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The Influence of Attachment Type on Shaping Infants' Expectations for CareGiver Responses: Subdivision of Insecure Attachment

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Abstract. This article will reveal the different expectations of different attachment styles of infants to caregiver responses: secure infants rely on stable responses, while insecure attachment subtypes exhibit different patterns due to attachment needs activation or inhibition. This study complements attachment theory and emphasizes the heterogeneity of insecure attachment subtypes, which provides a basis for the design of targeted parenting interventions (e.g., increased response sensitivity for ambivalent infants and reduced emotional neglect for avoidant infants). Study limitations include that the sample is limited to the Toronto area, may be affected by cultural and socioeconomic backgrounds, and can be expanded to a global multicenter study in the future. In addition, it is planned to introduce physiological indicators such as heart rate monitoring to further verify the association between fixation duration and emotional response, and enhance the reliability of the conclusions.

Keywords: attachment types, infant development, caregiver responses, insecure attachment subtypes, Fixation duration

1. Introduction

In the early development of infants, attachment relationship is an important emotional bond between infants and caregivers. It not only plays a key role in infants' emotional regulation and social interaction ability, but also deeply affects their future mental health and interpersonal relationship patterns [1].Therefore, it is very necessary to understand and explore the impact of attachment relationship on infants.

The type of attachment relationship is initially assessed using the Strange Situation Procedure (SSP). The SSP was designed and tested by Ainsworth et al. and focuses on the child's behavior after a temporary separation from the caregiver, such as whether the child avoids contact with the caregiver after reuniting, whether the child is angry, and whether the child behaves in an disorganized manner [2]. And based on these different behaviors, researchers classify children's attachment types to their caregivers as secure attachment, in which the child is rarely disturbed after the caregiver leaves and is happy to greet the caregiver after the reunion, and insecure attachment, in which the child displays negative or disorganized behaviors during separation and after the reunion.

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Among insecure attachments, researchers have also made a detailed classification: infants who display little anxiety during separation but actively avoid and ignore the caregiver's communication when reunited, are classified as insecure-avoidant attachment; those who show excessive upset when separated and display closeness when reunited but show anger because the parent is unable to alleviate the child's distress after separation are classified as insecure-ambivalent; and those who display chaotic behaviors such as repeating the same behavior or remaining frozen when reunited are classified as insecure-disorganized attachment [3].

2. Background

In order to gain a deeper understanding of how attachment affects infants' psychological development, researchers have gradually focused on different attachment types and their specific effects on infant behavior. In existing studies, the influence of attachment types on infants' expectations for caregiver responses has been explored based on the different attachment patterns [4].used animated geometric characters to simulate videos of caregivers responding to or not responding to a child's crying. The larger ellipse in the video represented the caregiver, and the smaller ellipse represented the child. Specifically, the experimental video first showed both people at the bottom of an incline, and the caregiver left the child alone and ascended halfway up the incline and paused, at which point the child cried. In the responsive outcome, the caregiver returned down the incline to the child; in the unresponsive outcome, the caregiver continued to move away from the child and ascended to the top of the incline. The experiment tested the gaze duration of 21 infants aged 12 to 16 months with secure and insecure attachments when watching videos of two different caregiver responses. And the results showed that secure-attached infants spent more time observing the caregiver's unresponsive outcome than insecure infants, which reflects the fact that infants with different attachment types have their own unique internal attachment working models, that is, they have different behavioral and psychological patterns according to their attachment types, which also affects their expectations of social interactions, especially for caregivers.

However, there is a clear gap in this study, and that is, the classification of attachment patterns is too simple. Attachment patterns are simply divided into secure and insecure types, which may hide the differences between different insecure types. After all, there is already an existing study that have demonstrated the differences between individuals with different insecure attachment types [5]. explored the similarities and differences between the three insecure attachment patterns through a comprehensive review and analysis of existing literature that relating to this topic. The results showed that individuals with insecure-ambivalent attachment tend to have a high activation of attachment needs, while individuals with insecure-avoidant and insecure-disorganized attachment deactivate their attachment needs. This shows that if different insecure attachment types are simply grouped into one category and compared with secure attachment, many important findings may be missed. Therefore, to address this issue, I decide to replicate the experiment of Johnson et al [4]., but subdivide the insecure attachment types into insecure-avoidant, insecure-ambivalent, and insecure-disorganized attachment, and re-explore whether different attachment types affect infants' expectations for caregivers' responses, and especially focus on whether the new results will be different from the previous results of Johnson et al.

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3. Method & results

3.1. Participants

This study requires 400 local infants aged 12 – 16 months in Toronto, Canada, because this age group is similar to the SSP infant participants and is at a critical stage of attachment relationship development. In addition, there is experimental evidence that 12-month-old infants can understand and infer the behavioral intentions of abstract animated figures based on the movements of animated geometric characters they observe [6]. And in order to better balance the influence of gender and attachment type on the results, the ratio of male to female participants will be 1:1, and will include 100 secure attachment infants, 100 insecure-avoidant attachment infants, 100 insecure-ambivalent attachment infants, and 100 insecure-disorganized attachment infants. Before the experiment is conducted, the guardians of all participants need to sign an informed consent.

Regarding recruitment, the study will use videos that explain the general experimental process in an easy-to-understand manner, and provide popular science explanations of what attachment styles are and the benefits of this study on the infants' psychological development for the general public, in order to attract more potential participants. Online, author will post these videos and popular science information on social media platforms related to families, such as maternal and child forums and Whats App parenting groups; offline, author will introduce our study at some parent-child activities in the community.

As a reward for participating in the study, all participating families will receive $30, and the infant participants will receive a small ball toy.

3.2. Materials and procedure

This study will use a mixed design, one independent variable is attachment type of the infant, which is a between-subjects design because each infant belongs to only one attachment type; the other independent variable is the type of caregiver response, which is a within-subjects design because each participant needs to be tested in two different caregiver response conditions; and the dependent variable is the infant's gaze duration to the caregiver response outcome. In addition, this study is also a cross-sectional design, all participants will be tested at the same time.

In the study, all the infant participants will be tested individually in a separate room. The infant participants will first watch a video of animated geometric characters, in which two animated ellipses perform a separation event. The larger ellipse represents the mother, and the smaller ellipse represents the child. Firstly, the two are together at the bottom of an incline, then the larger ellipse, the mother, walks halfway up the incline and stops, while the smaller ellipse, the child, below it, accompanied by a slight bouncing, begins to produce the realistic crying sounds of a human infant. The screen then pauses, allowing the participant babies to freely observe the screen until they look away. At this point, the video will play again until the babies' gaze duration on the video drops to half of their initial attention, which means that the babies have reached the habituation criterion for the video and will not be distracted by the novelty of the scene to affect the gaze duration in subsequent experiments.

After that, two videos with different response conditions will be presented to the infant participants. The child in the video is still crying. In responsive outcome condition, the mother responds by coming down the middle of the incline and returning to the child. In unresponsive outcome condition, the mother does not respond to the child's crying, but continues to climb away from the child to the top of the incline. These two different response videos are repeated twice for

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each participant to reduce the possibility of experimental error. And the order in which the two response conditions are presented is random, which means that the order of presentation is counterbalanced, and the experimental results will not be affected by the order of presentation.

huge amount of data. Group A will blindly code the attachment types of all the baby participants, while group B will blindly estimate the attachment types of 200 randomly selected baby participants. Meanwhile, an experimental group C, which is unknown to the attachment type of the infants and the type of caregiver's response, uses computers to code the gaze time of all participants online, and another experimental group D will randomly select 200 participants from it to also code their gaze time.

3.3. Results

In data processing, the researchers will remove invalid data from those who quit the experiment midway, and calculate the average gaze time of all infants in each response condition as a reference for the length of individual participant's gaze time.

Since the research question of this study is whether different attachment types have an effect on infants' expectations of caregiver responses, the main way this paper processed the data is to use a mixed ANOVA to test the relative length of the gaze time of individual infant participants compared with the average gaze time for the corresponding caregiver responsive outcome condition, and to define the gaze time as relatively longer as inconsistent with the infant's original expectations and more surprised to the current condition.

And because Mayseless [5] showed that individuals with different insecure attachment types have different attachment needs, ambivalent ones have high attachment needs, while avoidant and disorganized ones suppress their attachment needs. Therefore, I predict different results for infant gaze duration than Johnson et al [4].: Securely attached infants will have longer gaze durations to the unresponsive outcome of the caregiver than the mean duration of gaze to the unresponsive outcome of this experiment; insecure ambivalent infants will have longer gaze durations to both the responsive and unresponsive outcomes of the caregiver, especially longer durations for the responsive outcomes; infants with insecure avoidant and disorganized attachment will have shorter gaze durations to the unresponsive outcome of the caregiver, and their gaze durations to the responsive outcome will be lower than the mean duration of gaze to the responsive outcome but higher than their own to unresponsive outcome.

4. Conclusion

If my hypothesized results are confirmed, it will mean that infants with different attachment types do not respond to different caregivers' expectations in a consistent way, and this is especially obvious in insecure attachment: Infants with secure attachments will be surprised by the absence of a response from the caregiver because they are used to receiving responses, and thus will look longer when seeing an unresponsive outcome. Infants with insecure-ambivalent attachment, although familiar with the unresponsive outcome, will still look longer because of their high attachment desire to the caregiver; and they will look longer than themselves toward unresponsive outcome when facing responsive outcome, because of the adding up of their high attachment needs and their surprised reactions by receiving a response from the caregiver. Insecure-avoidant and insecure-disorganized attachment infants will have shorter than average gaze durations to the caregiver's unresponsive outcome because of the inhibition of attachment needs and familiarity with the unresponsive outcome, and will show relatively longer gaze durations to the caregiver's responsive outcome than

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they do to the unresponsive outcome because of the surprise of getting a response from the caregiver. However, due to their closed attachment desire, I predict that their gaze durations to the responsive outcome in this experiment will still be lower than the average gaze duration of the responsive outcome.

Such experimental results complement the impact of attachment theory on infant development by highlighting how early attachment experiences shape infants' differing expectations of social interactions. It emphasizes that insecure attachment is not a homogeneous category, and that the expectation patterns of each subtype for caregiver responses may not be the same. This can also deepen the understanding that infants with different types of insecure attachment have different internal working modes. Previous studies have shown that avoidant and disorganized attachment are significantly associated with externalizing problems (such as aggressive behavior), with avoidant attachment additionally closely associated with internalizing problems (such as anxiety and depression), while ambivalent attachment is not significantly associated with either of these problems [7].Therefore, this more refined understanding can help relevant social institutions design more precise and effective parenting intervention measures for infants with different attachment styles, especially those with different insecure attachment styles.

As for possible alternative explanations for the results of this study, time of testing may be a relevant factor. Because the sample of infants participating in the experiment will be relatively large, it will be difficult for all participants to complete the experiment at exactly the same time. What author can do is to try to arrange the experiments for all participants in the same time slot every day (e.g. morning slot) within a few months or in different time slots (e.g. morning, afternoon or evening slot) within a few weeks. However, this means that the results may be affected by other factors. If the experiment is conducted on different days at the same time, the infant's gaze duration may be affected by the different temperatures and weather each day, for example, because the sound of thunder on a rainy day may more likely to distract the infant's attention from the video compared to a sunny day. And if the experiment is conducted at different times on the same day, the infants' looking time may also be affected, as infants tested in the afternoon are more likely to be sleepy and therefore distracted than those who are tested in the morning when they have just woken up. The resulting differences in gaze duration will not be related to the infant's attachment type, but will be affected by third confounders such as the environment or personal energy, so that it is impossible to conclude that attachment type affects infants' expectations for caregivers' responses and that infants with different attachment types have different internal working models.

Regarding the possible objection to the approach of this study, it may be related to the method testing infants' expectations. Because the method using to measure infants' expectations towards different caregiver responses in this experiment is to compare the individual participant's looking time with the average duration of looking time, but the length of looking time may be questioned whether it can truly represent the level of infants' expectations. Therefore, in order to better address this issue, I will anticipate that in the next step of improving the study, introducing more equipment that measures physiological data, such as tools that measure heart rate. These devices will measure infant participants at three fixed time points before, during, and after the experiment, and this paper will use these data to gain further insight into infants' emotional responses to caregiver responses and to provide additional supporting evidence about infants' expectations toward caregiver responses.

For the other limitations of this study, I consider that they are related to the geographical limitation of the sample. The sample in this study is all from local participants in Toronto, ignoring the factors of different cultures and socioeconomic backgrounds, which may have a negative impact

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on the generalizability of the results of this study. Therefore, in the future, if there are more studies related to this experiment, researchers can consider the influence of different cultures when exploring the attachment patterns and expectations of infants toward caregivers' responses, and try to recruit participants from all over the world and from different socioeconomic backgrounds, or conduct multiple studies in different countries.

References

[1] Cassidy, J. (1994). Emotion regulation: Influences of attachment relationships. Monographs of the Society for Research in Child Development, 59, 228–283. [PubMed: 7984163]

[2] Van Rosmalen, L., Van der Veer, R., & Van der Horst, F. (2015). Ainsworth's Strange Situation Procedure: The origin of an instrument: Ainsworth's Strange Situation Procedure. Journal of the History of the Behavioral Sciences, 51(3), 261–284. https: //doi.org/10.1002/jhbs.21729.

[3] Duschinsky, R., & Solomon, J. (2017). Infant disorganized attachment: Clarifying levels of analysis. Clinical Child Psychology and Psychiatry, 1-15. DOI: 10.1177/1359104516685602

[4] Johnson, S.C., Dweck, C.S., & Chen, F.S. (2007). Evidence for infants' internal working models of attachment. Psychological Science, 18(6), 501-502. https: //doi.org/10.1111/j.1467-9280.2007.01929.x

[5] Mayseless, O. (1996). Attachment patterns and their outcomes. Human Development, 39(4), 206–223. https: //doi.org/10.1159/000278448.

[6] Kuhlmeier, V., Wynn, K., & Bloom, P. (2003). Attribution of dispositional states by 12-month-olds. Psycholohical Science, 14 (5), 402-408. https: //www.jstor.org/stable/40064159

[7] Cassidy, J， Jones, j.D., & Shaver, P.R.(2013).Contributions of attachment theory and research: A framework for future research, translation, and policy. Developmentand Psychopathology, 25(402), 415-1434. doi: 10.1017/S0954579413000692