

Intervention Research on Attachment Behavior in Children with Autism

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Abstract: The positive behavior support strategy was used to intervene in the attachment behavior of a 4-year-old autistic child. During the intervention, the ABC behavior observation form and the children's attachment behavior classification cards were used to observe the child and implement the intervention. The intervention lasted for 6 weeks, with 5 sessions per week and 30 minutes per session, and the intervention effect was monitored in a timely manner. The intervention results showed that the case's attachment behavior was significantly reduced, and the positive behavior support strategy could effectively improve the case's attachment behavior. In future attachment behavior interventions, designs with multiple samples and multiple scenarios need to be considered.

Keywords: Autism, Attachment Behavior, Positive Behavioral Support Strategies.

1. Research Background

The Diagnostic and Statistical Manual of Mental Disorders (5th edition) states that the diagnostic criteria for Autism Spectrum Disorders (ASD) are: social impairment, restricted and repetitive behaviors/interests, and these symptoms appear in the early developmental stage [1]. In 2023, the Centers for Disease Control and Prevention (CDC) reported that 1 in 36 children (2.8%) aged 8 were identified as having Autism Spectrum Disorders. According to statistics in our country, the incidence rate of autism has exceeded 1% and has become the leading mental disorder among children in our country[2]. With the increasing prevalence of this disorder, research on children with ASD has also increased both domestically and internationally. In the past decade, "rehabilitation," "inclusive education," "intervention," "sleep disorders," and "joint attention" have become hot keywords in research [3]. However, most of these studies focus on the intervention of the core impairments of children with ASD, and the attention to the attachment behaviors of children with ASD is relatively insufficient.

Attachment theory was originally proposed by British psychologist John Bowlby in the 1950s. This theory primarily investigates the ways in which individuals establish emotional attachments in interpersonal relationships from infancy to adulthood and their impact on personal development [4]. Bowlby identified attachment styles, including secure attachment, anxious attachment, and avoidant attachment, which influence individuals' interpersonal relationships and psychological development [5]. As research on attachment behaviors has deepened, Chinese scholar Zhao Lan Meng proposed that the external manifestations of the attachment system are attachment behaviors, which include the following four characteristics: first, seeking proximity, which is the most external manifestation of attachment; second, separation anxiety, which is considered a sign of attachment formation; third, safe base behavior; and fourth, safe haven behavior [6]. The measurement of attachment mainly includes the Strange

Situation Procedure initially used by Ainsworth and Q-sort techniques.

In the field of intervention research for children with ASD, although domestic and international researchers have employed a variety of intervention strategies to improve their attachment behaviors, the significant heterogeneity among individual children with ASD limits the generalizability of existing research methods, and this area remains in its infancy. After reviewing the relevant literature, it was found that there are relatively few studies on improving the attachment behaviors of children with ASD using positive behavior support strategies. Based on the above considerations, this study employs positive behavior support strategies to intervene in the attachment behaviors of individual cases, with the expectation of effectively improving their attachment behaviors and providing references for interventions targeting similar problematic behaviors.

2. Research Methods

(1) Research Subject

A child with ASD was selected as the research subject through regular observation records and teacher interviews. The child, referred to as July (a pseudonym), is a four-year-old boy currently enrolled in an inclusive kindergarten. His mother did not suffer from any diseases during pregnancy, and there is no family history of relevant conditions. The family enjoys a relatively good financial situation, and the mother is July's primary caregiver.

The child's attachment behaviors are mainly manifested as follows: he only attends classes with Teacher H, and will cry and fuss if another teacher takes the class; during games, he stays close to Teacher H, holding her hand or hugging her, and will cry and fuss if he cannot find Teacher H; in the morning, when his mother brings him to the kindergarten, he will cry and hold onto her until Teacher H comes to pick him up, at which point the crying stops.

The specific ability profile of the child is shown in the following table:

Table 1. Basic Information of the Case

Various Abilities	Basic Information
Cognitive Abilities	Possesses basic cognitive abilities, capable of matching objects and naming items.
Language Abilities	Can engage in simple conversations, can actively imitate speech with assistance, and has relatively clear speech expression but with a limited vocabulary.
Communication and Social Skills	Can pay attention to peers, has strong imitation abilities but requires reinforcement, cannot initiate interactions or make requests on their own, mostly plays alone, and does not know how to share.
Self-care Abilities	Can dress and undress independently, can fold clothes with assistance, can eat with a spoon on their own, but does not know how to express the need to use the restroom to the teacher.
Gross and Fine Motor Skills	Can walk, run, jump, climb, and go up and down stairs independently. Has good finger dexterity, but takes a longer time to string small beads.
Visual Perception	Can visually track moving objects, with an attention span of about ten seconds.

(2) Research Instruments

1) ABC Behavior Observation Checklist

To analyze the causes of the case's attachment behaviors, the ABC Behavior Observation Checklist [7] was employed to observe and record the antecedents (A), behaviors (B), and consequences (C) of the case's behaviors, followed by analysis.

2) Behavioral Motivation Assessment Scale

Adapted from Durand's Behavioral Motivation Assessment Scale (revised) [8], the Behavioral Motivation Assessment Scale was used. Interviews were conducted with the case's head teacher and parents, and they were asked to complete it effectively. The scale consists of 16 items, which are mainly divided into four dimensions: "self-stimulation," "escape," "attention-seeking," and "obtaining tangible items." Each dimension contains four items. A five-point rating method is adopted: "never" is rated as 1 point, "rarely" as 2 points, "sometimes" as 3 points, "often" as 4 points, and "always" as 5 points. The function with the higher score is considered the main reason for the problem behavior.

3) Children's Attachment Behavior Classification Cards

The Chinese version of the Children's Attachment Behavior Classification Cards consists of 90 items, each describing a common child behavior in daily life, with a retest reliability of ($r = 0.96$) ($p < 0.01$). Another part describes the interactions between children and adults. Based on the behaviors observed in daily life, the mother sorts these 90 items into 9 groups. The items describing the least common behaviors in the child are rated as 1 point, while those rated as 9 points describe the most common behaviors in the child's daily life. Generally speaking, when classifying, the mother of the child being tested should try to place 10 cards in each group[9].

(3) Intervention Plan

Through observation of the case, it was found that the attachment behaviors are mainly directed towards the mother and Teacher H. The intervention goals and plans were determined through observation and interviews. The intervention goal is to reduce the case's attachment behaviors, including crying when separating from the mother and seeking only Teacher H. The intervention plan involves using positive behavior support strategies and the scientific application of reinforcers to improve the case's attachment behaviors.

1) Baseline Period

After determining the intervention goals and plan, functional analysis of the case's attachment behaviors was conducted through direct observation and interviews.

① Direct Observation

The ABC Behavior Observation Checklist was used to observe and analyze the case's attachment behaviors over a period of 4 weeks. The frequency of attachment behaviors was recorded. An attachment behavior was counted whenever the case exhibited the following actions: crying when separated from a parent, seeking a hug from Teacher H, looking for Teacher H, or crying after a teacher change during class.

② Teacher and Parent Interviews

Through interviews with the parents, it was learned that the case is attached to the mother at home. The mother tends to do almost everything for the case and meets all his demands without encouraging him to develop self-care abilities. As a result, the case cries and searches for the mother when she leaves. The grandparents also dote on the case, holding him almost all the time, whether at home or when taking him out. When the case's demands are not met or when he cries due to the mother's absence, family members will hold him and meet his demands to avoid his crying.

2) Intervention Period

Based on the observation records of the case's attachment behaviors during the baseline period, the main goals of the intervention period are to develop alternative behaviors, reinforce positive behaviors, and extinguish attachment behaviors. The intervention method is the positive behavior support strategy, which is implemented in the following ways:

① Antecedent Control Strategy

Through observation, it was found that the case would run to Teacher H or seek a hug from her in order to gain attention or obtain something. When such behavior occurs, the request of the case should be denied and his attention should be redirected.

The instructional adjustment strategy is employed to address the attachment behaviors that arise from the case's task avoidance. During teaching, the "small steps" principle is followed, and teaching tasks are flexibly adjusted according to the case's cognitive development and emotional state to ensure that the tasks are appropriately challenging. This approach not only enables the case to complete tasks successfully, thereby fostering a sense of achievement and maintaining interest in learning, but also prevents emotional issues. Task analysis is used to break down teaching tasks into simpler layers and to set differentiated goals for different periods. The case is patiently guided through tasks with clear and understandable instructions, and positive behaviors are reinforced in a timely manner. A learning atmosphere that encourages "learning through play" is created to facilitate the

case's learning.

The visual prompting strategy is utilized to leverage the case's visual strengths, such as visual matching and tracking. Teaching aids like cards and photos are used. During class, images are used to arouse the case's emotions and provide timely attention, thereby reducing attachment behaviors driven by the need for attention. Teachers should also offer the case choices of activity tasks that interest him. This not only improves teaching efficiency but also reduces attachment behaviors.

② Alternative Behavior Development Strategy

Given that the case is capable of engaging in simple conversations and has some expressive language abilities, correct language expressions can be shaped to replace attachment behaviors. In natural settings, teachers initially pose closed-ended questions to the case, to which he responds with "yes" or "no." For instance, when the case desires something, the teacher asks, "Do you want XXX?" If the case replies "yes," he receives the item; if "no," he does not. After a period of training, the fill-in-the-blank method is employed to encourage the case to respond with phrases like "I want..." or "I don't want..." to enhance his initiative and enthusiasm in expression.

When attachment behaviors occur, the attention redirection strategy is applied. The case's favorite items or activities, such as building blocks, animal cards, or snacks, are used to attract his attention, removing him from the current situation or emotional state and reducing the frequency of attachment behaviors. Differential reinforcement is utilized by ignoring attachment behaviors, allowing them to gradually extinguish, while reinforcing positive behaviors and developing

alternative behaviors to ultimately reduce attachment behaviors.

③ Consequence Management Strategy

The modeling teaching method was employed to help the case learn appropriate ways of expression. Storytelling, picture book reading, and rhythmic exercises were used to enhance the case's learning efficiency. During the intervention, this strategy was combined with differential reinforcement. In the later stages of the intervention, the frequency of reinforcement was gradually reduced, and eventually the reinforcers were faded out completely.

3) Maintenance Period

After the intervention period, the intervention was withdrawn and the maintenance period began. The case's attachment behaviors continued to be observed, recorded, and assessed, and the data collected served as one of the valid proofs of the intervention's effectiveness.

3. Research Results

(1) Frequency Change Analysis

To facilitate the observation and comparison of the frequency of the case's attachment behaviors across the baseline, intervention, and maintenance periods, the frequency of attachment behaviors was observed and recorded over a period of three months. The baseline period lasted for 2 weeks, the intervention period for 6 weeks, and the maintenance period for 2 weeks. The weekly frequency was obtained by summing the number of attachment behaviors that occurred on each school day. The results are shown in the following figure:

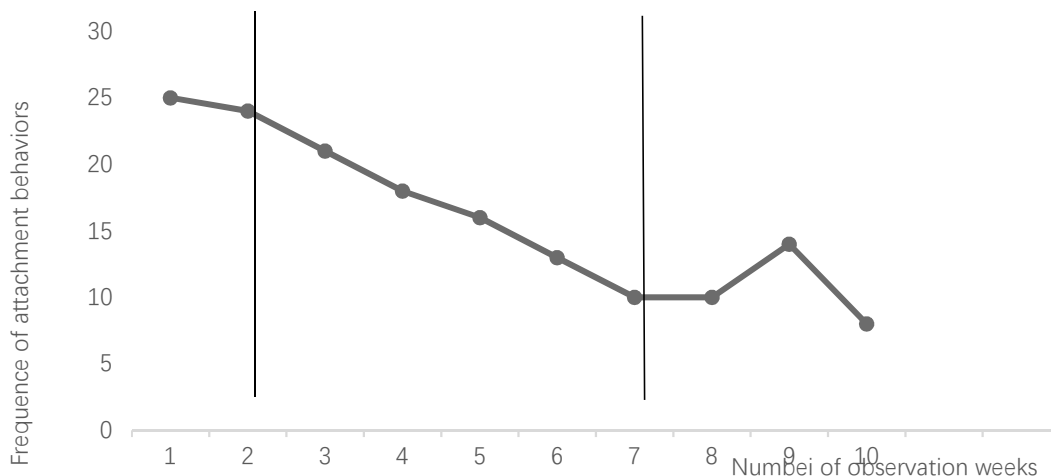


Figure 1. Line Chart of Frequency Changes in Attachment Behaviors

As shown in Figure 1, the frequency of the case's attachment behaviors was relatively stable during the baseline period, with no significant changes, indicating that the case was in a stable initial state and ready for the planned intervention. During the intervention period, the frequency of attachment behaviors decreased weekly and then stabilized, with the frequency of attachment behaviors per week remaining around 10 times, basically achieving the expected goal. In the maintenance period, the frequency of attachment behaviors rebounded slightly in the first week, reaching 17 times, but in the second week, the frequency of attachment behaviors remained around 8 times, which verified the

effectiveness of the intervention. Later, according to the information provided by teachers and parents, the frequency of the case's attachment behaviors decreased significantly, which also proved that the positive behavior support strategy is effective and sustainable in improving the attachment behaviors of children with ASD.

(2) Difference Test

The frequency of the case's attachment behaviors was statistically analyzed using SPSS 21 data processing software. A one-way analysis of variance (ANOVA) was conducted to test for differences among the three periods, and the results are shown in the following table:

Table 2. Descriptive Statistics of Attachment Behavior Frequency Across Different Phases

	Weeks of Observation	Mean	Standard Deviation
Baseline Period	2	22.330	0.477
Intervention Period	6	13.000	3.195
Maintenance Period	2	20.670	0.528
Total	10	16.710	4.591

As shown in Table 2, the mean and standard deviation of the case's attachment behavior frequency for each phase, as well as the significant differences in attachment behavior frequency across the three phases, are presented. The data analysis indicates that during the baseline period, the standard deviation is relatively small, suggesting stable occurrences of

attachment behaviors. In contrast, during the intervention period, the standard deviation is larger, reflecting greater variability in the frequency of attachment behaviors. In the maintenance period, the standard deviation is again small, with the frequency of attachment behaviors remaining relatively stable.

Table 3. Analysis of Variance (ANOVA) of Attachment Behavior Frequency Across Different Phases

	Sum of Squares	df	Mean Square	F	Significance
Between Groups	301.024	3	102.675	10.875*	0.002**
Within Groups	85.333	10	8.533		
Total	386.357	13			

*Note: * ($p < 0.05$) is indicated by *, * and ($p < 0.01$) is indicated by **.

As shown in Table 3, there is an extremely significant difference in the frequency of attachment behaviors across the three periods ($p = 0.002 < 0.01$). The frequency of attachment behaviors changed significantly: the difference between the baseline and intervention periods is extremely significant ($p < 0.01$); the difference between the intervention and maintenance periods is also extremely significant ($p < 0.01$). This indicates that after the intervention was withdrawn, the frequency of attachment behaviors decreased significantly, demonstrating the effectiveness of the positive behavior

support strategy.

(3) Analysis of Influencing Factors

1) Correlation Analysis between Children's Attachment Behaviors and Familiarity with the Attachment Object.

To further understand the correlation between the case's attachment behaviors and the familiarity with the attachment object, data were collected using the Autism Children's Attachment Behavior Survey. The results are shown in the following table:

Table 4. Correlation Analysis between Case's Attachment Behaviors and Familiarity with the Attachment Object

Dimensions	M	SD	Min	Max
Relationship with Caregivers	2.19	0.72	1.22	4.18
Relationship with Strangers	1.35	0.08	0.26	4.29
General Behavioral Tendencies	2.03	0.64	1.04	3.88

As shown in the table above, the occurrence of the case's attachment behaviors is highly correlated with caregivers. First, before the intervention, discussions were held with the case's mother to develop an intervention plan, which was also implemented promptly at home. The strategy involved ignoring the case's attachment behaviors and reinforcing positive behaviors to reduce the frequency of attachment behaviors triggered by the mother's departure. Second, the occurrence of the case's attachment behaviors has a low correlation with strangers, which may be because the case tends to form attachment relationships with familiar people.

Additionally, the scores for general behavioral tendencies show a moderate correlation, which may be related to the case's personality and environmental factors.

2) Correlation Analysis between Children's Attachment Behaviors and Development in Functional Domains

To explore the correlation between children's attachment behaviors and development in functional domains, data were collected using the Autism Children's Development Assessment Form[10]. The results are shown in the following table:

Table 5. Developmental Status in Functional Domains

Functional Domain	M	SD
Self-care	2.333	0.066
Language	2.002	0.068
Motor Skills	2.494	0.062
Sensory	2.569	0.065
Social Interaction	1.970	0.067
Cognitive	1.937	0.091
Emotional	1.868	0.058
Overall Development	2.159	0.047

As shown in the table above, the case scored relatively high in the domains of motor skills and sensory functions, while the lowest score was in the emotional domain. Attachment behaviors can influence children's development across various functional domains in multiple ways. A secure and supportive environment provided by a good attachment relationship can promote children's development in self-care, language, motor skills, and sensory functions. At the same time, attachment behaviors can provide social models and emotional support, thereby affecting children's social interactions and emotional capabilities. The development of cognitive abilities may be related to learning opportunities and cognitive stimulation within attachment behaviors. Therefore, understanding the relationship between attachment behaviors and functional domains is of great significance for supporting children's overall development.

4. Discussion

(1) Positive Behavior Support Strategies Help Reduce Attachment Behaviors in Children with ASD

Positive behavior support (PBS), as a behavioral intervention and change technique, aims to enhance individuals' quality of life and minimize problem or challenging behaviors in children with autism. It has demonstrated positive therapeutic effects and has been favored by the majority of intervention practitioners [11]. The application of PBS strategies to address attachment behaviors in children with ASD, including antecedent control, development of alternative behaviors, and consequence management, has yielded positive outcomes.

During the intervention process, the antecedent control strategy effectively reduced attachment behaviors triggered by the need for attention or task avoidance by adjusting teaching methods, utilizing visual prompts, and providing choices. For example, the use of task analysis and adherence to the "small steps" principle in teaching, along with flexible task adjustments based on the cognitive development and emotional state of children with ASD, enabled them to better complete tasks and thereby reduced attachment behaviors caused by task difficulty.

In the development of alternative behaviors strategy, shaping and reinforcing positive behaviors, as well as redirecting attention, helped children with ASD learn to express their needs appropriately, replacing attachment behaviors. Relaxation training through games such as "blowing bubbles" and kicking balls improved children's emotional regulation abilities and reduced excessive attachment to specific teachers.

In the consequence management strategy, the combination of modeling teaching and differential reinforcement reinforced positive behaviors while ignoring attachment behaviors, leading to the gradual extinction of attachment behaviors. This fully demonstrates that PBS strategies can target the causes of attachment behaviors in children with ASD, develop personalized intervention plans, effectively improve their behavioral performance, enhance social adaptability, and provide a scientifically effective method for the behavioral intervention of children with ASD.

(2) Scientific Use of Reinforcers Helps Reduce Attachment Behaviors in Children with ASD

Reinforcement refers to an event that follows a behavior and increases the likelihood of that behavior occurring again. Reinforcement theory is the most important part and

foundation of Skinner's learning theory and plays a significant role in the behavior correction and shaping of children with autism [12]. Praise and encouragement are the driving forces for human progress, and this is also true for children with special needs. In the educational process, the scientific use of reinforcers can assist children in engaging in activities, promote their development, and thereby achieve good teaching results [13]. During the intervention, reinforcers were selected based on the case's preferences, such as snacks and toys, and were promptly provided when the child exhibited positive behaviors. This effectively increased the frequency of positive behaviors and reduced attachment behaviors. For example, when a child correctly uses language to express their needs, reinforcement is given, which gradually increases their enthusiasm for proactive expression. In the later stages of the intervention, gradually reducing and eventually withdrawing the reinforcers helps children internalize positive behaviors as habits and stably reduce attachment behaviors. This demonstrates that the scientific use of reinforcers can guide children with ASD to learn new behavioral patterns and overcome problematic behaviors.

(3) Research Limitations and Reflections

Firstly, the sample size consisted of only one child with ASD, which limits the representativeness of the study results due to the small number of participants. Future research could expand the sample size to include a more diverse group of children with special needs to enhance the generalizability of the findings.

Secondly, the research methodology was relatively limited, focusing solely on the application of positive behavior support strategies. Subsequent studies could incorporate a combination of multiple intervention approaches, such as cognitive-behavioral therapy and play therapy, to further improve the effectiveness of interventions.

Additionally, this study primarily focused on the child's behavior within the school environment, with insufficient exploration of the intervention effects and parenting styles in the home setting. Future research could consider interventions within a family-based model and investigate the impact of parenting styles on intervention outcomes.

Moreover, given the close interrelationship and mutual influence between the functional domain development and attachment development of children with ASD [14], future studies could delve into how to develop more precise and personalized intervention plans based on the functional domain development of children with ASD. This would better meet their unique needs, enhance their quality of life, and improve their social adaptability.

References

- [1] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorder:DSM-5[M].Washington, DC:American Publishing,2013:50-59.
- [2] Zhang Wenkang. 2022 World Autism Day Digital Healthcare Summit[EB/OL].(2022-04-04)[2024-11-18].<https://baijiahao.baidu.com/s?id=1729009419199250376&wfr=spider&for=pc>.
- [3] Miao Xiaoyan, Qi Yuan, Li Rui. A Review of Autism Research in China over the Past Decade-A CiteSpace Analysis Based on the CNKI Database [J]. Chinese Journal of Special Education, 2023(12): 54-61.
- [4] [5]Bowlby, J.Attachment[M].London:Hogarth Press;New York (Basic Books),1969.

- [5] Bowlby, J. Attachment [M]. London: Hogarth Press; New York (Basic Books), 1969.
- [6] Meng Zhaolan. Infant Psychology [M]. Beijing: Peking University Press, 1997.
- [7] Wang Hui. Behavior Management of Children with Special Needs [M]. Nanjing: Nanjing Normal University Press, 2015: 259–262.
- [8] Liu Yujie, Wei Xiaoman, Liang Songmei. The Development and Characteristics of Positive Behavior Support Model [J]. Chinese Journal of Special Education, 2012(5): 12–17.
- [9] Wu Fang, Zou Hong. Revision of the Chinese Version of the Children's Attachment Behavior Classification Cards [J]. Psychological Development and Education, 1994(2): 18–24.
- [10] Wang Xuemei. A Study on the Use of the Autism Children's Development Assessment Form [J]. Journal of Suihua University, 2016, 36(10): 74–76.
- [11] Wang Haoran, Lin Xiaoxiao, Lu Minghui, et al. A Bibliometric Study on Positive Behavior Support for Autism Spectrum Disorder in International Context [J]. Psychological Monthly, 2023(18): 1–6+56.
- [12] Zhang Jing, Xu Sheng, Niu Ruihua. Application Analysis of Reinforcement Theory in the Education of Children with Autism [J]. Science & Education Journal (Mid-monthly Edition), 2016(05): 31–32.
- [13] Zhu Tianyu. Selection and Application of Reinforcers in Individual Training for Children with Autism [J]. Journal of Jiamusi Vocational Institute, 2015(02): 201–202.
- [14] Lin Yunqiang, Zhang Fujian. A Study on the Attachment of Children with Autism and Its Relationship with Functional Domains [J]. Applied Psychology, 2010, 16(02): 126–133.