

The Psychometric Properties of the Mother-Child Attachment Scale in Early Childhood

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Abstract:

This study aims to investigate the psychometric properties of the attachment scale in early childhood by examining its validity and reliability. The scale addresses attachment styles such as secure, anxious, avoidant and disorganised attachment, as well as dimensions such as emotional closeness, trust, independence and social interaction. It assesses how these dimensions influence the child's psychological and social development. The sample consisted of 30 children aged 3-5 years from four nurseries in different regions.

The researcher used a descriptive statistical approach with various methods to measure validity, including expert validity and internal consistency, to ensure the accuracy of the assessments. Cronbach's alpha coefficient was used to assess reliability, and the results indicate a high level of reliability and consistency for the scale.

The results showed that the scale has a high level of validity and reliability, making it a valuable tool for researchers and professionals studying attachment in early childhood.

Keywords: Psychometric properties, mother-child attachment, early childhood.

1. Introduction

The ability to form and maintain reciprocal social relationships is one of the greatest assets a person can possess. These relationships play a crucial role in an individual's life, influencing learning, work, love and reproduction. Social relationships take many forms, but among the most intense, enjoyable and often positive are those with family, friends and loved ones. Within the context of these intimate relationships, individuals are connected through what is known as "emotional bonding", resulting in a general emotional interconnectedness (Bruce Perry, 2006, p. 180).

The ability of individuals to form and maintain these emotional bonds varies. Some people seem to be born with an innate ability to love and integrate with others, enabling them to develop warm and intimate social interactions with many people and to take great pleasure in expanding their social networks. Conversely, others may find it difficult or impossible to form interactive relationships, leading to withdrawal from most social interactions and a preference for isolation. In extreme cases, they may lack any emotional connection with others, resulting in self-absorption or living within their own boundaries, possibly showing signs of neurosis or psychological problems such as schizophrenia or autism.

The ability and desire to form and develop emotional relationships is linked to specific functions organised within the human brain. The brain not only enables us to see, smell, taste, think, speak and move, but it also enables us to love and bond with others or, conversely, to disconnect. Brain systems contribute to the development and maintenance of emotional relationships that begin in early childhood, where early experiences significantly influence our ability to form intimate and friendly relationships.

The essential characteristics of healthy emotional experiences include empathy, care, attention, sharing, freedom from violence, acceptance, warmth in relationships and the exchange of love. Psychological studies indicate that a healthy, happy and productive individual is the result of positive

and healthy attachment experiences with others, especially parents, during early childhood (Bruce Perry, 2006, p. 143).

2. Definition of attachment

The concept of attachment is widely used in the fields of mental health and child developmental psychology. It refers to different types of relationships that are characterised by their uniqueness and specificity. According to the *Child Development Dictionary* (1995), attachment is defined as “a special bond characterised by unique features of highly specific relationships between the child and his or her primary caregivers”.

The attachment bond has several essential elements, including:

- **Durability:** The attachment bond is a long-term emotional relationship with a specific person.
- **Sense of security:** The mutual emotional relationships embodied in positive attachment bring a sense of security, comfort, peace and pleasure to both parties.
- **Response to Loss:** The loss of the other person (who represents the primary attachment), or even the mere threat of their absence, causes significant psychological tension and anxiety, potentially leading to severe psychological and behavioural disorders (Alaa El-Din Kafafi, 1997, p. 127).

3. Bonding styles

3.1 Secure attachment

Secure attachment is defined as an attachment style in which the child feels safe and comfortable in the presence of his or her parents or caregivers, fostering confidence to explore the world around him or her. Children with secure attachments are more likely to form healthy relationships in the future (Ainsworth et al, 1978).

John Bowlby describes secure attachment as a pattern in which the child feels comfortable and safe when the parent or caregiver is present, which promotes confidence in exploring the environment. When the caregiver leaves, the child experiences distress, but can quickly calm down when they return. This relationship serves as a foundation for the development of trust and independence in the future (Bowlby, John, 199-201).

3.2 Anxious attachment

Anxious attachment is a style in which the child shows excessive anxiety and tension when separated from their caregivers. Children who display this pattern tend to be overly attached to their caregivers and may be difficult to calm even after their caregivers return. They often feel insecure and fearful of separation, which affects their ability to explore their environment freely (Ainsworth, Mary, pp. 230-235).

3.3 Avoidant Attachment

Avoidant attachment is a style in which the child avoids contact with parents or caregivers and appears indifferent to their presence or absence. Children who exhibit this pattern tend to be highly independent and show no anxiety when separated from their caregivers. This style may result from previous experiences of rejection or unresponsiveness from their parents (Ainsworth, Mary, pp. 923-925).

3.4 Disorganised attachment

Disorganised attachment is characterised by the child's inconsistent and unpredictable behaviour towards caregivers. The child may express mixed feelings of anxiety and confusion towards the caregiver. This pattern reflects the child's difficulty in forming clear strategies for dealing with feelings of stress and anxiety, often related to past experiences of neglect or abuse (Ainsworth, Mary, pp. 85-88).

4. Dimensions of attachment

4.1 Emotional closeness

Emotional closeness refers to the deep sense of connection between individuals in a relationship, characterised by high levels of warmth and mutual understanding. In the context of attachment, emotional closeness reflects an individual's desire to remain close to the person who serves as a source of security and emotional support, such as parents or partners (Ainsworth, Mary, pp. 240-245).

4.2 Trust

Trust is seen as a fundamental element in attachment relationships, where an individual feels that the person to whom they are attached will respond to their needs in a consistent and predictable way. Trust

develops when there is a history of positive and supportive responses from the caregiver, enabling the child or individual to rely on them in times of distress or anxiety.(Bowlby , pp. 207-210.)

4.3 Independence

Independence reflects an individual's ability to act freely and make their own decisions while maintaining strong and supportive relationships. In the context of attachment, secure attachment promotes an individual's independence because the person feels confident in his or her ability to explore the world and make choices, knowing that he or she can return to a source of security when needed (Sroufe, L. Alan, pp. 89-93).

4.4 Social interaction

Social interaction refers to how an individual engages with others in social relationships. Individuals with secure attachments tend to be more skilled at social interaction and show greater flexibility in dealing with different social situations. Successful social interaction enhances an individual's ability to form and maintain healthy and stable relationships (Cassidy, Jude, and Phillip R. Shaver, eds., pp. 200-205).

The different dimensions of attachment serve as indicators of different attachment styles. For example:

- Strong emotional closeness coupled with high trust typically indicates secure attachment.
- Excessive independence without a desire for emotional closeness suggests avoidant attachment.
- High anxiety in the absence of the caregiver coupled with a strong desire for closeness indicates an anxious attachment.
- Inconsistency in responses across dimensions indicates disorganised attachment.

Using these dimensions, researchers can identify a child's predominant attachment style and understand how each dimension influences the child's social and psychological relationships.

5. Historical development of attachment measures

The development of attachment measures over time has occurred through several milestones and works:

5.1 The origins of attachment theory: John Bowlby

The journey of developing attachment measures began with the work of John Bowlby, who is considered to be the primary founder of attachment theory. In the late 1940s and early 1950s, Bowlby introduced the concept of "attachment" as one of the fundamental drives of human behaviour, suggesting that children are born with an innate tendency to form strong emotional bonds with their primary caregivers. Bowlby saw these bonds, which he called 'attachment', as fundamental to a child's emotional security and as having a significant impact on their psychological and social development.

In this context, Bowlby did not provide specific measures to assess attachment, but he laid the theoretical groundwork that has inspired researchers to develop measurement tools based on his understanding of the attachment relationship. Bowlby's primary interest was in how the absence or instability of attachment affected children, which stimulated empirical studies and the development of tools to measure this phenomenon.

5.2 The work of Mary Ainsworth and the development of the Strange Situation Test

Mary Ainsworth, who worked closely with Bowlby, played a crucial role in moving attachment theory from a theoretical framework to practical application. In the 1960s, Ainsworth developed the 'Strange Situation Procedure' as a tool for measuring attachment styles in children.

The Strange Situation is an observational protocol that involves a series of scenarios in which the child is separated from and then reunited with their primary caregiver. Through this test, Ainsworth identified three main attachment styles: secure attachment, anxious/resistant attachment and avoidant attachment. Later, a fourth style was added, known as disorganised or chaotic attachment, which Ainsworth and her colleagues observed in specific experimental cases.

This test represented a significant advance in attachment research, providing a concrete tool for assessing the nature of attachment between children and their caregivers. Thanks to the Strange Situation, attachment styles became a key standard in psychological research on child development, allowing a deeper understanding of how early attachment relationships influence later emotional and social outcomes.

5.3 Modern measures of attachment

As research on attachment has progressed, more sophisticated measures have been developed, drawing on technology and advanced psychological instruments. Among these tools, neuroimaging-based

measures have been introduced to explore the interaction between the neurological and behavioural dimensions of attachment. These modern measures aim to provide a deeper understanding of how attachment influences brain function and the development of emotions and relationships.

In addition, some measures have been developed to be more culturally compatible, which is critical in contemporary attachment research. Instruments such as the Multicultural Attachment Scale have been designed to account for cultural differences in attachment styles, allowing these measures to be used in diverse settings around the world.

6. Research Problem

The problem for the current study arose from the researcher's practical observations in the field of early childhood and from a review of previous studies that have addressed the issue of attachment between children and their primary caregivers. These studies highlight the importance of accurately measuring the dimensions and styles of attachment, as attachment is a fundamental factor influencing a child's psychological and social development.

Early childhood is a critical period for the development of attachment styles, which may influence the child's future relationships and mental health. Previous studies have highlighted the need for reliable measures to assess the dimensions of attachment at this stage, and the need to examine the psychometric properties of these measures to ensure their accuracy and effectiveness.

Thus, the current research aims to investigate the psychometric properties of the attachment scale for children in early childhood. This problem can be formulated by the following main question

What are the indicators of validity for the Attachment Scale in early childhood?

What are the indicators of reliability for the Attachment Scale in early childhood?

7. Aims of the research

The current research aims to:

- To test the validity of the attachment scale for children in early childhood.
- To test the reliability of the attachment scale for children in early childhood.

8. Significance of the research

The significance of the current research is as follows:

A. To provide a reliable tool for measuring attachment styles and dimensions in children in early childhood.

B. Using the results of the current research to develop early intervention programmes that can assist psychologists and educators in supporting children and their families, thereby improving the quality of the relationship between the child and caregivers.

9. Research limitations

Human limitations:

A sample of children aged 3-5 years was selected to participate in the study. These children are in the early childhood stage and are preparing to enter primary school. The researcher administered the constructed measurement tools to 40 cases, with data retrieved from only 34 children. Four cases were excluded because they did not complete all the items on the study instruments. Finally, the study sample consisted of 30 children from four different kindergartens.

They were carefully selected to represent this sensitive age range, which is crucial for understanding the impact of attachment in relationships with caregivers during this formative period of their lives. The children were selected on the basis of criteria including the stability of the family environment and the number of hours of care the child receives outside the home.

10. Spatial and temporal limitations

The study was conducted in four kindergartens located in two different geographical areas, which increased the diversity of the sample and the accuracy of the results. In the Flausen area, two kindergartens were selected: "Language Academy and Success Laws Kindergarten", which focuses on early education and language development, and "Birds of Paradise Kindergarten", which offers a comprehensive educational programme for children in this age group. In the Tlemcen area, the study included "ZouinaOujlida Kindergarten", known for its outstanding programmes in social and language development, and "Angels of Paradise Kindergarten" in Mansoura, which emphasises a supportive educational environment for children's development.

The research was conducted during the 2023/2024 academic year, a critical period for monitoring the development of attachment between children and caregivers, especially as children begin to adapt to the kindergarten environment and spend longer hours away from home. This period allowed for the

collection of comprehensive and continuous data on children's behaviours and emotional and social responses in the nursery setting. In addition, conducting the research during this academic year provides a specific context related to the return to normal educational activities following the challenges of the pandemic, adding an extra dimension to understanding any changes that may have occurred in attachment behaviours.

11. Research Procedures

First - Research Methodology:

The current research relied on a descriptive analytical methodology due to its ability to provide a comprehensive and accurate analysis of the characteristics of the Attachment Scale for Early Childhood. This methodology is used to answer the research questions related to the validity and reliability of the scale that measures the dimensions of attachment in children, thereby analysing the appropriateness and accuracy of the scale in measuring the different dimensions of attachment.

Second - The research sample:

The exploratory sample consisted of young children aged 3-5 years, distributed across four kindergartens. The sample included the following nurseries

- In Flaussen: Language Academy Kindergarten, Birds of Paradise Kindergarten.
- In Tlemcen: ZouinaOujlida Kindergarten, Angels of Paradise Kindergarten.

The exploratory sample was selected from children who had previously been diagnosed using the approved attachment diagnostic tools in each kindergarten. The number of children in the exploratory sample was 30, and the study tools were administered individually under the supervision of the researcher and the psychologist in each kindergarten to ensure data quality and suitability for psychometric analysis.

Third - Research tool

Attachment Scale for Early Childhood (prepared by the researcher)

Aim of the scale:

The scale aims to assess the dimensions of attachment in early childhood children, aged 3 to 5 years. It seeks to measure the level of emotional closeness, trust, independence and social interaction between the child and the caregiver.

11. Steps to prepare the scale

1. Review the theoretical framework:

The theoretical framework related to developmental psychology and attachment was reviewed to understand the characteristics of early childhood children and their behaviours in relation to attachment dimensions. The literature on attachment styles and their basic dimensions was also reviewed.

2. Review of existing instruments:

A number of psychological tests and measures that have focused on the assessment of attachment in early childhood were reviewed. These tools included tests such as the 'Strange Situation' and the 'Attachment Questionnaire' in order to compare methodologies and identify best practice.

3. Identification of sub-dimensions:

The sub-dimensions of attachment were identified based on the theoretical framework and previous reviews. The dimensions addressed are emotional closeness, trust, independence and social interaction.

4. Formulation of statements:

Statements reflecting each dimension of the scale were formulated with the following points in mind

- Use of simple and understandable language.
- Clear coverage of all four dimensions.
- Ensuring that each statement belongs to the dimension it represents.

5. Preparation of the preliminary version of the scale:

The preliminary version of the scale was prepared, consisting of four dimensions containing 28 statements.

This exploratory sample was used to verify the efficiency of the scale and to test it before applying it to the main sample, thus ensuring the accuracy and reliability of the results in the context of the actual measurement of the attachment dimensions.

12. Psychometric Properties of the Scale for Measuring Infant Attachment to Mother in Early Childhood

First - Validity:

Logical validity assessment: The preliminary version of the scale was presented to a group of experts in clinical psychology, special education and methodology, who unanimously agreed on the suitability of the scale. They assessed the logical validity of the scale on the basis of the following items:

- The appropriateness of the wording of the statements for the intended purpose of the scale.
- The alignment of each statement with the dimension to which it belongs.
- Your feedback on the possible removal or modification of statements, together with suggestions for improving the scale and its scoring method.

Validity through internal consistency: This was calculated by finding the correlation coefficient between each statement and the total score. The table below illustrates these coefficients.

Table 1: Internal consistency of the Child Attachment to Mother Scale in Early Childhood (N=30)

Dimension	Paragraphnumber	Correlation to dimension	Paragraphnumber	Correlation to dimension
Emotionalcloseness	S1	0.53**	S3	0.85**
	S2	0.60**		
Dimension	Paragraphnumber	Correlation to dimension	Paragraphnumber	Correlation to dimension
Trust	S4	0.69**	S6	0.57**
	S5	0.80**		
Dimension	Paragraphnumber	Correlation to dimension	Paragraphnumber	Correlation to dimension
Independence	S7	0.47**	S9	0.64**
	S8	0.82**		
Dimension	Paragraphnumber	Correlation to dimension	Paragraphnumber	Correlation to dimension
Social interaction	S10	0.53**	S12	0.71**
	S11	0.66**		
Dimension	Paragraphnumber	Correlation to dimension	Paragraphnumber	Correlation to dimension
Secure attachment	S13	0.49**	S15	0.33
	S14	0.58**	S16	0.80**
Dimension	Paragraphnumber	Correlation to dimension	Paragraphnumber	Correlation to dimension
Anxiousattachment	S17	0.76**	S19	0.72**
	S18	0.91**	S20	0.59**
Dimension	Paragraphnumber	Correlation to dimension	Paragraphnumber	Correlation to dimension
AvoidantAttachment	S21	0.79**	S23	0.62**
	S22	0.51**	S24	0.72**
Dimension	Paragraphnumber	Correlation to dimension	Paragraphnumber	Correlation to dimension
Disorganisedattachment	S25	0.64**	S27	0.78**
	S26	0.69**	S28	0.79**

- ****Significant at 0.01**
- ***Significant at 0.05.**

From Table (1) it is clear that the items of the scale were significant at 0.01 and 0.05 levels, while there were some statements that were not significant but were retained because of their meaningfulness rather than statistical significance. Therefore, it can be said that the scale has acceptable validity.

Discriminant validity (comparative analysis):

This involves ranking the participants according to their scores, either in ascending or descending order, and then forming two groups (the top 27% and the bottom 27%). The differences between the means of the two groups on each dimension were examined individually to determine whether the test was able to discriminate between the extremes of the trait.

Table 2: Illustration of the Discriminant Validity of the Child Attachment to Mother Scale in Early Childhood (N=30)

	Statistical Technique				
	Count	Mean	T value	Standard Deviation	Significance level
Lower Group	4.76	92.12	8	8.93	Significant at 0.00
Upper Group	1.72	108.12	8		

From Table (2) it can be seen that, using the “t” test for independent samples, there are statistically significant differences between the upper group and the lower group, with a “t” value of (8.93), which is significant at the (0.00) level. This difference favours the upper category, which has the highest score on the scale. The scale therefore has good discriminant validity.

Self-validity:

This is calculated as the square root of the reliability coefficient.

Table 3: Illustration of the self-validity of the Child Attachment to Mother Scale in Early Childhood

Variable	Reliability Coefficient	Square Root ✓
Child Attachment to Mother Scale in Early Childhood	0.57 ✓	0.75

Table (3) shows that the scale has good internal validity.

Second - Reliability:

- Calculation of test reliability using Cronbach’s Alpha:

The reliability of the Child Attachment to Mother Scale in Early Childhood has been calculated using Cronbach’s Alpha and is shown in the following table:

Table 4: Reliability of the Child Attachment to Mother Scale in Early Childhood, calculated using Cronbach’s Alpha:

Variables	Cronbach’s Alpha
Overall scale	0.57

From table (4) we can see that the Cronbach’s alpha reliability is 0.57, which indicates an acceptable reliability.

- Reliability by split-half method:

The reliability of the Child Attachment to Mother Scale in Early Childhood was calculated using the split-half method and the Spearman-Brown formula for length correction. This is illustrated in the following table:

Table 5: Reliability of the Child Attachment to Mother Scale in Early Childhood, calculated using the split-half method and length correction:

Variables	Split-Half Correlation Coefficient	Spearman-Brown Correlation Coefficient
Overall Scale	0.59	0.74

From Table (5) we can see that the split-half reliability was 0.59, and after length correction it was 0.74, indicating good reliability.

Therefore, based on the results obtained in this study, it can be stated that the Child Attachment to Mother Scale in Early Childhood developed by the researcher has strong and acceptable psychometric properties in terms of validity and reliability. These properties are essential for confirming the reliability of psychological instruments used in scientific research, where validity is based on the scale's ability to accurately measure the concept for which it was designed, while reliability reflects the stability of the results obtained with the instrument over time.

In terms of validity, the results of the logical validity analysis showed that the scale was carefully designed and that the statements included effectively and clearly represented the dimensions related to the child's attachment to the mother. A panel of experts and researchers confirmed the effectiveness of the scale in measuring the targeted dimensions and provided feedback to improve the accuracy and validity of the measurement. In addition, the internal consistency results supported the strength of the correlation between the items and the dimensions of the scale, indicating the coherence of the statements with the basic concept of attachment.

Furthermore, the discriminant validity results indicated that the scale has a high ability to discriminate between children with different levels of attachment. The significant differences between the upper and lower groups show that the scale can help identify children who have high or low levels of attachment to their mothers, which is crucial in studies related to children's social and emotional development, especially at this stage.

In terms of reliability, the results of the reliability analysis using Cronbach's alpha and the split-half method indicate that the scale has an acceptable level of reliability. This conclusion strengthens the credibility of the scale, as it can be relied upon to provide consistent and stable results when applied in different contexts or with different samples of children. Correction using the Spearman-Brown formula showed that reliability increases the accuracy of results, making the scale a trustworthy tool for use in similar studies.

In practical terms, these reliable psychometric properties provide an essential basis for using the scale in research focused on understanding attachment patterns in early childhood. The scale can be relied upon in psychological and educational studies that focus on the impact of parental care and the role of attachment in shaping a child's psychological and social development. In addition, the scale can be used to evaluate the effectiveness of early intervention programmes aimed at promoting positive attachment between the child and the mother.

In conclusion, the results support the use of this scale as a reliable and accurate tool in studies of child attachment to mother in early childhood, thereby increasing the potential for deeper and more comprehensive research in this important area. This scale can serve as a fundamental basis for understanding the effects of attachment on various aspects of the child's psychological and social development.

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