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Investigating the Mediating Role of Self-Talk in the Relationship Between Secure Attachment and Children's Behavioral Self-Regulation

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Abstract

Purpose: The present study aimed to investigate the mediating role of self-talk in the relationship between secure attachment and children's behavioral self-regulation.
Method: The present study was conducted as a basic research in terms of its purpose and as a descriptive study of correlation based on path analysis in terms of its nature. The statistical population included all 3-6 year old boys and girls in kindergartens in Garmsar city and their parents. According to Klein's (2015) suggestion regarding the optimal sample size for structural equation modeling, 250 children, 130 girls and 120 boys, were selected using a cluster random sampling method. The research data collection tools included the Attachment Disorder Interview developed by Smike and Zineh (1999), the Self-Talk Questionnaire, and the Structured Observation of Self-Regulation by Ponitz et al. (2008). Descriptive and inferential statistical methods were used to analyze the data.
Findings: Based on the results obtained, the research hypotheses were confirmed. Accordingly, secure attachment style has a direct effect on children's behavioral self-regulation. Self-talk also has a direct effect on children's behavioral self-regulation. Also, secure attachment style has an indirect effect on behavioral self-regulation through self-talk.
Conclusion: Children with secure attachment perform better in cognitive self-regulation. The reason for this is that emotional safety, stress reduction, and constructive communication patterns provide the foundation for the development of executive functions of the brain.

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Introduction

Behavioral self-regulation is one of the most important cognitive and emotional development skills in childhood that plays a key role in academic success, social adjustment, and mental health. This skill refers to the child's ability to control impulses, regulate attention, and manage behavior toward goals (1). Research has shown that individual differences in self-regulation are formed from the early years of life and are influenced by emotional and relational factors such as attachment to the primary caregiver. Accordingly, the quality of the attachment relationship can be considered as a foundation for the development of self-control mechanisms (2).

Secure attachment, as a stable emotional bond between the child and the caregiver, is considered the first emotion regulation system in human life. According to Bowlby's theory (1969), children with secure attachment have greater trust in the caregiver in stressful situations and use adaptive strategies instead

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of impulsive reactions (3). This characteristic provides the basis for the formation of self-regulation, because in the context of secure interaction, the child experiences a sense of control, calmness, and predictability. Longitudinal studies have shown that these children perform better on tasks that require response inhibition (4). However, the precise mechanisms of the relationship between secure attachment and self-regulation are not yet fully understood. One of the effective cognitive factors in this regard is self-talk, which is known as an internal tool for guiding behavior and managing emotions. Self-talk is a reflection of the internalization of the child's external interactions and communicative experiences with others (5). This talk helps the child to reflect on his behavior, predict possible consequences, and choose appropriate strategies before taking action (6). Therefore, self-talk can be a mediator between secure attachment experiences and the development of behavioral self-regulation. Research has shown that children with secure attachments use more strategic and positive self-talk, and this type of self-talk strengthens self-control, reduces impulsivity, and increases behavioral adaptation. In contrast, children who suffer from insecure attachment tend to use more negative self-talk, such as statements expressing hopelessness or helplessness, which in turn impairs self-regulation (7). Thus, self-talk not only reflects the quality of attachment but also serves as a mediating mechanism for its impact on self-regulation.

Neurological evidence further strengthens the proposed link between self-talk, attachment, and self-regulation. Neuroimaging studies have demonstrated that engaging in self-directed speech is associated with increased activation in the prefrontal cortex (PFC), a brain region critically involved in executive functions such as response inhibition, cognitive flexibility, planning, decision-making, and behavioral control (9, 10). The PFC plays a central role in regulating attention, managing impulses, and coordinating goal-directed behavior. When children use self-talk—whether overtly or internally—they recruit these executive networks, which in turn facilitate more deliberate and controlled responses to environmental demands. This neural activation suggests that self-talk is not merely a linguistic phenomenon, but a cognitive regulatory tool supported by higher-order brain systems (11, 12).

Within the framework of attachment theory, this neurological process can be better understood as a developmental outcome of early relational experiences. Children who grow up in secure attachment relationships internalize the supportive, guiding, and soothing dialogues they experience with caregivers. Over time, these external regulatory interactions are transformed into internal self-guiding speech, enabling children to manage their emotions and behaviors independently. In this sense, self-talk acts as a psychological bridge through which the benefits of secure attachment are transmitted to self-regulation capacities (13). By internalizing caregivers' reassuring and instructive voices, securely attached children develop stronger executive control and emotional regulation abilities, reflecting both psychological internalization and the maturation of underlying neural systems (14, 15).

Despite extensive evidence of the relationship between secure attachment and self-regulation, few studies have directly examined the mediating role of self-talk. Neglecting this construct may hinder a thorough understanding of the psychological mechanisms underlying self-regulation in children. Studies have shown that self-talk training can increase self-control ability by up to 35% and reduce the negative effects of insecure attachment by up to 40%. Therefore, identifying the mediating role of self-talk in the relationship between secure attachment and behavioral self-regulation can help design targeted educational and therapeutic interventions to improve children's behavior regulation and pave the way for preventing social and psychological consequences resulting from poor self-regulation (16).

The Method of Research

The present study was conducted as a basic research in terms of its purpose and as a descriptive correlational study based on path analysis in terms of its nature. The statistical population included all 3-6 year old boys and girls in kindergartens in Garmsar city and their parents. According to Klein's (2015) suggestion regarding the optimal sample size for structural equation modeling, 250 children, 130 girls and 120 boys, were selected using a cluster random sampling method. Data collection was carried out in two parts: library and field studies. In the library section, theoretical foundations, research background, and conceptual frameworks related to secure attachment, self-talk, and behavioral self-regulation were collected from Persian and Latin sources. In the field section, the main data collection tools were questionnaires and standardized interviews. After obtaining permission from the university research unit, mothers of children were asked to complete questionnaires about their children by visiting 7 selected kindergartens. In the present study, the following tools were used to collect data:

- Secure Attachment Questionnaire: To measure secure attachment, the Attachment Disorder Interview developed by Smike and Zine (1999) was used. This semi-structured interview consists of 12 items that measure the presence of symptoms of attachment

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disorder or disturbance. If behavioral symptoms are not specifically present, items are coded zero. Code one is for situations where there is some evidence for symptoms, and code two is for when symptoms are specifically present. The inter-rater reliability of the Kappa coefficient in the study by Jankman et al. (2014) was based on the agreement between the two interviewers for all items in the two sections, and the coefficient ranged from 0.88 to 1. Also, in the study by Smike, Deuterescu, and Zine (2002), the inter-interviewer agreement coefficient was 0.88 and the internal consistency of this interview was 0.80 and 0.83. Based on principal component factor analysis, Otterman and Eschwangel (2007) showed that 0.71 of the total variance of the items is explained.

- Self-talk questionnaire: To measure self-talk, the researcher, together with the consulting team, designed a tool based on mother's report. This tool is based on the theoretical foundations of Vygotsky, Luria, and the cognitive behaviorist approach. This scale has 20 questions that are asked of the mother and are scored on a Likert scale. The selected questions are based on the theoretical foundations of self-talk and focus on the child's behavior in natural situations such as playing, doing homework, situations of frustration, eating, and interacting with others. The reliability of the scale in the study of Emraei et al. (2017) was obtained through the internal consistency method with Cronbach's alpha coefficient of 0.88 and a test-retest of 0.74 with an interval of two weeks. The concurrent validity with the Behavior Problems Questionnaire, which is theoretically due to poor self-talk, showed a negative correlation coefficient of -0.61, indicating appropriate validity of the instrument. The face and content validity of the items was also confirmed by reviewing the opinions of 8 experts and professors in the field of developmental psychology, and the rate of agreement between the raters was reported to be 0.82.
- Behavioral self-regulation: The structured observation of self-regulation by Ponitz et al. (2008) was used to measure behavioral self-regulation. This tool includes the head-toe-knee-shoulder task. This test consists of 20 test items and is designed for preschool children. After two stages of familiarization with the commands, the child is asked to respond to the commands in reverse. For example, if the examiner says, "Put your hand on your toe," the correct response is for the child to put his hand on his head. This task measures the child's ability to inhibit responses, control impulses, and follow contradictory commands.

In the present study, the reliability of the instruments using Cronbach's alpha coefficient was 0.848 for secure attachment, 0.88 for self-talk, and 0.75 for behavioral self-regulation, respectively. The collected data were analyzed using SPSS version 26 and Amos version 24 software. Descriptive and inferential statistical methods were used to analyze the data.

Findings

The demographic information of the study is presented as follows:

In this study, 250 children aged 3 to 6 years from kindergartens in Garmsar city with a mean age of 4.86 ± 1.09 years in the age range of 3 to 6 years were studied. The demographic characteristics of children aged 3 to 6 years from kindergartens in Garmsar city are reported in Table 1.

Table 1. Demographic variables of children

Demographic variable	Level	Number	Percentage
Gender	Girl	120	48
	Boy	130	52
Mother's occupation	Housewife	220	88
	Employee	30	12
Father's occupation	Freelance	230	92
	Employee	20	8

The results show that 130 (52%) of the study subjects were male in terms of gender, 220 (88%) were housewives in terms of mother's employment status, and 230 (92%) were Freelance in terms of father's employment status.

Before examining the structural coefficients, the fitness of the proposed model was examined. The fit of the proposed model was evaluated based on the introduced fit indices. IFI=0.950, RMSEA=0.078, CMIN/DF=1.68, PNFI=0.524, PCFI=0.522, CFI=0.934 and GFI=0.915. The fit indices indicate a good fit of the proposed model with the data. Therefore, the proposed model has a good fit.

The R2 index shows the amount of variance explained by endogenous latent variables. Chin (1998) describes values of 0.67, 0.33, and 0.19 in structural equations as strong, moderate, and weak, respectively. The coefficient of determination of the behavioral self-

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regulation variable is 0.31, which indicates that all exogenous and mediating variables, namely self-talk and secure attachment, can predict 31 percent of changes in behavioral self-regulation, which is moderate. Table 2 also shows the standardized path coefficients and Figure 1 shows the proposed research model.

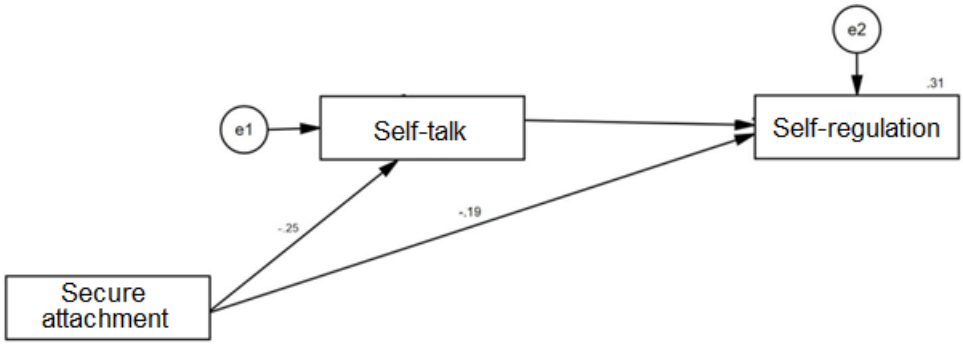


Figure 1. Standard coefficients of the proposed model

Therefore, according to the estimated indices, the results show that the structural relationship of the self-talk mediation model test is suitable for the relationship between secure attachment and behavioral self-regulation in 3- to 6-year-old children. In Figure 1, the numbers on the paths are path weights or betas. . Among these coefficients, the highest coefficient of 0.433 is related to the self-talk and behavioral self-regulation path. The results of the direct relationships of the research variables in the proposed model show that in the entire sample, all path coefficients were statistically significant. Referring to Table 2, the standard coefficients of all paths and critical values in the proposed model can be seen.

Table 2. Standardized coefficients of the proposed model paths

Path	Standard coefficients	Standard error	Critical ratio	Significance level (P)
Secure attachment, behavioral self-regulation	-0 . 186	0 . 293	-2 . 34	0 . 019
Secure attachment, self-talk	-0 . 251	0 . 278	-3 . 13	<0 . 001
Self-talk, behavioral self-regulation	0 . 433	0 . 121	5 . 07	<0 . 001

The results of Table 2 show that the effect of secure attachment ($p < 0.001$, $\beta = -251.0$) on self-talk was significant. This means that with increasing attachment, which actually indicates a disturbance in attachment, the amount of self-talk decreases. Therefore, this variable has the ability to predict the variance of self-talk.

The results of the mediation relationships using the bootstrap test to test the mediation paths are shown below. The bootstrap results for the mediation paths of the proposed model of the present study can be seen in Table 3.

Table 3. Bootstrap results for indirect paths of the proposed model

Path	Indirect effect	Error	Lower limit	Upper limit	Probability value
Secure Attachment to Behavioral Self-Regulation through Self-Talk	-0 . 1075	0 . 0319	-0 . 1638	-0 . 0642	<0 . 001

The following is an examination of the research hypotheses:

Hypothesis 1: Secure attachment has a direct effect on children's behavioral self-regulation.

Based on the results in Table 2, the path coefficient of secure attachment has a negative and significant effect on children's behavioral self-regulation ($p<0.019$ and β=-0. 186). Therefore, secure attachment has a direct effect on children's behavioral self-regulation and the first hypothesis was confirmed.

Hypothesis 2: Self-talk has a direct effect on children's behavioral self-regulation.

Based on the results in Table 2, the path coefficient of self-talk has a positive and significant effect on

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children's behavioral self-regulation ($p<0.001$ and $\beta=0.433$). Therefore, self-talk has a direct effect on children's behavioral self-regulation and the second hypothesis was confirmed.

Hypothesis 3: Secure attachment has an indirect effect on children's behavioral self-regulation through the mediation of self-talk.

As can be seen in Table 3, the lower bound of the confidence interval for self-talk as a mediating variable between secure attachment and behavioral self-regulation is -0.1638 and its upper bound is -0.0642. The confidence level for this confidence interval is 95% and the number of bootstrap resamplings is 5000. Given that zero is outside this confidence interval and is statistically significant, self-talk plays a mediating role in the relationship between secure attachment and behavioral self-regulation, and its indirect effect is -0.1075.

Discussion

Hypothesis 1: Secure attachment style has a direct effect on children's behavioral self-regulation.

According to the research findings, secure attachment style has a direct effect on children's behavioral self-regulation. This finding is consistent with previous results such as (10) and (16, 17).

Hypothesis 2: Self-talk has a direct effect on children's behavioral self-regulation.

Based on the results obtained in the present study, the path coefficient for self-talk indicated a positive and statistically significant effect on behavioral self-regulation in children. This finding suggests that children who engage more frequently and effectively in self-directed speech demonstrate greater ability to manage their behaviors, control impulses, and regulate their emotional responses in challenging situations. Self-talk appears to function as a cognitive strategy that enables children to guide their actions, remind themselves of rules, anticipate consequences, and maintain focus on goals. In this way, it strengthens executive functions such as attention control, response inhibition, and planning. Therefore, the findings provide empirical support for the direct and meaningful role of self-talk in enhancing behavioral self-regulation, leading to the confirmation of the second research hypothesis (18, 19).

Regarding the third hypothesis, the results revealed that secure attachment style exerts an indirect effect on behavioral self-regulation through self-talk. This indicates that secure attachment does not only influence self-regulation directly, but also facilitates the development of internal self-guiding speech, which in turn enhances regulatory capacities. Children who experience warm, responsive, and supportive relationships with caregivers are more likely to internalize constructive dialogues and transform them into adaptive self-talk. This internalization process strengthens their ability to independently monitor and adjust their behavior. The observed mediating role of self-talk is consistent with previous research findings (20, 17), which have highlighted the importance of early attachment experiences in shaping cognitive and emotional regulatory mechanisms. These results underscore the interconnected roles of relational security and cognitive processes in promoting optimal behavioral development in children.

Conclusion

Secure attachment creates a lasting sense of inner security. The child is confident that the caregiver is available, responsive, and supportive in times of need. This security frees the child's cognitive and emotional resources from worries about abandonment or rejection and allows him to focus his energy on exploring the environment. Active exploration of the environment provides numerous opportunities for practicing self-regulation in the face of challenges, frustrations, new emotions, and interactions with peers. The insecure child spends a lot of energy monitoring the caregiver or managing relationship anxiety and has less capacity to practice self-regulation.

Egocentric speech is the child talking to himself out loud while performing an activity or solving a problem. This speech has no external audience and is not intended to communicate with others, but rather to guide and regulate the child's own behavior and thinking. Speech is initially purely social (for communicating with others). Then, in a process called internalization, the child uses social speech to guide his or her own behavior, first in an out loud form (ego-focused speech) and then gradually in a covert, internal form (inner speech). Ego-focused speech usually peaks between the ages of 3 and 7, precisely during a period when language skills are developing rapidly and self-regulation challenges (such as sitting in class, doing homework, taking turns) increase.

A secure attachment style develops when primary caregivers (parents) respond sensitively, responsively, and consistently to the child's needs. A child with a secure attachment feels inner security and trusts a secure base, can confidently explore the environment, and uses adaptive strategies to seek support when faced with stress (10). Securely attached children perform better in cognitive self-regulation. This is because emotional safety, reduced stress, and constructive communication patterns provide the foundation for the development of executive functions of the brain.

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Among the limitations of the research are the possibility that important variables such as the child's general intelligence, temperament, neurodevelopmental health, the overall quality of the home environment and education, or the family's socioeconomic status may have influenced the main research variables; these variables were not fully controlled or measured. Accordingly, in future research, it is recommended to measure and include important variables such as intelligence, temperament, socioeconomic status, and the quality of the educational environment as control or moderator variables.

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Authors contribution

Authors conceptualized the study objectives and design.

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Ethics

None

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