experiences in Close Relationships (ECR) scale across different cultural contexts. Furthermore, the children and adolescents' version of the ECR, validated by Brenning et al. (2011), corroborates these dimensions, affirming the consistency and relevance of the two-dimensional approach in diverse settings.

Although it presented two dimensions, some items presented factor loading in the two dimensions of the AFR-C/ARA-C; the SSA overcame this limitation of PA when it demonstrated why the items presented these characteristics through the projection of the items in the Euclidean plane. One item of particular interest was item 13, "*I get nervous when affective relationships become very close*," which predominantly loaded on the Anxiety dimension. The term "nervous" was likely interpreted by child respondents not as an aversion to intimacy but as an anticipatory reaction to engaging in close relationships. This interpretation suggests that children's expressions of nervousness may represent positive yet anxious anticipation rather than resistance to intimacy. This interpretation aligns with the possibility that children's expressions of nervousness can sometimes reflect a positive, albeit anxious, anticipation towards relationship dynamics rather than a mere resistance. Therefore, because the removal

of the item did not improve the factorial structure of the scale, as well as the projection of the item in the SSA, the statement was maintained in the avoidance dimension.

The AFR-C/ARA-C demonstrated robust internal consistency across all dimensions, meeting established psychometric standards (Nunnally, 1978). This validation is crucial as it ensures that the scale reliably measures what it purports to in different settings and populations. Specifically, Cronbach's alpha coefficients for the AFR-C/ARA-C were consistent with those reported in the foundational Attachment in Friendship Relationships (**AFR/ARA**), scale developed by Roazzi, Vermigli, and Roazzi (2009). The coefficients were α=0.78 for the Avoidance dimension and α=0.88 for the Anxiety dimension, indicating good internal consistency. These values align closely with the original ARA scale, affirming the AFR-C/ARA-C's reliability in assessing affective relationships among Brazilian children.

An intriguing finding from this study is the lack of significant correlations between the two dimensions of the Affective Relationships Scale. The first dimension encapsulates traits associated with a subject who values close, continuous physical and emotional proximity within friendships. This dimension reflects an attachment style characterized by a higher need for intimacy and reassurance from social connections.

Conversely, the second-dimension captures traits indicative of a subject who experiences discomfort with close affective interactions, displaying a preference for emotional distance and reduced affective expression towards peers. This aligns with an avoidant attachment style, where individuals maintain their independence and emotional distance from others.

These findings align with the theoretical framework proposed by Brennan, Clark, and Shaver (1998), which distinguishes between attachment-related anxiety and avoidance. The distinct and non-overlapping nature of these dimensions within the scale underscores the complex dynamics of interpersonal relationships in children, reflecting a clear delineation between those seeking closeness and those withdrawing from it in their friendships.

The absence of significant correlations between the two identified dimensions of the AFR-C/ARA-C is noteworthy. The AFR-C/ARA-C effectively differentiates between types of attachment behaviors rather than measuring their intensity. This means the scale distinctly categorizes individuals as primarily exhibiting characteristics

associated with either anxiety or avoidance concerning attachment. This separation aligns with the foundational theory of attachment that posits distinct patterns of attachment behaviors rather than a spectrum of intensity (Bowlby, 1982). Furthermore, the finding that these dimensions do not correlate with one another corroborates earlier research by Shiramizu, Natividade, and Lopes (2013), which similarly identified discrete, non-overlapping dimensions of anxiety and avoidance in attachment behaviors. Their study supports the notion that anxious and avoidant attachments are fundamentally different ways of interacting with attachment figures, rather than varying levels of a single attachment style.

Regarding the AFR-C/ARA-C's construct validity was evaluated through Spearman's correlation with an established measure of empathy, revealing findings consistent with prior research, notably studies by Williams, Brown, McKenna, Beovich and Etherington (2017) and Panfile and Laible (2012). These studies reported a significant negative correlation between insecure attachment and empathy, suggesting that individuals with insecure attachment styles typically exhibit lower empathy levels. This pattern aligns with theoretical frameworks suggesting that individuals with insecure attachments tend to be less responsive to others' distress, primarily due to their own relational anxieties (Williams et al., 2017). Furthermore, this negative correlation underscores the effectiveness of the empathy measure used in this study for divergent validation. The scale's ability to discern between empathy and attachment styles validates its utility in assessing distinct but related psychological constructs.

This study's findings from the factor analysis were predominantly validated by the Similarity Structure Analysis (SSA). Unlike the broad scope of the Principal Axis method, SSA precisely delineated the presence of two distinct factors, offering a refined visualization of the data structure. Particularly, SSA proved invaluable in elucidating the roles of several items ambiguously represented in the factor analysis. This clear graphical representation provided by SSA underscores its sensitivity and precision in defining factor boundaries compared to traditional Principal Axis factor analysis. Notably, the application of SSA highlighted its efficacy in resolving ambiguities related to item alignment, reinforcing its utility as a superior tool for evaluating the internal consistency of psychometric instruments. Such multidimensional approaches are increasingly recognized for their robustness in

psychometric validation, as they enhance the interpretability of complex data sets, unveiling the internal structure of psychometric instruments (Roazzi & Souza, 2019). This study reaffirms the significant advantages of employing multidimensional analysis techniques in the psychometric examination of educational and psychological measures.

Final Thoughts

The preliminary results of the AFR-C/ARA-C are promising; however, they represent an important initial step that necessitates further validation. Future studies must go beyond the current state school cohort to ensure the tool's robustness and broad applicability. Sampling children from diverse socio-economic, cultural, and educational backgrounds is essential. This expansion would improve the generalizability of the findings and address potential biases that could influence the interpretation of insecure attachment across different demographic groups. Moreover, the AFR-C/ARA-C exhibits considerable potential as an evaluative tool for assessing child attachment. Nevertheless, there remains a pressing need for extensive investigative efforts to bolster its validation. Future research should prioritize replicating these findings in more extensive and demographically varied populations, thereby solidifying the scale's validity and reliability across diverse contexts.

Looking forward, the AFR-C/ARA-C's ability to objectively assess attachment from a child's perspective highlights its value as a critical instrument in developmental psychology. Attachment is a foundational construct in human development, shaping future interpersonal relationships and psychological outcomes. Accurate measurement of attachment in children could enable the design of more effective interventions and foster a deeper understanding of the relationship between attachment and psychological disorders. Continued refinement and validation of this tool will allow researchers to make meaningful contributions to therapeutic and educational strategies that empower children to navigate their social environments successfully.

In conclusion, ongoing development and refinement of the AFR-C/ARA-C remain crucial. With targeted adjustments and more comprehensive testing, the AFR-C/ARA-C has the potential to become a foundational tool in the study of child development. By offering key insights into attachment dynamics, this instrument could

revolutionize approaches to education, psychology, and intervention strategies, ultimately fostering healthier developmental trajectories for children.

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Appendix 01. Items List of the "Apego nas Relações de Amizade para Crianças" (ARA-C) – in English "Attachment in Friendship Relationships" (AFR-C)

01.e Prefiro não demonstrar o que estou sentindo ao meu amigo
02.a Tenho medo de ser abandonado
03.e Gosto quando fico mais próximo de meu amigo
04.a Sempre me preocupo com minha relação afetiva
05.e Quando vejo que meus amigos estão próximos demais de mim, me afasto deles.
06.a Tenho medo que meu amigo me admire menos do que eu o admiro.
07.e Fico incomodado quando meu amigo se aproxima demais de mim.
08.a Tenho medo de perder meu amigo
09.e Tenho dificuldade em me abrir com o meu/minha amigo/a.
10.a Costumo desejar que meu amigo goste de mim da mesma forma como gosto dele
11.e Gostaria de me aproximar mais dos meus amigos, mas quando isso está quase acontecendo, eu desisto
12.a Com frequência gostaria de ter um relacionamento próximo com o meu amigo/a, e isto, às vezes, o amedronta e o afasta.
13.e Fico nervoso quando as relações afetivas se tornam muito próximas.
14.a Tenho medo de ficar sem amigo
15.e Gosto de contar ao meu amigo o que penso e o que sinto.
16.a As vezes a minha vontade de ser próximo amedronta e afasta as pessoas.
17.e Procuro não me aproximar muito do meu amigo
18.a Preciso ter certeza que meu amigo me quer bem
19.e É fácil me tornar próximo de meu amigo.
20.a Às vezes penso que estou forçando meu amigo a se dedicar e gostar mais a mim.
21.e Não consigo confiar completamente em meu amigo
22.a Não me preocupo muito em ser deixado/a sozinho/a
23.e Prefiro não ser muito próximo de meu amigo
24.a Fico chateado quando meu amigo não demonstra interesse por mim
25.e Conto quase tudo ao meu amigo/a.

26.a Acho que meu amigo não quer ser tão próximo de mim como eu gostaria
27.e Geralmente falo com o meu amigo/a sobre os meus problemas e as minhas preocupações.
28.a Me sinto ansioso e inseguro quando não consigo manter uma relação de amizade profunda.
29.e Fico à vontade em poder confiar no meu amigo.
30.a Fico triste quando o meu amigo/a não está presente da forma que eu gostaria.
31.e Não me importo em pedir conforto, conselho ou ajuda ao meu amigo/a.
32.a Fico triste quando preciso do meu amigo e ele não está disponível para me ajudar
33.e Ajuda-me procurar o meu amigo/a nos momentos de necessidade
34.a Fico triste quando meu amigo me critica
35.e Costumo procurar meu amigo por muitas coisas, inclusive conforto e segurança.
36.a Fico triste quando meu amigo não me procura

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