

The Correlation between Resilience, Self-Control, Self-Regulation, and Decision-Making Style and Aggressive Behavior in Adolescents: An Analysis Using Structural Equation Modeling

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Abstract

Background: Aggressive behavior is a common emotional manifestation among students of all grades. The present study aimed to establish the correlation between resilience, self-control, self-regulation, and decision-making style with aggressive behavior in adolescents.

Method: In this cross-sectional study conducted in 2022 in Marvdasht, Iran, 469 students with a mean age of 15.48 ± 1.74 years were recruited. Standard questionnaires were used to collect data on aggression, resilience, self-control, self-regulation, and decision-making style. The data were analyzed using SPSS version 22 and Amos version 24, with a significance level of $P < 0.05$. Statistical methods including Pearson's correlation coefficient, linear regression, and structural equation modeling (SEM) were employed for analysis.

Results: The findings revealed significant negative correlations between self-regulation ($r = -0.577$, $P < 0.001$), self-control ($r = -0.962$, $P < 0.001$), resilience ($r = -0.984$, $P < 0.001$), and deliberative decision-making style ($r = -0.571$, $P < 0.001$) with aggressive behavior in adolescents. Additionally, all variables except intuitive decision-making were found to have a significant association with aggressive behavior. Notably, resilience emerged as the most related variable to aggressive behavior. SEM analysis showed that standardized total effects of self-regulation, self-control, resilience, and deliberative decision-making on aggressive behavior were -0.500 , -0.912 , -0.632 , and -0.565 , respectively. The model fit indicators showed that the final model fit was acceptable ($\chi^2 / df = 2.431$, $P = 0.063$, $GFI = 0.994$, $AGFI = 0.969$, $CFI = 0.999$, $NFI = 0.989$, $RMSEA = 0.055$).

Conclusions: The study suggested all these variables, particularly resilience and self-control should be considered when planning interventions to reduce and control aggressive behavior.

Keywords: Aggression, Adolescent, Resilience, Self-control, Decision-making

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1. Introduction

Aggression refers to the deliberate use of any form of behavior, which threatens others and is used to harm another person or group. This behavior leads to mental and physical injuries and even social deprivation (1). This multifaceted behavior is the most important psychological risk factor among children and adolescents. In addition, it can affect the social, mental, and physical health of students and teachers (1). It also creates a significant burden for schools (2). This behavior is the most prevalent and extensive emotional expression among students across all levels of education (3). Students in school, experience high levels of stress due to conflicts with the educational system and

peers, thereby tending to express aggression (4).

Waschbusch and colleagues discovered that 14% of third-grade students and 8% of high school students reported being involved in a physical altercation on school grounds during the previous year (2). A cross-sectional study carried out in Iran with 13,486 students, with an average age of 12.47 years, found that 48% of boys and 31% of girls had engaged in aggressive actions (5). Various studies reported the prevalence of aggression in adolescents in India 46.04%, (6) in USA 22.6%, (7) and in Russia up to 80% (8).

Understanding the correlations of aggressive behavior is vital to effective prevention and

intervention. Previous studies have reported different psycho-cognitive factors which associated with aggression such as resilience, (9) self-control (10), self-regulation (11), and decision-making styles (12).

Various findings showed that one of the effective factors in controlling and reducing aggression is resilience (9, 13). People in adverse situations can react in such a way as to reduce the possibility of adverse consequences according to their perception of the environment and situation (14). However, some people resort to unhealthy reactions to deal with stress factors, which leads to negative consequences. Thus, resilience is one of the important characteristics that helps people control their emotions, cognitions, and behaviors under control over time (15). Resilience is an interactive concept, referring to the ability of people to overcome stress and stay healthy in difficult situations which may make them stronger (16). Research has indicated that increased resilience in adolescents is linked to lower levels of aggression, possibly due to their ability to adapt to stress and manage impulsiveness (9).

A critical psychological factor associated with fostering resilience is self-control (13, 17). Self-control is the capacity to control emotions, urges, or behaviors through a thoughtful evaluation of a stimulus that results in a deliberate and usually non-aggressive action (17). People with a high level of self-control have good communication skills with others (17, 18).

Evidence also has shown that self-regulation is a significant protective factor of resilience (18). Self-regulation means the ability to self-organize, plan, monitor, and revise thoughts, emotions, and behaviors to attain desired outcomes (19, 20). It seems that successful adaptation to challenging situations depends on people learning and knowing how to manage their feelings and emotions, think constructively, and ultimately regulate and direct their behavior and on the environment to act to change or reduce the stressor (21). The concepts of self-regulation and self-control are sometimes used interchangeably, but they are different. While self-regulation is an internal state, self-control is the ability to control responses; thus, self-control could be seen as a part of the self-regulatory repertoire (22). Research indicated that individuals who struggle to regulate their emotions are more

prone to aggressive behaviors and tend to engage in impulsive and risky actions (23-25). The findings showed that self-regulation skills are effective in adjustment to aggression problems (26).

Decision-making process is another factor affecting aggressive behaviors in undesired and stressful situations (12). The two primary methods of decision-making are characterized as deliberative and intuitive. Deliberative decision-making is a slow, controlled, and effortful process and includes computational and analytical thinking, while the intuitive decision-making process is fast, automatic, effortless, and sometimes emotionally charged, and relies on personal memories (27, 28). According to Shin and Kelly, resilience could be linked to the style of decision-making (29).

While many studies have examined the relationship between the above-mentioned psycho-cognitive factors and aggressive behaviors (9-11), no study has investigated the correlation of all of these factors on aggression, especially in adolescents. Therefore, this study aimed to examine the correlation between resilience, self-control, self-regulation, and decision-making style with aggressive behavior in adolescents using SEM. Accordingly, four hypotheses were tested:

Hypothesis 1: Self-regulation has significantly and negatively related to aggressive behavior.

Hypothesis 2: Self-control has significantly and negatively related to aggressive behavior.

Hypothesis 3: Resilience has significantly and negatively related to aggressive behavior.

Hypothesis 4: Decision-making has significantly and negatively related to aggressive behavior.

2. Methods

2.1. Study Design and Participants

In this cross-sectional study conducted in Marvdasht, Southern Iran (2022), 469 female (46.7%) and male (53.3%) students, from the seventh to the twelfth grade participated. The sample size was established according to mean aggression (86.87 ± 25.26) in a previous study (30). Given a 95% significance level, 0.1 margin of error, the sample size was set as 425, using NCSS PASS 15 software.

The inclusion criteria were: students in grades 7 to 12, both male and female, who were willing to participate and had obtained consent from their legal guardians. Participants who did not fill out the questionnaire were not included in the study.

The selection of participants was carried out using a multistage random sampling method. To do so, four schools were chosen at random from a list of fifteen high schools (two boys' and two girls' high schools). Then, in each school, one class from each grade was randomly selected. Therefore, the survey was given to students in grades 7 through 12, with an explanation of the purpose of the study and the signing of an informed consent form before distribution. Participants were assured that their responses would be kept confidential.

2.2. Measures

Data were gathered using a form that asked for demographic characteristics such as grade, gender, parents' level of education (Elementary, Diploma, Academic), parents' employment status (Employee, Unemployed, Retired), and whether the participant lived with their parents, and five standard questionnaires for aggression, resilience, self-control, self-regulation, and decision-making style.

The aggression assessment involved using a 29-item questionnaire adapted from Buss and Perry's aggression scale (31). This tool encompasses four dimensions of aggression (physical, verbal, anger, and hostility). All the items were rated using a 5-point Likert scale (1=does not describe me at all, 5=completely describes me) (e.g., "If I have to resort to violence to protect my rights, I will"). Cronbach's alpha coefficient for 29 items was 0.89 and internal consistency (α) obtained for each subscale was reported as 0.80, 0.76, 0.72, and 0.72 for the factors of physical aggression, verbal aggression, anger, and hostility, respectively (31). The Persian questionnaire has been previously assessed for validity and reliability, with studies confirming its psychometric properties (32). In the present study, Cronbach's alpha was calculated as 0.90 for all items.

Connor-Davidson's 25-item resilience scale was used to measure resilience (33). This scale measures one's ability to cope with stress. Therefore, it is crucial to prioritize addressing anxiety, depression, and stress responses as these can be significant

issues. All components of this scale were scored based on a 5-point scale (0=not true at all to 4=almost always true). (e.g., "Adapt to change"). The Persian version of the questionnaire was validated by Rezaeipandari and colleagues. They reported a content validity ratio (CVR) of 0.85 and a content validity index (CVI) of 0.90 in their study on the scale. Moreover, they reported a Cronbach's alpha coefficient of 0.89 (34). In this study, all items in the scale yielded a Cronbach's alpha of 0.89.

The self-control scale was a 13-item scale designed by Tangney and colleagues. Five-point Likert scale (never-always) was used for scoring (e.g., "I say inappropriate things"). The Cronbach's alpha of the original version of the questionnaire was reported as 0.75 (35). The validity and reliability of the Persian version of this questionnaire have been confirmed by Asgarian and co-workers. The Cronbach's alpha in the present study was 0.73 (36).

The self-regulation questionnaire used in this study was designed by Carey and co-workers. It has 31 items and is scored based on a 5-point Likert scale (strongly disagree to strongly agree) (e.g., "I have trouble making plans to help me reach goals") (37). In a study conducted by Motamed-Jahromi and colleagues, the researchers determined that CVR was 0.84, indicating a high level of agreement among experts regarding the relevance and appropriateness of the content of the study. Additionally, CVI scores were found to be 0.90. Furthermore, the study reported a Cronbach's alpha coefficient of 0.87 (38). A Cronbach's alpha coefficient of 0.76 indicates good internal consistency reliability for the scale used in the present study.

The decision-making style of the participants was assessed by a 19-item scale (39). All the items on this scale were scored on a 5-point Likert scale (completely agree to disagree). Items 1, 3, 5, 7, 8, 9, 10, 11, 12, 15, and 16 of this questionnaire was dedicated to deliberative decision-making, and the rest of the items measured intuitive decision-making. Cronbach's alpha reported the reliability of the tool at 0.76 for the intuitive process and 0.79 for the deliberative process (39). In the Persian version of this scale validated by Alborzi and co-workers, Cronbach's alpha coefficient was reported as 0.79 for the intuitive process and 0.73 for the deliberative process (39). In the present study, Cronbach's alpha coefficient for the deliberative

and intuitive process was obtained at 0.81, and 0.68, respectively.

2.3. Statistical Analyses

The statistical analysis was performed using SPSS version 22. A significance level of less than 0.05 was applied to establish statistical significance. The normal distribution of the variables was assessed using the Kolmogorov-Smirnov test, which revealed that the P values for all variables were more than 0.05. This indicates that the data followed a normal distribution. Frequency-based descriptive statistics were employed to display the demographic details of the participants. This approach offers a succinct and comprehensive overview of demographic attributes, including age, gender, education level, and other pertinent factors. Pearson's correlation analyses were used to identify the correlations between the variables. Linear regression analysis was used to evaluate the relationship between the independent and dependent variables. The fit indexes of the proposed model were evaluated through SEM by AMOS version 24. To assess the fitness of the final model the following fit indices were used: Goodness-of-fit indices such as Chi-Square/Degrees of Freedom Ratio (χ^2/Df), Root Mean Square Error of Approximation (RMSEA), Goodness-of-Fit Index (GFI), Comparative Fit Index (CFI), and Incremental Fit Index (IFI). Figure 1 depicts a conceptual framework for this study.

3. Results

Both female (46.7%) and male (53.3%) students participated in the study. The mean age of female and male participants was 15.32 ± 1.72 and 15.61 ± 1.75 years, respectively. Most of the participants' parents had elementary education (46.9%). About 83% of students' fathers were employed and 88% of their mothers were housewives. Twelve percent of participating students had a smoking experience at least once. More details on demographic variables

are shown in Table 1.

Table 2 shows the correlation between the variables being studied and aggressive behavior to determine which variables to include in the path model. The results revealed significant negative correlations between self-regulation ($r = -0.577$, $P < 0.001$), self-control ($r = -0.962$, $P < 0.001$), resilience ($r = -0.984$, $P < 0.001$), and deliberative decision-making style ($r = -0.571$, $P < 0.001$) with aggressive behavior. However, there was no significant correlation found for intuitive decision-making style.

Table 1: Demographic characteristics of the population (n=469)

Characteristics	n (%)
Sex	
Female	219(46.7)
Male	250 (53.3)
Grade (n, %)	
Seventh	65 (13.7)
Eighth	72(15.4)
Ninth	76 (16.2)
Tenth	75 (16)
11th	87 (18.6)
12th	94 (20)
Father's education level	
Elementary	220 (46.9)
Diploma	205 (43.6)
Academic	44 (9.4)
Mather's education level	
Elementary	217 (46.3)
Diploma	211(45)
Academic	41(8.7)
Father's job	
Employee	388 (82.7)
Unemployed	48 (10.2)
Retired	33 (7)
Mather's job	
Employee	54 (11.5)
Unemployed	413 (88.1)
Retired	2 (0.4)
Living with parents	
Yes	431 (91.9)
No	38 (8.1)

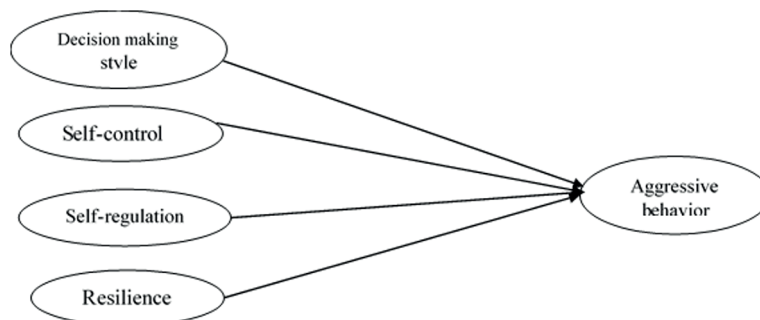


Figure 1: The figure shows the conceptual path model (Primary).

Table 2: Pearson correlation coefficients between variables (n=469)

Variable	Mean (SD)	1	2	3	4	5	6
1. Aggressive behavior	101.03 (14.76)	1					
2. Self-regulation	103.94 (11.26)	-0.577**	1				
3. Resilience	62.58 (11.98)	-0.984**	0.571**	1			
4. Self-control	48.36 (8.28)	-0.962**	0.528**	0.916**	1		
5. Deliberative decision making	40.96 (6.42)	-0.571**	0.975**	0.569**	0.524**	1	
6. Intuitive decision making	22.11 (3.96)	0.079	-0.033	-0.078	-0.064	0.001	1

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

Table 3: Linear regression analysis of the association between independent variables and aggressive behavior

Variables	Unstandardized coefficients		Standard B	t	P value
	B	SE			
Self-regulation	-0.083	0.026	-0.062	-3.158	0.002
Resilience	-0.973	0.017	-0.633	-57.431	<0.001
Self-control	-0.721	0.021	-0.373	-35.132	<0.001
Deliberative decision making	0.081	0.035	0.045	2.295	0.022
Intuitive decision making	0.012	0.016	0.003	0.719	0.473

Adjusted R²=0.982 P<0.001

SE: Standard Error

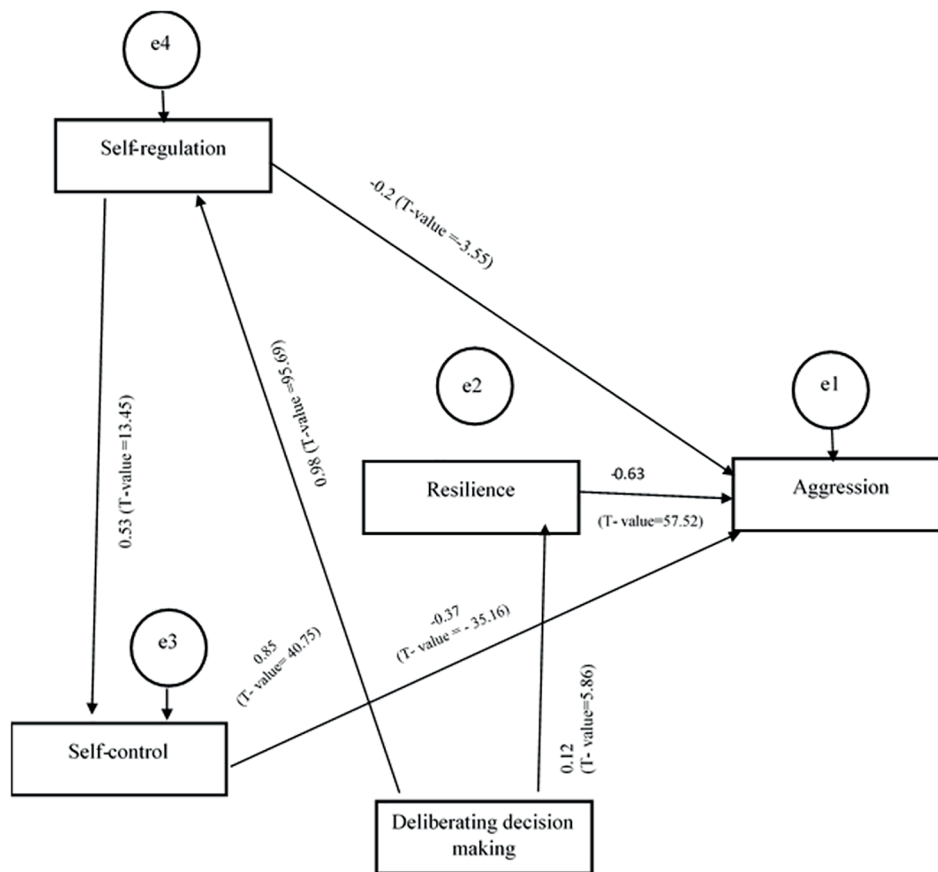


Figure 2: The figure shows the standardized estimates of parameters for the ultimate model.

It is noteworthy that resilience, and self-control exhibited strong negative correlations with aggressive behavior. All the correlations were significant at the 0.01 level.

Table 3 shows the results of the linear regression analysis, revealing a significant association between independent variables and aggressive behavior. Notably, resilience emerged as the most

related variable with aggressive behavior ($\beta = -0.633$, $P < 0.001$).

The results of the structural equation modeling analysis indicated that self-regulation, self-control, resilience, and deliberative decision-making have negative effects on aggressive behavior with standardized total effects of -0.500, -0.912, -0.632, and -0.565, respectively. However, intuitive decision-making was not included in the model (Figure 2). The model fit indices indicated the acceptable final model fit ($\chi^2 / df = 2.431$, $P = 0.063$, $GFI = 0.994$, $AGFI = 0.969$, $CFI = 0.999$, $NFI = 0.989$, $RMSEA = 0.055$).

4. Discussion

The results of this study provided valuable perspectives on the correlation of resilience, self-control, self-regulation, and decision-making style on adolescents' aggressive behavior. The results supported the hypotheses that self-regulation, self-control, resilience, and decision-making style have direct negative and significant relationships aggressive behavior in adolescents.

Firstly, it is evident that individuals with higher levels of regulation exhibit lower levels of aggression. This suggests that the ability to organize thoughts and emotions contributes to reduced aggressive behaviors. Moreover, individuals with strong-control skills tend to engage in thoughtful evaluation before taking actions, leading to a decrease in impulsive and potentially aggressive. This finding has been confirmed by other studies (10, 40).

Furthermore, the study demonstrated a negative relationship between resilience and aggression among adolescents, which was similar to the findings of Mojrian and colleagues (9). This underlines the importance of adaptive coping strategies in mitigating aggression challenging situations. Teenagers with greater resilience are more apt to effectively navigate stress and maintain control (16).

Additionally, the findings emphasized the significance of decision-making processes in relation to aggressive behaviors. The study indicated that individuals who engage in deliberative decision-making processes are less likely to exhibit aggressive tendencies than those who rely on intuitive decision-making styles driven by emotion or memories

(12). Overall, these results highlighted key psychocognitive factors that play crucial roles in shaping behavior. Understanding these factors can inform effective prevention and intervention strategies to reduce aggression. The results of this study did not align with the conclusions of previous research.

4.1. Limitations

The strength of this study lied in its inclusion of both boys and girls from 7th to 12th grades, making its results more generalizable. However, the cross-sectional nature of the study suggested that the relationships observed cannot be considered causal. Another limitation was that the study only focused on adolescents. Future research should employ longitudinal designs to establish causal relationships between psychological factors and aggressive behavior, helping to determine if improvements in resilience and self-control lead to reduced aggression over time. Schools should consider implementing programs that promote emotional resilience and self-regulation among students. Designing workshops and activities designed to enhance these skills may help mitigate aggressive tendencies in school settings.

5. Conclusions

Our findings indicated that aggressive behavior can be associated with all variables, with the exception of intuitive decision-making. The two factors with the lowest P values in the study were resilience and self-control, indicating that they have a stronger correlation with aggression compared to other variables. It is crucial to take this into account when devising methods to diminish and manage aggressive behavior.

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Authors' Contribution

Mohammad Hossein Kaveh: Conducted literature reviews, assisted in data interpretation, and review the manuscript for clarity and coherence. Elahe Zare: Provided substantial input into the study's design and conceptual framework,

including data collection, analysis, interpretation, and critical review of the manuscript. Leila Ghahremani: Contributed to data analysis and interpretation, manuscript drafting, and critical reviews. Mahin Nazari: Engaged in evaluating and interpreting project data, drafting the manuscript, and conducting critical reviews. Masoud Karim: Made significant contributions to the conceptualization and design of the study, data acquisition, analysis, and interpretation, as well as drafting and critically reviewing the manuscript. All authors have reviewed and approved the final manuscript and take responsibility for all aspects of the work, including questions regarding the accuracy or integrity of any part.

Conflict of interests: None declared.

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Ethical Approval

The study was approved by the ethics committee of the Shiraz University of Medical Sciences with the code of IR.SUMS.SCHEANUT.REC.1401.051 and also was conducted in accordance with the principles of the Declaration of Helsinki. Before completing the questionnaire, the students and their parents signed the informed consent form. It should be noted that the questionnaires were anonymous and the students participated in the study voluntarily with no force in completing the questionnaires. They were ensured that the data would only be analyzed and reported collectively too.

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