

The Correlation Between Intensive Maternal Attitudes and Cognitive Abilities in Female Students Applying for the Gifted Exam: The Mediating Role of Maternal Mental Health

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Abstract

Background: Intensive maternal parenting, while intended to foster academic achievement, has been linked to increased stress and anxiety in children. The present study aimed to investigate the mediating role of maternal mental health in the correlation between intensive maternal attitudes and cognitive abilities in female students applying for the gifted exam.

Methods: The study employed a descriptive cross-sectional approach that incorporated the use of structural equation modeling (SEM) techniques. The target population comprised all female students applying for the ninth-grade gifted exam in Tehran, Iran during 2023, along with their mothers. A convenience sample of 301 student-mother dyads participated in the study by completing a battery of self-report questionnaires. These instruments included Cognitive Abilities Questionnaire (CAQ), Intensive Parenting Attitudes Questionnaire (IPAQ), and General Health Questionnaire (GHQ-28). The hypothesized model was evaluated using SEM, and bootstrapping was employed to assess the significance of indirect correlations. Statistical analyses were performed using SPSS version 27 and Amos version 25.

Results: The findings indicated a negative correlation between intensive maternal attitudes and students' cognitive capabilities ($P=0.020$). There was also a significant negative correlation between intensive maternal attitudes and mothers' mental health ($P=0.001$). The correlation between mothers' mental health and girls' cognitive abilities was positive and significant ($P=0.001$). The correlation between intensive maternal attitudes and students' cognitive abilities was significant through the mediating role of mental health ($P=0.005$).

Conclusion: Intensive maternal parenting practices were associated with decreased cognitive abilities in students and poorer mental health in mothers. The negative effect of intensive maternal attitudes on cognitive abilities appears to be indirectly mediated by mothers' mental health.

Keywords: Mothers, Parenting, Cognitive, Mental health, Students

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1. Introduction

The role of intelligence in the progress of human societies has been of paramount importance. Human capital and skilled workforce are considered as one of the most crucial factors in the development and progress of nations so that the advancement of societies cannot be achieved without nurturing the gifted class (1). In line with this, the development of various aspects of intelligence has drawn the attention of societies as a significant factor in predicting the success of individuals and societies (2). Individual development is itself the product of multiple factors, including the continuous and dynamic interactions between biological structure, genetics, and environmental characteristics (3).

In the early 20th century, the concept of giftedness was associated with high cognitive intelligence, which could be identified through intelligence scores (4). Today, most psychologists believe that not only cognitive intelligence but also multiple factors such as wisdom, creativity, and successful intelligence can play a significant role in giftedness (5). However, it seems that these variables have not received adequate attention in the current educational system. Consequently, the concept of giftedness, as one of the central concepts in the field of psychology of children with special needs, has faced many challenges and ambiguities in the present era. From the perspective of the classical experts, giftedness is synonymous with the concept of intelligence (6).

Within the field of psychology, a dominant perspective on intelligence characterizes it in terms of cognitive abilities. These abilities encompass the neural mechanisms underlying the intake, processing, storage, and using information (7). Given its evolutionary significance, these cognitive processes have evolved due to the necessity of solving ecological problems and navigating complex social environments (8). Bridging the gap between neural architecture and outward behavior, cognitive abilities encompass a multifaceted repertoire of skills. These include planning, focused attention, response inhibition, problem-solving strategies, the ability to manage multiple tasks concurrently, and cognitive flexibility (9, 10).

1.1. Educational Framework and Cognitive Abilities

From an educational standpoint, cognitive abilities represent the neural processes underlying the acquisition, processing, storage, and application of information. These abilities are theorized to have evolved as a response to the challenges of navigating complex social environments and solving ecological problems (11).

1.2. Cognitive Intelligence as a Multifaceted Construct

The concept of cognitive intelligence emerges at the intersection of cognitive abilities and brain structure. It encompasses a broad spectrum of capabilities, such as planning, focused attention, response inhibition, problem-solving strategies, multitasking, and cognitive flexibility (12).

1.3. Refining the Definition

Further refining this concept, Rodrigues and colleagues (13) proposed a definition of cognitive intelligence as a specific set of abilities including attention, working memory, cognitive flexibility, and problem-solving skills. Gioia and co-workers (14) provided further granularity to our understanding of specific cognitive abilities. They defined attention as the cognitive process responsible for selectively focusing the mind on a particular stimulus while filtering out others. Additionally, they characterized working memory as the capacity to maintain information in an accessible state for the express purpose of task completion. Finally, they defined cognitive flexibility as the ability to perform multi-step

activities, mentally complete calculations, or follow complex instructions.

Given the importance of cognitive abilities in students, investigating the factors affecting them is of particular importance (15). In this regard, the significant role of parents can be highlighted. Given the crucial role of mothers and parenting processes in ecological theory, a comprehensive understanding of the nature and causes of a child's intelligence inevitably requires an understanding of the mother's attitudes, behaviors, and emotions (16). Among these three factors, the element of maternal attitudes has received less attention, despite its undeniable importance. These attitudinal factors are numerous and have been discussed within a range of concepts, one of which is intensive mothering (17).

The concept of intensive mothering was first introduced by Hays (18) and refers to beliefs such as the idea that mothers should devote themselves entirely to the mental and emotional development of their children and create a child-centered home environment. The intensive mothering project essentially examines mothers who invest an excessive amount of time, thought, and effort into ensuring that their children engage in activities that promote cognitive development (19, 20). This perspective includes ensuring that children's needs should take precedence over parents' needs, and that mothers have a responsibility to ensure that their young child has access to an environment as rich as possible in the stimuli needed for cognitive processes. Despite its seemingly positive appearance in terms of preparing the ground for children's development, this approach may potentially lead to various harms (21). Liu and colleagues (22) showed that such high standards and expectations for mothers to be parents create psychological pressure and stress, which has worse developmental consequences for children.

Among different age groups, the impact of this type of maternal attitude is particularly important for middle school students. This is because they are considered the future builders of society, and their development in various cognitive, emotional, and social aspects can have a significant impact on the progress of a society (23). On the other hand, with the perceived guaranteed success of individuals who are identified as gifted and the importance of high school years as the last stage of adolescence

and the individual's entry into adulthood, it is believed that these years are the last and most important opportunity for nurturing intelligence and adding the individual to the gifted class and enhancing the individual's abilities before entering adulthood (24). Therefore, achieving success in the gifted exam, which means entering gifted schools at the high school level, becomes doubly important for parents, especially mothers. This view of all ecological systems, including the family, has caused many teenagers to experience double pressure from their parents to develop their cognitive abilities and achieve success in the gifted exam in order to secure their future due to the structure of the university entrance exam. Despite this assumption, a review of the available literature suggests that the role of mothers in the cognitive development of their children is not necessarily direct, and maternal influences can be indirect and through various cognitive, emotional, and social constructs (25, 26).

One important factor that can influence intensive maternal attitudes and lead to increased cognitive abilities in students is maternal mental health (27). Mental health is defined as the mastery and skill in establishing proper communication with the environment (28). According to Singh and colleagues (29), the key areas of life, love, work, and leisure, having a family, creating a happy family environment, avoiding conflict with the law, enjoying life, and making proper use of opportunities are the criteria for balance and mental health. A review of the available literature suggested that maternal mental health levels can impact children's cognitive, emotional, and social development (30, 31). Children whose parents experience high levels of psychological distress score lower in personal, social, and emotional development (32).

Given the educational path of students and the existence of the university entrance exam at the end of their school career, families of adolescents make extra efforts for their children to enter gifted schools and subsequently succeed in this exam. Therefore, there is a need for planning to address their academic problems. Therefore, the present study aimed to investigate the correlation between intensive maternal attitudes and cognitive abilities in middle school girls applying for the gifted exam, with the mediating role of maternal mental health.

2. Methods

2.1. Design

The present study employed a descriptive correlational design to examine the correlation between the variables in the framework of structural equation modeling (SEM).

2.2. Participants

The statistical population of the study consisted of all ninth-grade female students in Tehran, Iran who applied for the gifted exam in 2023. Using the convenience sampling method, female students who attended preparatory classes for the gifted exam in institutes, along with their mothers, were selected. According to Loehlin and Beaujean (33), a sample size of 270 was sufficient for the proposed model and research hypotheses, considering the number of paths and variables in the study. However, to account for potential attrition, a sample size of 320 was selected. The inclusion criteria were: ninth-grade female students who applied for the gifted exam; willingness of both the students and their mothers to participate in the study; mothers' willingness to provide information about their own mental health. The exclusion criteria were: being diagnosed with learning disabilities or cognitive impairments; incomplete data on maternal mental health; student cognitive abilities, or intensive maternal attitudes.

2.3. Procedure

Prior to commencing the study, ethical approval was obtained for all research components. A meeting was held with school officials, students, and their mothers. During this meeting, the researchers explained the purpose and significance of the study. After obtaining an informed consent from the study participants, mothers completed the Intensive Parenting Attitudes and General Health Questionnaires, and the students independently completed the Cognitive Abilities Questionnaire. In the initial stage, 320 participants completed the questionnaires. However, 19 participants were excluded due to incomplete data. Ultimately, data from 301 participants who fully completed the questionnaires were included in the final analysis.

2.4. Instruments

2.4.1. Cognitive Abilities Questionnaire

(CAQ): CAQ (34) is a multi-factorial instrument designed to evaluate seven cognitive domains: memory, selective attention, decision-making, planning, sustained attention, social cognition, and cognitive flexibility. CAQ comprises 30 items, with a distribution of 5-7 items per domain. Each item uses a 5-point Likert scale ranging from “almost never” (1) to “almost always” (5), allowing for a quantitative assessment of these cognitive functions. The construct validity of CAQ was established using a Content Validity Index (CVI) of 0.98 and a Content Validity Ratio (CVR) of 0.93, indicating strong agreement among experts regarding the instrument’s content relevance (34). Moreover, the reliability of the questionnaire was reported to be satisfactory (Cronbach’s alpha=0.83) (34). In the present study, a Cronbach’s alpha of 0.82 was used to determine the reliability of the total score of the Cognitive Abilities Questionnaire.

2.4.2. The Intensive Parenting Attitudes Questionnaire (IPAQ): IPAQ developed by Liss and colleagues (35) was used to measure intensive maternal attitudes. IPAQ consists of 25 items and 5 subscales: Essentialism (Items 1, 2, 4, 6, 12, 16, 17, 20): This subscale measures the belief that parents should be highly involved in their children’s lives and make sure that they have the best possible opportunities. Fulfillment (Items 7, 10, 14, 18): This subscale measures the belief that parents should strive to provide their children with a happy and fulfilling childhood. Stimulation (Items 3, 9, 21, 25): This subscale measures the belief that parents should provide their children with a stimulating environment and encourage them to learn and grow. Challenging (Items 5, 8, 13, 15, 22, 23): This subscale measures the belief that parents should challenge their children to reach their full potential. Child-centeredness (Items 11, 19, 24): This subscale measures the belief that parents should put their children’s needs first. Each item is rated on a 6-point Likert scale (1: strongly disagree to 6: strongly agree). Higher scores indicate more intensive maternal attitudes. The construct validity of the instrument was supported by a high CVI of 0.94 and a CVR of 0.90, indicating strong consensus among experts on the relevance of the questionnaire content (36). In the present study, the reliability coefficients for the subscales of essentialism, fulfillment, stimulation, challenging, child-centeredness, and total score were 0.95, 0.91, 0.86, 0.95, 0.76, and 0.97, respectively.

2.4.3. General Health Questionnaire (GHQ-28): GHQ-28 is a 28-item self-report questionnaire developed by Goldberg and Hillier (37) to assess mental health. It consists of four subscales: Somatic Symptoms and General Health Status (Items 1-7): This subscale measures physical symptoms and overall health status. Anxiety (Items 8-14): This subscale measures anxiety and worry. Social Dysfunction (Items 15-21): This subscale measures social impairment and difficulty functioning in social roles. Depression (Items 22-28): This subscale measures depression and feelings of hopelessness. Items are rated on a four-point Likert scale ranging from 0 (not at all) to 3 (much more than usual), with higher scores reflecting greater severity of mental health symptoms. The instrument’s construct validity was further corroborated by a CVI of 0.89 and a CVR of 0.91 (38). These findings suggested substantial agreement among experts regarding the questionnaire’s content relevance. The reliability coefficient of GHQ-28 was estimated to be 0.91 (38). In the present study, the reliability of GHQ-28 was found to be 0.86 using Cronbach’s alpha.

2.5. Statistical Analyses

Statistical analyses were performed using IBM SPSS Statistics version 27 and Amos version 25. Descriptive statistics were employed to characterize the distribution of the study variables. These included means and standard deviations. To examine the correlations between the variables, Pearson correlation coefficients were calculated. Additionally, SEM was used to investigate the hypothesized correlations within a comprehensive framework. The significance level was set at $P < 0.05$.

3. Results

The mean age of the students was 14.50 ± 0.31 years, and the mean age of their mothers was 39.75 ± 4.30 years. Descriptive statistics for the study variables, including means, standard deviations (SD), and Pearson correlation coefficients, are presented in Table 1. Based on the results in Table 1, cognitive abilities had a negative correlation with intensive maternal attitudes ($r = -0.19$) and a positive correlation with maternal mental health ($r = 0.29$). Figure 1 presents the proposed model for explaining cognitive abilities based on intensive maternal attitudes and mental health.

Table 1: Means, standard deviations (SD), and Pearson correlation coefficients for the study variables

Variables	Mean	SD	1	2	3
1- Cognitive abilities	89.69	18.74	1		
2- Intensive maternal attitudes	77.62	29.56	-0.19*	1	
3- Mental health	40.65	11.40	0.29**	-0.21*	1

*P<0.05; **P<0.01; SD: Standard Deviation

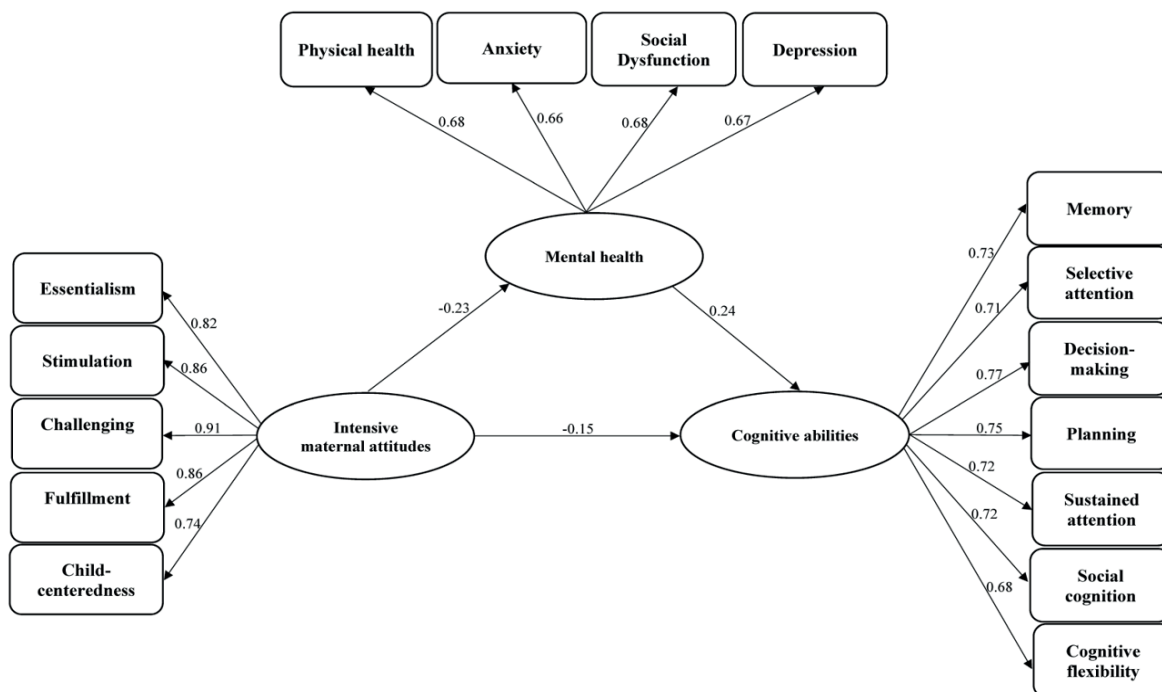


Figure 1: The figure shows the proposed model for explaining cognitive abilities based on intensive maternal attitudes and mental health.

Table 2: Fit indicators of the proposed model

Fit indicators	χ^2	df	(χ^2/df)	TLI	CFI	IFI	NFI	RMSEA
Proposed model	172.50	101	1.70	0.96	0.97	0.91	0.93	0.049

χ^2 : Chi-square; χ^2/df : The ratio of chi-square to degree of freedom; GFI: Goodness of Fit Index; IFI: Incremental Fit Index; NFI: Normed Fit Index; RMSEA: Root Mean Square Error of Approximation

Table 3: Path coefficients of direct and indirect correlations between research variables

Path	β	P
Intensive maternal attitudes → Cognitive abilities	-0.15	0.020
Intensive maternal attitudes → Mental health	-0.23	0.001
Mental health → Cognitive abilities	0.24	0.001
Intensive maternal attitudes → Cognitive abilities through the mediating role of mental health	-0.091	0.005

As shown in Table 2, all fit indices indicated that the proposed model fit the data well. These indices included the chi-square value ($\chi^2=172.50$, $df=101$), normed chi-square value ($\chi^2/df=1.70$), Tucker-Lewis index (TLI=0.96), comparative fit index (CFI=0.97), incremental fit index (IFI=0.91), normed fit index (NFI=0.93), and the root mean square error of approximation (RMSEA=0.049).

Table 3 shows the estimated path coefficients for the direct and indirect correlations between the

study variables. The findings revealed significant negative associations between intensive maternal attitudes and both students' cognitive abilities (P=0.020) and mothers' mental health (P=0.001). Conversely, mothers' mental health exhibited a significant positive association with girls' cognitive abilities (P=0.001). Furthermore, the negative association between intensive maternal attitudes and students' cognitive abilities was mediated by mental health, with a significant indirect effect (P=0.005).

4. Discussion

The present study aimed to investigate the correlation between intensive maternal attitudes and cognitive abilities in female students applying for the gifted high school entrance exam, mediated by mental health. The first finding showed a significant correlation between intensive maternal attitudes and girls' cognitive abilities. No similar studies were found to compare and contrast the results, indicating the novelty of the present research. This finding can be explained by the considerable impact of intensive maternal attitudes on students' cognitive abilities. Mothers who experience high levels of stress due to various factors such as social, economic, or family pressures may not be able to fully meet their children's cognitive and emotional needs. Studies have shown that maternal stress and pressure during pregnancy and after childbirth can lead to decreased attention to and support for the child's cognitive development (39, 40). Additionally, stressful situations can sometimes reduce the mother's memory, concentration, and attention, consequently leading to a lack of attention to the child's cognitive strengths and weaknesses (41).

The results also indicated a significant correlation between maternal mental health and girls' cognitive abilities, demonstrating a positive association between the mother's mental health and the child's cognitive abilities. No similar studies were found to corroborate this finding. This finding can be explained by the fact that mothers with good mental health generally pay more attention to and support their children's cognitive needs (31). This can lead to the strengthening of children's cognitive abilities. These mothers are mostly capable of providing emotional and affective support to their children. The ecological systems theory is a significant approach to examining the influence of environmental factors on various aspects of development. According to this theory, four systems: microsystem (the deepest level of the environment), mesosystem (the relationship between microsystems), exosystem (social situations), and macrosystem (the outermost level of the system) simultaneously and intertwined affect the individual's growth and development (42). The microsystem, which includes family interactions and the relationships between its members, such as the mother's relationship with her child, is of considerable importance. Based on this theory, the mother is the first and most influential person

in a child's upbringing, and the importance of the mother's role in the child's development in various areas is noteworthy. Additionally, parent-child relationships and maternal mental health are fundamental to children's health. Therefore, investigating the role of maternal mental health in individual development, especially during adolescence, is of great importance due to the significance of this age in shaping the individual's academic, professional, and social success.

The results also revealed a significant correlation between intensive maternal attitudes and cognitive abilities, with mental health acting as a mediator. The analysis of direct correlations showed that intensive maternal attitudes had a significant negative correlation with cognitive abilities. In other words, higher levels of intensive maternal attitudes were associated with lower cognitive abilities in children. On the other hand, the indirect pathway analysis showed that intensive maternal attitudes were associated with decreased maternal mental health, which in turn led to reduced cognitive abilities in children. These findings suggested that mental health effectively played the role of a mediator in the correlation between intensive maternal attitudes and cognitive abilities.

Overall, the results suggested that a mother's intensive maternal attitude can negatively impact the mother-child interaction, especially in gifted students. Parents who have high expectations and pressure their children to achieve very high performances may increase stress and anxiety in the family environment. This can lead to decreased self-esteem and satisfaction in the children's personality. Additionally, intensive maternal attitudes may reduce cognitive abilities, creativity, and self-forgiveness in the educational environment. This is because a pressurized educational environment usually leads to a decrease in the children's personal and social abilities. Therefore, fostering support and a focus on love in the mother-child relationship, instead of coercion and pressure, may lead to a healthier and more sustainable relationship between mother and child.

Given the significant role of mothers and parenting processes in ecological theory, a comprehensive understanding of the nature and causes of a child's intelligence can only be achieved through understanding the mother's attitudes,

behaviors, and emotions. Of these three factors, the element of maternal attitude has received less attention despite its undeniable importance. These attitudinal factors are numerous and have been discussed in the context of multiple concepts, one of which is the intensive maternal attitude.

4.1. Limitations

The generalizability of the study results is limited due to the restricted nature of the sample. Participants were exclusively female ninth-grade high school students in Tehran, Iran applying for the gifted program. Caution is warranted when generalizing these findings to broader populations, including males, students in different grades, or from other geographic locations. Additionally, the use of self-reported measures introduces the potential for social desirability bias, which could influence the accuracy of participant responses.

5. Conclusions

The findings revealed that intensive maternal attitudes were negatively associated with both students' cognitive abilities and mothers' mental health. Conversely, mothers' mental health exhibited a positive association with students' cognitive abilities. Furthermore, the negative association between intensive maternal attitudes and students' cognitive abilities was mediated by mental health, suggesting that mothers' mental health plays a crucial role in this correlation. These findings highlighted the potential detrimental effects of high-pressure maternal attitudes on student outcomes. By negatively impacting mothers' mental health, such attitudes can indirectly decrease students' cognitive abilities. This underscores the importance of promoting healthy parenting practices that focus on support and encouragement rather than pressure and high expectations. Additionally, future research could explore specific mechanisms underlying the correlation between maternal mental health and cognitive development in children.

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Authors' Contribution

Marjan Ghasempour: Substantial contributions to the conception and design of the work; acquisition, analysis, and interpretation of data for the work, drafting the work and reviewing it critically for important intellectual content. Reza Johari Fard: Substantial contributions to the conception and design of the work; acquisition, analysis, and interpretation of data for the work, drafting the work and reviewing it critically for important intellectual content. Parvin Ehteshamzadeh: Substantial contributions to the conception and design of the work; acquisition, analysis, and interpretation of data for the work, drafting the work and reviewing it critically for important intellectual content. Rezvan Homaei: Substantial contributions to the conception and design of the work; acquisition, analysis, and interpretation of data for the work, drafting the work and reviewing it critically for important intellectual content. All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work, such as the questions related to the accuracy or integrity of any part of the work.

Ethical Approval

The study was approved by the Ethical Committee of Islamic Azad University- Ahvaz Branch with the code of IR.IAU.AHVAZ.REC.1403.018. Also, written informed consent was obtained from the participants.

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