



The relation of infant attachment to attachment and cognitive and behavioural outcomes in early childhood



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ABSTRACT

Background: In China, research on the relation of mother–infant attachment to children's development is scarce. **Aims:** This study sought to investigate the relation of mother–infant attachment to attachment, cognitive and behavioural development in young children.

Study design: This study used a longitudinal study design.

Subjects: The subjects included healthy infants ($n = 160$) aged 12 to 18 months.

Outcome measures: Ainsworth's "Strange Situation Procedure" was used to evaluate mother–infant attachment types. The attachment Q-set (AQS) was used to evaluate the attachment between young children and their mothers. The Bayley scale of infant development–second edition (BSID-II) was used to evaluate cognitive developmental level in early childhood. Achenbach's child behaviour checklist (CBCL) for 2- to 3-year-olds was used to investigate behavioural problems.

Results: In total, 118 young children (73.8%) completed the follow-up; 89.7% of infants with secure attachment and 85.0% of infants with insecure attachment still demonstrated this type of attachment in early childhood ($\kappa = 0.738, p < 0.05$). Infants with insecure attachment collectively exhibited a significantly lower mental development index (MDI) in early childhood than did infants with secure attachment, especially the resistant type. In addition, resistant infants were reported to have greater social withdrawal, sleep problems and aggressive behaviour in early childhood.

Conclusion: There is a high consistency in attachment development from infancy to early childhood. Secure mother–infant attachment predicts a better cognitive and behavioural outcome; whereas insecure attachment, especially the resistant attachment, may lead to a lower cognitive level and greater behavioural problems in early childhood.

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1. Introduction

John Bowlby [1] used the term "attachment" to describe the affectional bonds that develop between young children and their main caregivers. Mother–infant attachment refers specifically to the strong and lasting affectional bonds between an infant and his/her mother, wherein an infant selectively seeks his/her mother in times of stress as a means of achieving comfort and feelings of safety. According to the taxonomy of Ainsworth et al. and Main and Solomon, mother–infant attachment can be divided into 4 types: B type (secure type), A type (avoidant type), C type (resistant type) and D type (disorganised type). Bowlby [1] proposed that an individual's early experience with his/her main caregiver leads to the formation of an internal working model (IWM); this model determines the characteristics of his/her

attachment to and expectations of caregivers, as well as the development of his/her self-perception; particularly, once formed, this model tends to be stable and has an important and persistent impact on almost all aspects of an individual's development in later life. It was also believed that different types of attachment reflect different types of internal working models and may lead to different developmental outcomes in children.

Bowlby's theory has prompted a large and rapidly growing body of research on mother–infant attachment. Much research interest has been focused on the attachment stability from infancy to later childhood and its effect on children's social-emotion, cognitive and behavioural development, etc.

Researchers have tested the relationship between the attachment type in infancy and the attachment type in later childhood. Most of their studies [2–5] have strongly supported Bowlby's hypothesis that the early attachment pattern remains much stable once formed, whereas several studies, such as the investigations of Weinfield et al. [6] and Lewis et al. [7], have reported inconsistent findings. However, so far, relevant empirical research and reports are scarce in China.

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Most previous empirical studies on the influence of attachment on cognitive development have been cross-sectional studies, with few longitudinal follow-up studies. Moreover, the cognitive abilities tested in most investigations were almost completely different from each other. For example, Cassidy [8] demonstrated that 24-month-old infants with the secure type of attachment used more internal language than those with the insecure type of attachment; another study [9] demonstrated that insecure infants were more hesitant and used more individual strategies, while secure infants used overall strategies and were more active in peer relationships and exploration; Moss et al. [10] found that when mothers and infants interacted to solve cognitive problems together, the security of infant attachment was highly correlated with the performance of cognitive skills, such as action plans and self-regulation skills. In our previous cross-sectional study [11], we were the first in China to use the Bayley scale of infant development – second edition (BSID-II) to show that the general cognitive levels of securely attached infants were significantly better than those of insecurely attached infants.

Previous research [9] on the relationship between the early mother–infant attachment and children's later behavioural development revealed that children with the avoidance type in infancy were likely to exhibit aggressive behaviours, children with the resistant type in infancy were likely to exhibit withdrawal behaviours in later life, and children with the disorganised type in infancy were considered to be the most insecure children at high risk, often exhibiting mixed behaviours of children with the avoidance and resistance types of attachment in infancy. Two recent international longitudinal follow-up studies [12, 13] have also shown that the attachment type is an important predictor of mal-adaptation and behaviour problems in school-age children. In China, there have been many studies and reports on behavioural problems in children [14,15], but to our knowledge, there are few empirical studies on the relationships between attachment and children's behavioural development.

The current study adopted Ainsworth's "strange situation procedure (SSP)" to evaluate mother–infant attachment in 12- to 18-month-old infants, and the following evaluations were performed during early childhood: (1) the attachment between young children and their mothers; (2) the cognitive developmental level of young children; (3) and the behavioural problems in young children. Based on the existing theory and evidence, we hypothesised the following. (a) There exists a high consistency in attachment security from infancy to early childhood. (b) In contrast with secure infants, insecure infants show a lower-level cognitive development in their early childhood. Besides, infants with avoidant or resistant attachment types have cognitive impairment in different degrees. Possibly, resistant infants have greater cognitive impairment than avoidant infants in their early childhood. (c) In contrast with secure infants, insecure infants exhibit more behavioural problems in their early childhood; additionally, different insecure attachment types in infancy yield different behavioural problems in early childhood. Avoidant type is more likely to be related to depression or vandalism, etc., while resistant type is more likely to be related to social withdrawal or aggression, etc.

2. Subjects and methods

2.1. Subjects

At the first visit, the subjects included 160 infant–mother dyads. They were recruited from April 2007 to December 2008 in Shanghai through the child health care network. Most of the subjects came from middle-income families. All 160 infants were healthy firstborn and full-term infants, with a birth weight of ≥ 2500 g and without any acute or chronic diseases. The average age of these infants was 14.2 ± 1.6 months, including 82 boys and 78 girls. The average age of the mothers at partition was 28.9 ± 3.9 years. All mothers were married

and living with the baby's father and had no apparent mental or psychological disorders.

All 160 infant–mother dyads completed an attachment assessment by SSP during the first visit. After the assessment, the infants were followed up when they were approximately 3 years old. The participants were called and informed to visit our study unit according to the schedule. We tried our best to guarantee the visit of each infant, including adjusting our schedule when possible and providing all the transportation fees for the visit, etc. In total, 118 young children completed the follow-up (63 boys and 55 girls), with an average age of 35.6 ± 1.8 months. All the tests were administered in our study unit.

Forty-two infants were lost to follow-up for the following reasons: some subjects moved to a new location far from our study unit; some were living with their grandparents in other provinces during the anticipated visit time; and the others missed follow-up because of family arrangements or other events.

The young children who participated in the follow-up did not differ significantly from those who did not participate, with respect to family income, maternal age and maternal education in infancy.

Ethical approval was obtained from the Research Ethics Committee of the Children's Hospital of Fudan University. Informed consent was obtained from all the mothers.

2.2. Attachment evaluation in infancy

Ainsworth's "strange situation procedure" was used to evaluate the type of mother–infant attachment in the 160 infants [16]. The strange situation procedure included 8 scenarios: mother–infant dyads entering, infants staying with their mothers; the intervention of strangers; separation of infants from their mothers; staying with strangers; reunion with their mothers; and separation from their mothers followed by reunion with their mothers. Video and audio recording were employed throughout the procedure. The video data were then played back, and the Ainsworth et al. and Main and Solomon coding materials, as well as the ABCD taxonomy, were used to classify the attachment type of the infants.

The videotapes were coded by the first author, who was trained in the Psychology Department of Dundee University. The third author, another trained and reliable coder who was blind to all of the information about the infants, performed reliability checks on the data. Based on 30 videotapes coded by both the first and the third authors, the inter-coder agreement on the A, B, C and D categories was 95%.

2.3. Evaluation of attachment type in young children

The Waters child attachment Q-set (AQS), modified by Wu et al. [17, 18], was used to evaluate the attachment type of the 118 young children. The AQS 3.0 is composed of 90 items (cards) that reflect the security of a child's attachment and the related behavioural characteristics. According to the match between the content of the items and the children's characteristics, the evaluator grouped the items (cards) into 9 groups with 10 cards in each group, with an increasing level of match from group 1 to group 9. The position of a given item in the classification determined its score, with items that most matched the children's characteristics (group 9) scored as 9 and items that least matched the children's characteristics (group 1) scored as 1.

The actual evaluation was performed by the mothers of the young children. Prior to evaluation, the researcher explained to the parents the test objectives and significance and the method to use with the cards and then provided instructions to the parents throughout the study. Finally, the correlation between the scores that corresponded to the 90 items for each child and the expert's security criteria was analysed, and the resulting correlation coefficient indicated the position of the child on the linear continuum of security, which could be used to divide the children into 2 types: those with the secure type of attachment and those with the insecure type of attachment. In general, the

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