

Article type:
Original Research

1. M.A., Department of Psychology, Faculty of Education and Psychology, Alzahra University, Tehran, Iran.
2. Professor of Department of Psychology, Faculty of Education and Psychology, Alzahra University, Tehran, Iran.

Corresponding author email address:
b.ahadi@alzahra.ac.ir



Article history:

Received 12 Jul 2025
Revised 28 Jul 2025
Accepted 20 Sep 2025
Published online 01 Oct 2025

How to cite this article:

Lavasani, F. S., & Ahadi, B. (2025). Psychometric Evaluation and Normative Validation of the Beliefs and Attitudes Toward Transgenderism Scale in an Iranian Population. *International Journal of Body, Mind and Culture*, 12(7), 174-184.



© 2025 the authors. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is classified as a neurodevelopmental disorder

Mentalization as a Mediator between Developmental Trauma and ADHD Hyperactivity/Impulsivity Symptoms in Adolescent Boys: A Structural Equation Modeling Study

Faezeh Sadat. Lavasani¹, Batool. Ahadi^{2*}

ABSTRACT

Objective: This study examined whether mentalization mediates the association between developmental trauma and hyperactivity/impulsivity symptoms in adolescent boys.

Methods and Materials: In a descriptive-correlational design using structural equation modeling, 550 male students aged 13–17 years were selected through multistage cluster sampling from public and private secondary schools in Tehran. Participants completed the Childhood Trauma Questionnaire, the 14-item Persian Reflective Functioning Questionnaire, and the SNAP-IV self-report for ADHD symptoms. Data were analyzed using SPSS and AMOS 24. Confirmatory factor analysis supported three latent constructs (developmental trauma, mentalization, ADHD symptoms), and the structural model was tested to estimate direct and indirect effects.

Findings: The measurement model showed acceptable fit ($\chi^2/df = 2.84$, CFI = 0.95, TLI = 0.92, RMSEA = 0.075). Developmental trauma was positively associated with ADHD symptoms ($\beta = 0.38$, $p < .01$) and negatively associated with mentalization ($\beta = -0.35$, $p < .001$). Mentalization, in turn, was inversely related to ADHD symptoms ($\beta = -0.41$, $p < .001$). The indirect path from developmental trauma to ADHD symptoms via mentalization was significant ($\beta = 0.15$, $p < .001$), indicating partial mediation. The model explained 29% of the variance in ADHD symptoms.

Conclusion: Developmental trauma is linked to greater hyperactivity/impulsivity in adolescent boys both directly and through reduced mentalization. Integrating trauma-informed, mentalization-focused approaches into school-based prevention and clinical interventions may help improve emotional regulation and reduce ADHD-related behavioral problems.

Keywords: Developmental trauma, ADHD symptoms, hyperactivity, mentalization, structural equation modelling, adolescents.

characterized by hyperactivity, impulsivity, and inattention, and is divided into three subtypes: predominantly hyperactive-impulsive, predominantly inattentive, and a combined type (*American Psychiatric*

Association, 2013). These symptoms are associated with impaired academic performance, low self-esteem, negative occupational outcomes, poor adaptive functioning, deficits in social skills, aggressive and high-risk behaviors, and accidental injuries (Yari et al., 2024). Both genetic and environmental factors, as well as their interactions, contribute to the risk of developing this disorder. Given its multifactorial etiology, ADHD presents with heterogeneous manifestations, affects various cognitive domains, and frequently co-occurs with other psychiatric and medical conditions (Faraone & Radonjić, 2024).

Several hypotheses have been proposed regarding the neurobiological basis of ADHD: reduced function and volume of white and gray matter (associated with impairments in planning, cognition, attention, and behavior), alterations in the prefrontal cortex (which plays a key role in attention and behavioral regulation), delayed maturation, decreased activity, and reduced volume in the prefrontal regions (Amjad et al., 2024). In this review, the terms "Attention-Deficit/Hyperactivity Disorder (ADHD)" and "ADHD symptoms" will be used. The former refers to a clinical diagnosis, while the latter pertains to the presence of symptoms that may not necessarily meet the threshold for a formal diagnosis.

Adverse childhood experiences, including neglect, emotional, physical, or sexual abuse, and domestic violence, may contribute to the development of neurodevelopmental symptoms by disrupting typical developmental processes and creating developmental trauma (Hoover, 2020; Thumfart et al., 2022). Childhood abuse may have a bidirectional relationship with ADHD (Bali et al., 2023; Hoover, 2020; Karaca, 2022). Longitudinal prospective studies have confirmed this link and proposed multiple mechanisms explaining it. For instance, child maltreatment may lead to ADHD/impulsivity symptoms via biological and neurophysiological pathways, while children with ADHD/impulsivity may, in turn, increase parental stress and the risk of maltreatment (Bali et al., 2023). For example, (Karaca, 2022) found that higher maternal emotional abuse scores were significantly associated with greater scores for disruptive behavior disorders.

Developmental trauma has profound effects on the development of the frontal lobe in children. As the frontal lobe is crucial for cognitive skills and executive functions, its impairment may contribute to deficits in self-

regulatory processes, including problem-solving, response inhibition, emotional regulation, and self-motivation—factors closely linked to hyperactivity and impulsivity (Dalgin-Cohen, 2023; Maged Hamza et al., 2023). Childhood trauma may also exacerbate ADHD/impulsivity symptoms by increasing emotional reactivity, promoting maladaptive cognitive-emotional regulation strategies, and contributing to insecure attachment patterns (Abed et al., 2023; Rüfenacht et al., 2021). Researchers have emphasized that increased childhood maltreatment elevates the risk of anxiety and impulsivity, which mediate the relationship between maltreatment and suicide (Craig et al., 2020), self-harm (Chen et al., 2024), and binge eating (Bernstein et al., 2003). Findings from (Çoban & Tan, 2019) also support the mediating role of ADHD/impulsivity and mood symptoms in the link between developmental trauma and obsessive-compulsive symptoms.

Developmental trauma also adversely impacts children's mentalization capacity (Katzman & Papouchis, 2023; Yang & Huang, 2024). Mentalization, a reflective function, refers to the ability to understand one's own and others' mental states. It develops through early interpersonal relationships, particularly through attachment, and integrates self-awareness and relational understanding, thereby enabling individuals to manage loss, distress, anger, sadness, and anxiety (Poznyak, 2025). As the ability to mentalize supports children in understanding and predicting their own and others' behaviors in a coherent and purposeful way, it also facilitates the regulation of trauma-related emotional responses (Terradas et al., 2021). However, growing up in abusive or neglectful environments can impair the development of mentalization capacity (Riazi & Manouchehri, 2024). Anxiety and insecure-avoidant attachment have been identified as potential mediators of the relationship between developmental trauma and mentalization deficits (Wang et al., 2024). Deficits in mentalization may affect coping strategies, emotional regulation, and stress responses, increasing vulnerability to psychopathological developmental disorders (Wagner-Skacel et al., 2022). In line with this, (Shafaghi & Saadat, 2023) found that childhood traumatic experiences, both directly and indirectly through impaired mentalization, can predict aggression in adolescence.

Since the development of mentalization relies on attentional control and emotional self-regulation during early growth (Fonagy & Allison, 2013), ADHD may hinder its development (Conway, 2024). Inattention symptoms in ADHD are linked to deficits in emotional recognition abilities, which partly explain the observed lack of empathy—a construct closely related to mentalization (Haza et al., 2024; Perroud et al., 2017). Bozkurt et al., (2024) found that reduced visual attention to emotional cues in children with ADHD, along with poor mentalization skills, negatively affects their social functioning. These findings support the hypothesis that the empathy and social cognition deficits observed in individuals with ADHD may partly stem from impaired mentalization (Perroud et al., 2017). Other researchers (Ghasemi et al., 2021; Poznyak et al., 2024) have confirmed developmental deficits in mentalization among youth with ADHD and their relationship with attentional disorders. Adolescents with ADHD show increased mentalization errors, and lower mentalization scores are correlated with inattention and impulsivity indices (Poznyak et al., 2024). Impaired mentalization may create a vulnerability to maladaptive personality development, increasing the risk for impulsivity-related disorders such as impulsive gambling (Pizzini et al., 2025).

Given the role of mentalization in ADHD, researchers and clinicians have investigated the effectiveness of mentalization-based therapy (MBT) for children with ADHD and emphasized that enhancing mentalization capacity may improve emotional and behavioral regulation (Conway, 2024; Ghanbari et al., 2020). Although numerous studies have explored comorbidities, mechanisms, and variables associated with ADHD, a review of the Iranian literature indicates a lack of research on the relationship between developmental trauma and hyperactivity/impulsivity symptoms in Iranian adolescents. The impact of developmental trauma on mentalization capacity in this population remains underexplored. Additionally, the potential mediating role of mentalization in the relationship between developmental trauma and hyperactivity/impulsivity symptoms in adolescents has not been adequately addressed. Therefore, the present study aims to answer the following research question: Does mentalization mediate the relationship between

developmental trauma and hyperactivity/impulsivity symptoms in adolescents?

Methods and Materials

Design and participants

This study was a fundamental research employing a descriptive-correlational design using structural equation modeling (SEM). The statistical population comprised all adolescent boys enrolled in lower and upper secondary schools in Tehran during the 2024–25 academic year. According to (Kline, 2023), a minimum sample size of five participants per estimated parameter is recommended, with 20 participants per parameter being ideal. Based on the proposed model of this study and estimating 20 participants per parameter, the required sample size was calculated to be 480. Taking into account possible attrition, a total of 500 students were selected through cluster random sampling.

Instruments

Childhood Trauma Questionnaire (CTQ)

The CTQ was developed by Bernstein et al., (2003) to assess childhood trauma and maltreatment. It is used for both screening and identifying individuals with a history of abuse or neglect. The questionnaire measures five types of childhood maltreatment: Sexual abuse (Items 20, 21, 23, 24, 27), Physical abuse (Items 9, 11, 12, 15, 17), Emotional abuse (Items 3, 8, 14, 18, 25), Emotional neglect (Items 5, 7, 13, 19, 28) and Physical neglect (Items 1, 2, 4, 6, 26). It includes 28 items, of which 25 assess the main components, and 3 items (10, 16, 22) are validity check items to identify potential denial of childhood issues. The CTQ uses a 5-point Likert scale (1 = never to 5 = always), yielding subscale scores ranging from 5 to 25 and a total score from 25 to 125. In (Bernstein et al., 2003), the Cronbach's alpha coefficients for the subscales ranged from 0.78 to 0.95. Concurrent validity, as rated by clinicians, ranged from 0.59 to 0.78. In Iran, the internal consistency (Cronbach's alpha) for the subscales has been reported between 0.81 and 0.98 (Ebrahimi et al., 2014).

Reflective Functioning Questionnaire (RFQ)

Developed by Fonagy & Allison, (2013), the RFQ assesses mentalization or reflective functioning, i.e., the ability to interpret internal mental states of oneself and others such as feelings, desires, and intentions. The original version contains 46 items rated on a 7-point

Likert scale (1 = strongly disagree to 7 = strongly agree). A validation study in Iran by [Drogar et al., \(2020\)](#) identified 14 items as psychometrically sound, which were used in the current study. [Fonagy & Allison, \(2013\)](#) assessed the RFQ's psychometric properties across three studies: Study 1: factor structure and validity in individuals with borderline personality disorder (BPD), eating disorders, and healthy controls. Study 2: replication in personality disorder and control populations. Study 3: association between RFQ, parental reflective functioning, and infant attachment status. The RFQ demonstrated a two-factor structure: certainty and uncertainty about mental states. These dimensions showed satisfactory internal consistency and test-retest reliability, and differentiated well between clinical and non-clinical samples. They were also significantly correlated with empathy, mindfulness, and parental RF, which in turn predicted infant attachment classification. [Badoud et al., \(2018\)](#) confirmed the two-factor structure, reporting Cronbach's alpha values of 0.71 for certainty and 0.67 for uncertainty, with test-retest correlations of 0.70 and 0.54, respectively. [Drogar et al., \(2020\)](#) also reported satisfactory validity and reliability in Iranian samples, with alpha coefficients of 0.88 (certainty) and 0.66 (uncertainty). Certainty was negatively correlated with anxiety-depression ($r = -0.18$) and secure attachment ($r = -0.33$), while uncertainty was positively correlated with anxiety-depression ($r = 0.37$) and avoidant attachment ($r = 0.32$), indicating good convergent validity.

Swanson, Nolan, and Pelham Rating Scale – Self-Report (SNAP-IV, 4th Edition)

The SNAP-IV scale, developed by [Swanson et al., \(2012\)](#), is a self-report tool for screening ADHD symptoms in adolescents. The 18-item version includes two subscales: Inattention (Items 1–9) and Hyperactivity/Impulsivity (Items 10–18). Responses are recorded on a 4-point Likert scale (0 = not at all, 3 = very much). [Bussing et al., \(2008\)](#) reported Cronbach's alpha values of 0.97 (total), 0.90 (inattention), and 0.76 (hyperactivity/impulsivity). [Swanson et al., \(2012\)](#) found that inattention accounted for 41.52% of the variance, hyperactivity/impulsivity for 36.26%, and both together explained 77.78%. In Iran, [Kiani & Hadianfard, \(2016\)](#) validated the scale in 290 adolescent girls. The two factors accounted for 38.23% of the total variance. Alpha coefficients were 0.81 (inattention) and

0.75 (hyperactivity/impulsivity), with adequate Spearman-Brown and Guttman split-half reliability indices. Construct validity was supported by correlations with parent reports and the letter-number sequencing task ($r = -0.51$ for inattention; $r = 0.35$ for impulsivity).

Procedure

After obtaining ethical approval and preparing the instruments, the sample was selected based on the sampling procedure. Permission was secured from the Tehran Department of Education. Three educational districts (Districts 6, 7, and 11) were selected. From each district, two schools were randomly chosen: District 6: Shahid Pandi Middle School, Alborz High School, District 7: Shahid Fahmideh Middle School, Farhang High School and District 11: Allameh Tabatabaei Middle School, Moftah High School.

From each school, three classes were randomly selected. After coordination with school administrators, the study's purpose and procedures were explained to both school staff and students. Questionnaires were distributed among students who volunteered to participate. Participation was entirely voluntary. Instructions were provided, and participants were asked to respond to all items. Completion time was estimated at 30 minutes per participant. Data were collected in a single session and individually. Participants were informed about the purpose, confidentiality of their responses, and their right to withdraw at any time. Informed consent was obtained from all participants.

Ethics

This study adhered to ethical research standards. Participants were informed of the research purpose and assured of their right to withdraw at any time. All responses were anonymized using codes, and confidentiality was strictly maintained. Data collection, analysis, and reporting were conducted with integrity and transparency.

Analysis

Descriptive statistics including means, standard deviations, correlations, and normality tests were conducted. To examine the relationships among variables and answer the research questions, structural equation modeling (SEM) was used. After conducting exploratory and confirmatory factor analyses for measurement validation, the structural model was tested to assess direct, indirect, and total causal effects among latent variables and the explained variance of the

model. Data analysis was performed using SPSS and AMOS version 24.

Findings and Results

Descriptive analysis revealed that 58 participants (17.5%) were in lower secondary school, while 273 participants (82.5%) were in upper secondary school. The age distribution was as follows: 16 participants

(4.8%) were 13 years old, 42 (12.7%) were 14, 85 (25.7%) were 15, 103 (31.1%) were 16, 64 (19.4%) were 17, and 21 (6.3%) were 18 years old. Table 1 presents the mean, standard deviation, and Cronbach's alpha coefficients for the study variables, including developmental trauma (emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect), mentalization (certainty and uncertainty), and ADHD symptoms (inattention and impulsivity).

Table 1

Means, Standard Deviations, and Cronbach's Alphas of Study Variables

Variable	Mean	SD	Cronbach's Alpha
Developmental Trauma – Emotional Abuse	7.42	3.03	0.69
Developmental Trauma – Physical Abuse	6.21	2.14	0.73
Developmental Trauma – Sexual Abuse	6.30	2.27	0.66
Developmental Trauma – Emotional Neglect	9.76	3.90	0.79
Developmental Trauma – Physical Neglect	7.40	3.10	0.65
Mentalization – Certainty	37.68	8.15	0.84
Mentalization – Uncertainty	21.53	5.69	0.76
ADHD Symptoms – Inattention	11.85	3.84	0.77
ADHD Symptoms – Impulsivity	12.27	2.60	0.72

The reliability analysis indicated that all subscales had acceptable internal consistency, with Cronbach's

alphas near or above 0.70. Table 2 presents the correlation coefficients among the study variables.

Table 2

Correlations Among Study Variables

Variables	1	2	3	4	5	6	7	8
1. Emotional Abuse	1							
2. Physical Abuse	.57**	1						
3. Sexual Abuse	.39**	.44**	1					
4. Emotional Neglect	.46**	.38**	.32**	1				
5. Physical Neglect	.50**	.35**	.41**	.59**	1			
6. Mentalization – Certainty	-.18**	-.26**	-.12*	-.07	-.15**	1		
7. Mentalization – Uncertainty	-.37**	-.23**	-.27**	-.24**	-.29**	.51**	1	
8. Inattention	.33**	.19**	.11*	.18**	.21**	-.29**	-.37**	1
9. Impulsivity	.29**	.21**	.34**	.13*	.16**	-.20**	-.28**	.52**

* $p < .05$, ** $p < .01$

The correlations were in the expected directions and consistent with theoretical assumptions in the field.

Measurement Model

In the measurement model, nine observed indicators were used to reflect three latent constructs. Emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect were indicators for the latent

variable developmental trauma; certainty and uncertainty represented mentalization; and inattention and impulsivity represented ADHD symptoms. Model fit was assessed via confirmatory factor analysis (CFA) using AMOS 24.0 and maximum likelihood estimation. Fit indices for the initial and revised models are shown in Table 3.

Table 3

Model Fit Indices for the Measurement Model

Fit Index	Initial Model	Modified Model	Recommended Cut-off
-----------	---------------	----------------	---------------------

χ^2	101.70	62.44	—
Degrees of Freedom (df)	24	22	—
χ^2 / df	4.24	2.84	< 3
GFI	0.933	0.960	> 0.90
AGFI	0.875	0.918	> 0.85
CFI	0.906	0.951	> 0.90
RMSEA	0.099	0.075	< 0.08

The revised model achieved acceptable fit indices across all criteria. To improve fit, error covariances were

added between emotional abuse & physical abuse and between physical abuse & sexual abuse.

Table 4

Factor Loadings in the Measurement Model

Latent Variable - Indicator	b	β	SE	t
Developmental Trauma - Emotional Abuse	1.000	0.663	—	—
Developmental Trauma - Physical Abuse	0.481	0.434	0.052	9.20**
Developmental Trauma - Sexual Abuse	0.501	0.426	0.066	7.64**
Developmental Trauma - Emotional Neglect	1.848	0.789	0.149	12.43**
Developmental Trauma - Physical Neglect	1.172	0.782	0.094	12.51**
Mentalization - Certainty	1.000	0.560	—	—
Mentalization - Uncertainty	1.002	0.889	0.178	5.62**
ADHD - Inattention	1.000	0.855	—	—
ADHD - Impulsivity	0.767	0.689	0.113	6.80**

** $p < .01$

The highest standardized loading was for uncertainty ($\beta = 0.889$) and the lowest for sexual abuse ($\beta = 0.426$). Since all loadings exceeded 0.32, the indicators were deemed suitable for representing their respective latent constructs.

Structural Model

Following confirmation of measurement model fit, the structural model was tested. It was hypothesized that

developmental trauma would predict ADHD symptoms both directly and indirectly via mentalization. Model fit indices were similar to those of the measurement model, indicating acceptable fit. Table 5 displays the path coefficients for the structural model.

Table 5

Structural Path Coefficients (Direct, Indirect, and Total Effects)

Path	b	SE	β	p
Developmental Trauma → Mentalization	-1.131	0.278	-0.354	.001
Mentalization → ADHD Symptoms	-0.217	0.052	-0.413	.001
Developmental Trauma → ADHD Symptoms (Direct)	0.388	0.138	0.231	.007
Developmental Trauma → ADHD Symptoms (Indirect)	0.245	0.081	0.146	.001
Developmental Trauma → ADHD Symptoms (Total)	0.633	0.130	0.377	.001

The total path coefficient between developmental trauma and ADHD symptoms was significant ($\beta = 0.377$, $p < .001$), indicating a positive relationship. The path from mentalization to ADHD symptoms was negative and significant ($\beta = -0.413$, $p < .001$), supporting the mediating role of mentalization. The indirect effect of developmental trauma on ADHD symptoms via mentalization was also positive and significant ($\beta = 0.146$, $p < .001$), confirming mediation. The coefficient of

determination (R^2) for ADHD symptoms was 0.29, suggesting that developmental trauma and mentalization together explain 29% of the variance in ADHD symptoms among adolescents.

Discussion and Conclusion

The structural model of the present study demonstrated that developmental trauma is associated with symptoms of hyperactivity/impulsivity in

adolescents both directly and indirectly through the mediation of mentalization. Given the equal number of indicators, paths, and errors in both the measurement and structural models, similar fit indices were obtained for the structural model. Accordingly, it was concluded that the structural model showed acceptable fit with the collected data. The current result is consistent with the studies of (Abate et al., 2017; Berzenski & Yates, 2019; Fritz et al., 2023; López-Villatoro et al., 2025; Parada-Fernández et al., 2023; Şenkal Ertürk et al., 2020). The findings of Parada-Fernández et al., (2023) revealed a significant bivariate relationship between aggression, impulsivity, and mentalization. Structural equation modeling revealed a significant moderating effect, suggesting that while mentalization may not play a substantial role among individuals with low impulsivity, high mentalization capacity enables individuals with high impulsivity to engage in less aggressive behaviors compared to those with high or low impulsivity and low mentalization. The practical implications and limitations of mentalization capacity were discussed in their study. López-Villatoro et al., (2025) found that ADHD is more strongly associated with hypomentalization, while borderline personality disorder is related to hypermentalization. Their comparison with a comorbid group did not reveal significant differences.

Theoretically, based on attachment theory, developmental trauma has considerable negative impacts on individuals' cognitive, emotional, and behavioral systems. In other words, adolescents who have experienced various forms of developmental trauma (emotional, physical, sexual abuse, and domestic violence) during childhood are likely to exhibit maladaptive emotional and cognitive reactions, which can lead to the use of dysfunctional strategies such as impulsivity and emotional hyperreactivity. Another explanation is that developmental trauma experiences may shape a repertoire of hyperactive/impulsive behaviors. According to behavioral theory, parental behaviors and environmental experiences significantly influence personality development. In fact, children with such traumatic experiences may respond to frustrations in adolescence and adulthood with hyperactivity/impulsivity, as these are the only responses available in their behavioral repertoire (Berzenski & Yates, 2019).

This finding is also consistent with studies by (Katzman & Papouchis, 2023, Wadi & Ajil, 2025; Doba et al., 2022; Brown, 2018 and Kay, 2018). These findings suggest that different forms of developmental trauma reflect shortcomings in the parent-child relationship. Accordingly, disruptions in the formation of secure attachment styles can lead to developmental impairments. Essentially, any form of developmental trauma may result in insecure attachment and impairments in mentalization. Additionally, it is argued that neurobiological changes induced by developmental trauma become registered in the amygdala and serve as a primary source of distinctive emotional reactions to trauma and their long-term socio-emotional consequences. Neuroimaging studies indicate that developmental trauma is linked to amygdala hyperactivity, resulting in heightened emotional reactivity. Children exposed to violence and abuse struggle to reflect on their internal states and to reassess events; their responses are largely influenced by the emotional reactivity of the amygdala, reflecting deficiencies in reflective functioning and mentalization (Wagner-Skacel et al., 2022). In fact, deficits in mentalization are associated with increased hyperactivity/impulsivity. Impaired mentalization hinders individuals from accurately interpreting life events or understanding others' behaviors, thereby reducing their self-regulation, emotional control, and increasing ADHD symptoms in adolescence and beyond.

Ultimately, it may be concluded that developmental trauma can play a significant role in increasing hyperactive/impulsive behaviors through damage to mentalization capacity. This triadic link can be discussed within psychoanalytic, behavioral, and neurobiological frameworks. According to psychoanalytic theory, developmental trauma can weaken the ego and lead to excessive use of defense mechanisms. Excessive identification with an abusive parent may result in weakened mentalization and generalization of aggressive responses to similar situations (Malonda et al., 2019). From a behavioral perspective, developmental trauma in childhood can condition aggressive responses that are triggered in similar situations later in life, with the individual reacting violently without reassessment (Berzenski & Yates, 2019). From a neurobiological standpoint, amygdala hyperactivity caused by traumatic experiences generates aggressive responses to

environmental stimuli, as hyperactivity/impulsivity is linked to emotional sensitivity and reduced mentalization (Wagner-Skacel et al., 2022). Taken together, it can be concluded that developmental trauma directly increases the frequency of hyperactivity/impulsivity in adolescence, and also indirectly, by damaging mentalization capacity.

Like many studies in the field of human sciences, this research has limitations that constrain the generalization of its findings. These include: the study was conducted on all adolescent boys enrolled in lower and upper secondary schools in Tehran during the 2024–2025 academic year. Hence, the findings are applicable only to this specific population and may not be generalizable to other populations, genders, or age groups without caution. Another limitation concerns the exclusive use of self-report instruments. As in many studies, relying on self-reports instead of real behavioral observations may prompt participants to respond in socially desirable ways. Behavioral validation of self-report tools was not performed. Organizational constraints, particularly limited access granted by the Ministry of Education to all school districts, lack of time, insufficient researcher control over classroom hours, lack of cooperation by some participants, and the scarcity of domestic research on ADHD symptoms in adolescents based on developmental trauma and mediated by mentalization all posed limitations. The inability to control all influencing variables such as participants' fatigue or lack of motivation was also a constraint. Furthermore, the relatively long length of the three questionnaires (CTQ, RFQ, and SNAP-IV) led to limited willingness among adolescents to participate, which affected the representativeness of the sample.

Given the finding that ADHD symptoms in adolescents are predicted by developmental trauma and mediated by mentalization, it is recommended that clinicians consider both these factors when treating psychological disorders. Therapists can support individuals with psychological issues by targeting developmental trauma and enhancing mentalization, both of which are critical to emotional regulation and family functioning. In line with the research hypotheses and for improving trauma recovery via mentalization in adolescents with hyperactivity/impulsivity symptoms, it is recommended that school administrators and educational staff identify students with emotional and behavioral problems and

refer them to counseling services (Khabaznoori & Azad, 2024). Strengthening school-based counseling centers, particularly in secondary schools, and offering diverse programs (e.g., music, sports, arts) can serve as primary mental health prevention for students with ADHD symptoms.

Given the effectiveness of schema-based parenting education and acceptance and commitment therapy (ACT) in addressing children's behavioral problems, psychologists and counselors in mental health centers can apply these approaches to reduce child psychopathology. As findings showed that developmental trauma and mentalization predict ADHD symptoms in adolescents, students with such behavioral difficulties should be identified, and their parents should be invited to receive training in parenting skills. To better evaluate the prediction of ADHD symptoms based on trauma and mentalization, future research should include broader samples and explore additional variables such as intelligence, emotional regulation, psychological well-being, identity styles, creativity, cognitive components, and self-efficacy. Given that the present study was conducted among adolescent boys in Tehran, future researchers are encouraged to carry out similar studies across different educational levels, genders, and institutions such as universities or other social systems.

Acknowledgments

The authors express their gratitude and appreciation to all participants.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Ethical considerations in this study were that participation was entirely optional.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

Funding

This research was carried out independently with personal funding and without the financial support of any governmental or private institution or organization.

Authors' Contributions

All authors equally contribute to this study.

References

- Abate, A., Marshall, K., Sharp, C., & Venta, A. (2017). Trauma and aggression: Investigating the mediating role of mentalizing in female and male inpatient adolescents. *Child Psychiatry & Human Development*, 48(6), 881-890. <https://doi.org/10.1007/s10578-017-0711-6>
- Abed, M., Mansureh, H.-H., Masoud, G.-A. L., Elaheh, H., Mohammad-Hosseini, N. H., Yamin, B. D., & Abdol-Hosseini, V. (2023). Construction of meta-thinking educational program based on mental-brain simulation (mtmbs) and evaluating its effectiveness on executive functions, emotion regulation, and impulsivity in children with ADHD: A resting-state functional MRI study. *Journal of Attention Disorders*, 27(11), 1223-1251. <https://doi.org/10.1177/10870547231155436>
- Amjad, I., Niazi, I. K., Kumari, N., Duehr, J., Shehzad, G., Rashid, U., Duehr, J., Trager, R. J., Holt, K., & Haavik, H. (2024). The effects of chiropractic adjustment on inattention, hyperactivity, and impulsivity in children with attention deficit hyperactivity disorder: a pilot RCT. *Frontiers in psychology*, 15, 1323397. <https://doi.org/10.3389/fpsyg.2024.1323397>
- Badoud, D., Prada, P., Nicastro, R., Germond, C., Luyten, P., Perroud, N., & Debbané, M. (2018). Attachment and reflective functioning in women with borderline personality disorder. *Journal of personality disorders*, 32(1), 17-30. https://doi.org/10.1521/pedi_2017_31_283
- Bali, P., Sonuga-Barke, E., Mohr-Jensen, C., Demontis, D., & Minnis, H. (2023). Is there evidence of a causal link between childhood maltreatment and attention deficit/hyperactivity disorder? A systematic review of prospective longitudinal studies using the Bradford-Hill criteria. *JCPP advances*, 3(4), e12169. <https://doi.org/10.1002/jcv2.12169>
- Bernstein, D. P., Stein, J. A., Newcomb, M. D., Walker, E., Pogge, D., Ahluvalia, T., Stokes, J., Handelsman, L., Medrano, M., & Desmond, D. (2003). Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child abuse & neglect*, 27(2), 169-190. [https://doi.org/10.1016/S0145-2134\(02\)00541-0](https://doi.org/10.1016/S0145-2134(02)00541-0)
- Berzenski, S. R., & Yates, T. M. (2019). A developmental process analysis of the contribution of childhood emotional abuse to relationship violence. In *The effect of childhood emotional maltreatment on later intimate relationships* (pp. 180-203). Routledge. <https://doi.org/10.4324/9781315874920-9>
- Bozkurt, A., Yıldırım Demirdöğen, E., Kolak Çelik, M., & Akıncı, M. A. (2024). An assessment of dynamic facial emotion recognition and theory of mind in children with ADHD: An eye-tracking study. *Plos one*, 19(2), e0298468. <https://doi.org/10.1371/journal.pone.0298468>
- Brown, T. C. (2018). *Negative parental attachments as a contributing factor in the development of the other woman and their attitudes about infidelity*. The Chicago School of Professional Psychology. <https://www.proquest.com/openview/7527b916f7095319127b02bf0e415062/1?pq-origsite=gscholar&cbl=18750>
- Bussing, R., Fernandez, M., Harwood, M., Hou, W., Garvan, C. W., Eyberg, S. M., & Swanson, J. M. (2008). Parent and teacher SNAP-IV ratings of attention deficit hyperactivity disorder symptoms: psychometric properties and normative ratings from a school district sample. *Assessment*, 15(3), 317-328. <https://doi.org/10.1177/1073191107313888>
- Chen, X.-C., Xu, J.-J., Yin, X.-T., Qiu, Y.-F., Yang, R., Wang, Z.-Y., Han, Y.-W., Wang, Q.-K., Zhai, J.-H., & Zhang, Y.-S. (2024). Mediating role of anxiety and impulsivity in the association between child maltreatment and lifetime non-suicidal self-injury with and without suicidal self-injury. *Journal of affective disorders*, 347, 57-65. <https://doi.org/10.1016/j.jad.2023.11.080>
- Çoban, A., & Tan, O. (2019). Attention deficit hyperactivity disorder, impulsivity, anxiety, and depression symptoms mediating the relationship between childhood trauma and symptoms severity of obsessive-compulsive disorder. *Archives of Neuropsychiatry*, 57(1), 37. [HTTPS://10.29399/npa.23654](https://doi.org/10.29399/npa.23654)
- Conway, F. (2024). The Compassion Project: Mentalization-Based Therapy—Child (MBT-C) Clinical Interventions, Frequency, and Patterns in the Treatment of Children and Families with Attention Deficit/Hyperactivity Disorder. *Journal of Infant, Child, and Adolescent Psychotherapy*, 23(1), 72-84. <https://doi.org/10.1080/15289168.2024.2307843>
- Craig, S. G., Bondi, B. C., O'Donnell, K. A., Pepler, D. J., & Weiss, M. D. (2020). ADHD and exposure to maltreatment in children and youth: A systematic review of the past 10 years. *Current psychiatry reports*, 22(12), 79. <https://doi.org/10.1007/s11920-020-01193-w>
- Dalgin-Cohen, D. (2023). *Childhood Trauma and Students Identified as Attention Deficit Hyperactivity Disorder-A Qualitative Study Through a Redacted Retrospective Record Review of Childhood Trauma and Special Education in Connecticut Public, Suburban, High Schools*. University of Bridgeport. <https://www.proquest.com/openview/33e352366023491cc6bfdbf812e5b9e8/1?pq-origsite=gscholar&cbl=18750&diss=y>
- Doba, K., Saloppé, X., Choukri, F., & Nandirino, J.-L. (2022). Childhood trauma and posttraumatic stress symptoms in adolescents and young adults: The mediating role of mentalizing and emotion regulation strategies. *Child abuse & neglect*, 132, 105815. <https://doi.org/10.1016/j.chiabu.2022.105815>
- Drogar, E., Fathi-Ashtiani, A., & Ashrafi, E. (2020). Validation and Reliability of the Persian Version of the Mentalization Questionnaire. *Journal of Clinical Psychology*, 12(1), 1-12. [HTTPS://10.22075/jcp.2020.18897.1745](https://doi.org/10.22075/jcp.2020.18897.1745)
- Ebrahimi, H., Dejkam, M., & Seghatoleslam, T. (2014). Childhood traumas and suicide attempt in adulthood. *Iranian journal of psychiatry and clinical psychology*. <https://psycnet.apa.org/record/2014-46205-004>
- Faraone, S. V., & Radonjić, N. V. (2024). Neurobiology of attention deficit hyperactivity disorder. In *Tasman's psychiatry* (pp. 815-842). Springer. https://doi.org/10.1007/978-3-030-51366-5_33
- Fonagy, P., & Allison, E. (2013). What is mentalization?: The concept and its foundations in developmental research. In *Minding the child* (pp. 11-34). Routledge. https://discovery.ucl.ac.uk/id/eprint/1430329/7/Fonagy_chapter1_draft_pf revised_protected.pdf
- Fritz, M., Soravia, S.-M., Dudeck, M., Malli, L., & Fakhoury, M. (2023). Neurobiology of aggression—Review of recent

- findings and relationship with alcohol and trauma. *Biology*, 12(3), 469. <https://doi.org/10.3390/biology12030469>
- Ghanbari, F., Naziri, G., & Omidvar, B. (2020). The effectiveness of mentalization-based treatment on quality of life among children with attention deficit hyperactivity disorder (ADHD). <https://sid.ir/paper/999097/en>
- Ghasemi, F., Mirzahoseini, H., & MONIRPOOR, N. (2021). Mentalization in Children with Learning Disorders and Those with Attention Deficit Hyperactivity Disorder. <https://sid.ir/paper/1084856/en>
- Haza, B., Gosling, C. J., Ciminaghi, F., Conty, L., & Pinabiaux, C. (2024). Research Review: Social cognition and everyday social skills in children and adolescents with attention-deficit/hyperactivity disorder: a meta-analysis of case-control studies. *Journal of Child Psychology and Psychiatry*, 65(9), 1245-1254. <https://doi.org/10.1111/jcpp.14006>
- Hoover, D. W. (2020). Trauma in children with neurodevelopmental disorders: Autism, intellectual disability, and attention-deficit/hyperactivity disorder. In *Childhood trauma in mental disorders: A comprehensive approach* (pp. 367-383). Springer. https://doi.org/10.1007/978-3-030-49414-8_17
- Karaca, E. (2022). Doğu Trakya buluntusu savunma ve saldırı gereçleri. *Trakya Üniversitesi Edebiyat Fakültesi Dergisi*, 12(23), 313-341. <https://doi.org/10.33207/trkede.1021660>
- Katzman, W., & Papouchis, N. (2023). Effects of childhood trauma on mentalization capacities and dissociative experiences. *Journal of Trauma & Dissociation*, 24(2), 284-295. <https://doi.org/10.1080/15299732.2023.2168829>
- Kay, S. J. (2018). *The Relationship Among Reflective Functioning, History of Childhood Trauma, and Symptoms of Depersonalization and Derealization in Patients with Panic Disorder*. City University of New York. <https://www.proquest.com/openview/facc5ca30fb5d02b19c830b6358a3802/1?pq-origsite=gscholar&cbl=18750>
- Khabaznoori, A., & Azad, I. S. (2024). Reducing Sensation Seeking and Enhancing Inhibition: The Impact of Emotion-Focused Schema Therapy on Children with Attention Deficits. *International Journal of Body, Mind & Culture* (2345-5802), 11(3). <https://doi.org/10.22122/ijbmc.v11i3.697>
- Kiani, B., & Hadianfard, H. (2016). Psychometric properties of a Persian self-report version of Swanson, Nolan and Pelham rating scale (version IV) for screening attention-deficit/hyperactivity disorder in adolescents. <https://doi.org/10.1037/t57547-000>
- Kline, R. B. (2023). *Principles and practice of structural equation modeling*. Guilford publications. [https://books.google.com/books?id=t2CvEAAAQBAJ&pg=PP1&ots=sWXE2cYil&dq=Kline%2C%20R.%20B.%20\(2023\).%20Principles%20and%20practice%20of%20structural%20equation%20modeling.%20Guilford%20publications.&lr&pg=PP1#v=onepage&q=Kline,%20R.%20B.%20\(2023\).%20Principles%20and%20practice%20of%20structural%20equation%20modeling.%20Guilford%20publications.&f=false](https://books.google.com/books?id=t2CvEAAAQBAJ&pg=PP1&ots=sWXE2cYil&dq=Kline%2C%20R.%20B.%20(2023).%20Principles%20and%20practice%20of%20structural%20equation%20modeling.%20Guilford%20publications.&lr&pg=PP1#v=onepage&q=Kline,%20R.%20B.%20(2023).%20Principles%20and%20practice%20of%20structural%20equation%20modeling.%20Guilford%20publications.&f=false)
- López-Villatoro, J., Galvez-Merlin, A., Diaz-Marsá, M., & Carrasco, J. (2025). Social cognition impairment associated to a borderline personality disorder subtype linked to attention deficit hyperactivity disorder. *Journal of Psychiatric Research*, 185, 26-30. <https://doi.org/10.1016/j.jpsychires.2025.03.031>
- Maged Hamza, A., Ghobashy, S. A., & Abouelwafa, H. E. (2023). Effects of child abuse and neglect on executive functions among children diagnosed with learning disabilities or attention deficit and hyperactivity disorder. *Middle East Current Psychiatry*, 30(1), 81. <https://doi.org/10.1186/s43045-023-00349-7>
- Malonda, E., Llorca, A., Mesurado, B., Samper, P., & Mestre, M. V. (2019). Parents or peers? Predictors of prosocial behavior and aggression: A longitudinal study. *Frontiers in psychology*, 10, 2379. <https://doi.org/10.3389/fpsyg.2019.02379>
- Parada-Fernández, P., Herrero-Fernández, D., & Rodríguez-Arcos, I. (2023). The moderation effect of mentalization in the relationship between impulsiveness and aggressive behavior. *Scandinavian journal of psychology*, 64(6), 794-801. <https://doi.org/10.1111/sjop.12944>
- Perroud, N., Badoud, D., Weibel, S., Nicastró, R., Hasler, R., Küng, A.-L., Luyten, P., Fonagy, P., Dayer, A., & Aubry, J.-M. (2017). Mentalization in adults with attention deficit hyperactivity disorder: Comparison with controls and patients with borderline personality disorder. *Psychiatry Research*, 256, 334-341. <https://doi.org/10.1016/j.psychres.2017.06.087>
- Pizzini, B., Cosenza, M., Nigro, G., Sacco, M., & Ciccarelli, M. (2025). Maladaptive personality trait facets and mentalization in youth gambling. *International Journal of Mental Health and Addiction*, 23(3), 1951-1972. <https://doi.org/10.1007/s11469-023-01210-y>
- Poznyak, E. (2025). Understanding pathways to social impairments in adolescent ADHD: from emotion regulation to mentalizing. https://www.researchgate.net/publication/373172242_Mentalizing_in_Adolescents_and_Young_Adults_with_Attention_Deficit_Hyperactivity_Disorder_Associations_with_Age_and_Attention_Problems
- Poznyak, E., Samson, J. L., Barrios, J., Rafi, H., Hasler, R., Perroud, N., & Debbané, M. (2024). Mentalizing in adolescents and young adults with attention deficit hyperactivity disorder: associations with age and attention problems. *Psychopathology*, 57(2), 91-101. <https://doi.org/10.1159/000531512>
- Riazi, S. S., & Manouchehri, M. (2024). The mediating role of mentalization and integrative self-knowledge in the relationship between childhood trauma and fear of intimacy. *Frontiers in psychology*, 15, 1384573. <https://doi.org/10.3389/fpsyg.2024.1384573>
- Rüfenacht, E., Pham, E., Nicastró, R., Dieben, K., Hasler, R., Weibel, S., & Perroud, N. (2021). Link between history of childhood maltreatment and emotion dysregulation in adults suffering from attention deficit/hyperactivity disorder or borderline personality disorder. *Biomedicine*, 9(10), 1469. <https://doi.org/10.3390/biomedicine9101469>
- Şenkal Ertürk, İ., Kahya, Y., & Gör, N. (2020). Childhood emotional maltreatment and aggression: The mediator role of the early maladaptive schema domains and difficulties in emotion regulation. *Journal of Aggression, Maltreatment & Trauma*, 29(1), 92-110. <https://doi.org/10.1080/10926771.2018.1541493>
- Shafaghi, M., & Saadat, S. (2023). The mediating role of mentalization in the relationship between traumatic childhood experiences and aggression in girl adolescents. *Rooyesh-e-Ravanshenasi Journal (RRJ)*, 12(9), 179-188. <http://frooyesh.ir/article-1-4764-en.html>
- Swanson, J. M., Schuck, S., Porter, M. M., Carlson, C., Hartman, C. A., Sergeant, J. A., Clevenger, W., Wasdell, M., McCleary, R., & Lakes, K. (2012). Categorical and dimensional definitions and evaluations of symptoms of ADHD: history of the SNAP and the SWAN rating scales. *The International journal of educational and psychological assessment*, 10(1), 51. <https://pmc.ncbi.nlm.nih.gov/articles/PMC4618695/>
- Terradas, M. M., Poulin-Latulippe, D., Paradis, D., & Didier, O. (2021). Impact of early relational trauma on children's mentalizing capacity and play: A clinical illustration. *European Journal of Trauma & Dissociation*, 5(1), 100160. <https://doi.org/10.1016/j.ejtd.2020.100160>

- Thumfart, K. M., Jawaid, A., Bright, K., Flachsmann, M., & Mansuy, I. M. (2022). Epigenetics of childhood trauma: Long term sequelae and potential for treatment. *Neuroscience & Biobehavioral Reviews*, *132*, 1049-1066. <https://doi.org/10.1016/j.neubiorev.2021.10.042>
- Wadi, A. A., & Ajil, Z. W. (2025). Parental Stress Levels Among Parents of Children with ADHD: A Cross-Sectional Study in Iraq. *International Journal of Body, Mind & Culture (2345-5802)*, *12*(6). <https://doi.org/10.61838/ijbmc.v12i6.1102>
- Wagner-Skacel, J., Riedl, D., Kampling, H., & Lampe, A. (2022). Mentalization and dissociation after adverse childhood experiences. *Scientific reports*, *12*(1), 6809. <https://doi.org/10.1038/s41598-022-10787-8>
- Wang, Y., Jiang, X., Zhao, W., Xuan, R., Zu, X., Wang, H., Zhang, L., Li, N., Xie, S., & Dong, Y. (2024). The role of attachment and alexithymia in the relationship between childhood trauma and mentalization in people with schizophrenia: a multicenter study. *Current Psychology*, *43*(24), 1-11. <https://doi.org/10.1007/s12144-024-06128-9>
- Yang, L., & Huang, M. (2024). Childhood maltreatment and mentalizing capacity: A meta-analysis. *Child abuse & neglect*, *149*, 106623. <https://doi.org/10.1016/j.chiabu.2023.106623>
- Yari, Z., Mahdavi-Nia, F., Balaghi, H. S., & Ali-Mohammadlou, F. (2024). Psychological Vulnerability and Self-Efficacy of Adolescents with and without Attention Deficit Hyperactivity Disorder. *International Journal of Body, Mind & Culture (2345-5802)*, *11*(2). <https://10.22122/ijbmc.v11i2.532>