

# Rejection Sensitivity and Non-Suicidal Self-Injury among In-School Adolescents: Chain Mediation of Bullying Victimization and Loneliness

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**Submitted:** 21 November 2025

**Accepted:** 4 January 2026

Int J Behav Sci. 2026; 19(4): 197-204

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## Abstract

**Introduction:** In the present study, the relationship between rejection sensitivity and Non-Suicidal Self-Injurious (NSSI) behaviors has been documented. However, few studies have examined the mechanisms leading to NSSI. This study tested whether bullying victimization and loneliness function as serial mediators of the association between rejection sensitivity and NSSI among in-school adolescents.

**Method:** A total of 300 students (161 girls, 139 boys; ages 13-16; grades 7-9) in Birjand, Iran were selected through convenience sampling. Participants completed Persian-validated versions of the Rejection Sensitivity Questionnaire (RSQ), the Olweus Bully/Victim Questionnaire (OBVQ), the Social and Emotional Loneliness Scale for Adults (SELSA), and the Self-Harm Inventory (SHI). Mediation analyses were conducted using SPSS and Hayes' PROCESS macro.

**Results:** The direct effect of rejection sensitivity on NSSI was not significant ( $\beta = 0.02$ , 95% CI: -0.001 to 0.055), while the total indirect effect was significant ( $\beta = 0.13$ , 95% CI: 0.07 to 0.20). Specifically, rejection sensitivity influenced NSSI indirectly via bullying victimization ( $\beta = 0.08$ , 95% CI: 0.04 to 0.146), accounting for 64.9% of the total indirect effect. The pathway through loneliness alone was non-significant ( $\beta = 0.02$ , 95% CI: -0.006 to 0.05), whereas the serial mediation pathway was significant ( $\beta = 0.02$ , 95% CI: 0.009 to 0.04), representing 17.2% of the total indirect effect.

**Conclusion:** These findings indicate that adolescents with heightened rejection sensitivity are more vulnerable to peer victimization, which can increase feelings of loneliness and subsequently elevate the risk of NSSI. The results underscore the importance of implementing school-based anti-bullying programs, strengthening supportive peer relationships, and providing targeted socio-emotional interventions for students who exhibit rejection sensitivity.

**Keywords:** Adolescence, Rejection Sensitivity, Non-Suicidal Self-Injury, Bullying Victimization, Loneliness

## Introduction

Adolescence is a critical developmental period characterized by heightened interpersonal sensitivity [1], during which Non-Suicidal Self-Injury (NSSI) can occur. NSSI is most commonly defined as the direct and deliberate destruction of one's own body tissue without suicidal intent and for purposes not socially sanctioned, such as cutting, burning, or hitting oneself [2, 3]. Key risk factors for NSSI include primary vulnerabilities with strong empirical support, such as mental disorders, adverse childhood experiences [4], and emotion dysregulation [5], as well as secondary contributors like lack of social support [6]. Notably, rejection sensitivity has emerged as a significant vulnerability [7, 8].

Rejection sensitivity refers to the cognitive-affective disposition to anxiously expect, readily perceive, and intensely react to cues of interpersonal rejection [9]. Individuals high in rejection sensitivity are more likely to interpret ambiguous social interactions as rejecting

and to respond with heightened emotional and behavioral reactions [10]. During adolescence, developmental shifts in neuro-affective systems and pubertal changes amplify the salience of rejection cues, making rejection sensitivity especially potent in social navigation [11]. Theoretical frameworks such as interpersonal models of NSSI [3] and emotion regulation perspectives [12] suggest that adolescents who perceive frequent or intense social rejection may engage in non-suicidal self-injurious behaviors as a maladaptive strategy to regulate negative affect, reduce interpersonal distress, or communicate their emotional pain to others.

Empirical evidence indicates that adolescents with higher rejection sensitivity are at greater risk for self-injurious behavior, often through social anxiety, depressive symptoms, or interpersonal stress [7, 8]. However, the direct association is inconsistent, suggesting that mediating or moderating factors may influence this relationship. It appears that contextual factors, such as experiences of peer victimization, may help explain how rejection sensitivity translates into self-injurious behaviors. Bullying victimization, in particular, represents a salient social stressor during adolescence that may exacerbate feelings of rejection and intensify the risk of NSSI.

Bullying victimization, defined as repeated peer aggression involving a power imbalance, can take physical, verbal, relational, or cyber forms and is linked to negative psychosocial outcomes in adolescents [13-16]. Theoretical models, including Bronfenbrenner's Social-Ecological Model and Integrated Theoretical Model of NSSI, suggest that adolescents with high rejection sensitivity may perceive bullying as personal rejection, intensifying emotional distress and increasing the risk of NSSI as a maladaptive coping strategy [17, 18]. Although studies have shown independent associations between rejection sensitivity, bullying victimization, and NSSI [8, 19], few have directly examined victimization as a mediating mechanism. Related research indicates that peer victimization mediates the link between interpersonal vulnerabilities, such as emotion dysregulation or alexithymia, and NSSI [20], supporting the rationale for examining bullying victimization as a potential mediator between rejection sensitivity and NSSI. Loneliness, defined as the distress arising from a perceived gap between desired and actual social relationships [21], may help explain the link between rejection sensitivity and NSSI. It develops through directional pathways such as social skill deficits, low self-worth, limited peer acceptance, lack of belonging, victimization, and heightened interpersonal sensitivity, which amplify the impact of rejection sensitivity [22-27]. Adolescents high in rejection sensitivity tend to interpret ambiguous social cues as exclusion, leading to social disconnection and increasing loneliness [28]. Loneliness, in turn, contributes to maladaptive emotion regulation and greater psychological distress [29, 30], both of which increase the risk of NSSI [31]. Together, these pathways suggest a mechanistic cascade whereby rejection sensitivity amplifies loneliness, forming a psychosocial route to self-injurious behaviors in adolescents.

Victimization contributes to adolescent loneliness through both social and affective mechanisms [32]. Social-ecological theory emphasizes that peer relationships are crucial for adolescents' sense of belonging, and being targeted disrupts these bonds, fostering social isolation [17]. Empirical evidence consistently shows that victimized youth report higher levels of loneliness than their non-victimized peers [33-35]. Longitudinal research indicates that victimization, including bullying, is a strong predictor of loneliness, even after controlling for family factors [25]. Cross-sectional studies further reveal positive associations between both overt and relational victimization and loneliness [36], and nationally representative data confirm graded relationships between face-to-face and cyberbullying and the frequency of loneliness [37]. Collectively, these findings suggest that repeated peer aggression undermines social connectedness and amplifies adolescents' subjective experience of loneliness.

The purpose of this study was to examine whether bullying victimization and loneliness sequentially mediate the relationship between rejection sensitivity and NSSI among in-school adolescents. This model is grounded in the Interpersonal Theory of Suicide [38], adapted here for NSSI to emphasize pain regulation and belongingness deficits rather than lethal intent. Adolescents with heightened rejection sensitivity are more likely to perceive and internalize peer victimization as rejection, reducing their sense of belonging and increasing loneliness. Thus, bullying victimization and loneliness were hypothesized to function as chain mediators linking rejection sensitivity to NSSI. While prior research has examined individual associations [36, 39, 40], the sequential pathway remains underexplored, and this study aims to address that gap.

## Method

The present study was basic in purpose and employed a descriptive–correlational, cross-sectional design, which allows examination of associations but does not establish causal direction. The target population consisted of male and female junior high school students enrolled in seventh, eighth, and ninth grades who were actively attending school during data collection and able to provide informed consent. Consistent with recommendations for detecting indirect effects with adequate statistical power (approximately 80% for small-to-moderate pathways) [41], a total of 300 students were recruited to enhance generalizability and account for possible attrition. A convenience sampling strategy was adopted due to practical constraints, including limitations in accessibility, time, and resources. Eligibility criteria included active enrollment in grades seven to nine, sufficient language proficiency to understand and complete the study instruments, and the ability to provide informed consent. Students were excluded if they exhibited severe cognitive or developmental impairments that interfered with task comprehension, or if they were experiencing acute psychiatric conditions (e.g., active psychosis or clinically significant suicidal ideation), based on a brief mental health screening conducted by the

school counselor prior to participation. Ethical principles were rigorously observed. Informed consent was obtained from both students and their parents. Participation was voluntary, with the right to withdraw at any point without consequence. Confidentiality was safeguarded through anonymized data coding and secure storage. Given the sensitive focus on NSSI and bullying, students were informed of counseling services for additional support. The study adhered to the Declaration of Helsinki, ensuring participants' rights, dignity, and welfare were fully respected. Data analysis was performed using SPSS version 26.0. Descriptive statistics summarized demographic and study variables. Pearson correlations examined associations among key constructs, and Hayes' PROCESS macro (Model 6) tested the hypothesized serial mediation model. Bootstrapping with 5,000 resamples was used to estimate indirect effects and generate 95% bias-corrected confidence intervals.

The tools used in this study were as follows:

**Rejection Sensitivity Questionnaire (RSQ):** This questionnaire was developed by Downey and Feldman (9) to assess individual differences in the tendency to anxiously expect, readily perceive, and intensely react to potential rejection. The RSQ consists of 18 hypothetical interpersonal scenarios, each presented in two parts. In the first part, respondents rate the degree of anxiety or concern they would experience in the given situation. In the second part, they indicate the perceived likelihood of acceptance or rejection by the other person involved (e.g., *You ask a friend to do you a big favor. How concerned or anxious would you be about whether he/she would agree? How likely do you think it is that your friend would agree to help you?*). Responses are scored on a six-point Likert scale, and rejection sensitivity scores are computed by multiplying expectancy of rejection by anxiety ratings across items. The RSQ has shown strong psychometric properties, with the original study reporting a Cronbach's alpha of 0.83, supporting its internal consistency and construct validity across diverse populations. In the Persian adaptation, the RSQ demonstrated satisfactory convergent validity through its positive correlations with measures of worry and acceptable divergent validity via its negative correlations with self-esteem scales. The instrument also showed good internal consistency, with a Cronbach's alpha of 0.84 [42]. In the current study, the Cronbach's alpha was 0.70.

**Olweus Bully/Victim Questionnaire (OBVQ):** The original version of this self-report questionnaire was developed by Dan Olweus in 1986 and revised in 1996 to assess experiences of bullying and victimization among school-aged children [43]. The questionnaire has been widely used internationally and includes 10 items measuring different forms of bullying, such as verbal, physical, relational, and, in more recent adaptations, cyberbullying. Respondents indicate the frequency of their experiences on a 5-point Likert scale ranging from (1) "It has not happened to me at school in the past two months" to (5) "Several times a week." The OBVQ has demonstrated strong psychometric properties across multiple studies, with Cronbach's alpha coefficients

typically reported above 0.80, indicating high internal consistency [44]. The Persian version of the OBVQ was validated by Rezapour et al. [45] among Iranian middle school students. Reliability analyses indicated acceptable internal consistency, with Cronbach's alpha reported as 0.80 for the victimization scale. The Cronbach's alpha for victimization was notably high at 0.86.

**Adult Social and Emotional Loneliness Scale (SELSA):**

The Adult Social and Emotional Loneliness Scale (SELSA) was developed by DiTomaso et al. [46]. The original version consists of 15 items, assessing three subscales: romantic loneliness (five items), family loneliness (five items), and social loneliness (five items). Emotional loneliness is derived from the combined scores of the romantic and family subscales, whereas social loneliness reflects difficulties in forming or maintaining broader social relationships. Items are rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating greater loneliness. Psychometric evaluations in the original study confirmed its construct validity and internal consistency, with Cronbach's alpha values ranging from 0.78 to 0.92 across subscales [46]. In Iran, Jokar and Salimi [47] validated a 14-item Persian version after excluding one item with weak loading, supporting its factorial structure and discriminant validity in adolescents. Consistent with prior research, emotional (romantic + family) and social subscales were aggregated to form a total loneliness score used in the present analysis, reflecting a unified measure of perceived social disconnection. Reliability was also supported, with Cronbach's alpha coefficients reported as 0.92 for romantic loneliness, 0.84 for family loneliness, and 0.78 for social loneliness [47]. Loneliness demonstrated strong reliability, with a Cronbach's alpha of 0.87.

**Self-Harm Inventory (SHI):** The Self-Harm Inventory (SHI) is a 22-item self-report questionnaire designed to assess a broad range of self-destructive behaviors. Each item requires a dichotomous response (yes/no) regarding the occurrence of specific behaviors, such as cutting, burning, or overdosing. The total score is the sum of endorsed items, with higher scores indicating a greater variety of self-harming behaviors [48]. The SHI has demonstrated satisfactory psychometric properties in its original development study. Internal consistency, as assessed by Cronbach's alpha, was reported at 0.83, indicating good reliability across the 22 items. Test-retest reliability over a two-week interval yielded a coefficient of 0.81, supporting the temporal stability of the instrument. Construct validity was examined through correlations with measures of borderline personality disorder traits, with higher SHI scores observed among participants meeting criteria for borderline personality disorder, providing evidence for criterion-related validity. Additionally, a cutoff score of 5 or more successfully distinguished individuals with borderline personality disorder, with 83.7% of the identified cases correctly classified [48]. In the present study, the Cronbach's alpha for self-harm was 0.87.

## Results

Participants' mean age was 14.38 years ( $SD = 0.69$ ), ranging from 13 to 16 years. Of the total sample, 53.7% ( $n = 161$ ) were female. In terms of grade level, 76.7% ( $n = 230$ ) were ninth graders and 23.3% ( $n = 70$ ) were eighth graders. No significant differences were observed across grade levels on the key variables, as confirmed by the ANOVA results. Prior to analysis, the dataset was screened for missing values, which were subsequently imputed using the mean. Univariate outliers were assessed via box plots, revealing two outliers for the bullying victimization variable and three for non-suicidal self-injurious behaviors; no outliers were detected for the remaining variables. Scores exceeding these thresholds were adjusted by adding two standard deviations to the respective means. Multivariate outliers were evaluated using Mahalanobis distances, with significance determined through a chi-square test at  $p < 0/001$ , based on the number of predictor variables [49]. This procedure identified three cases with Mahalanobis distances exceeding the critical value of 16.27, which were subsequently excluded from the analysis.

The statistical assumptions required for testing the serial mediation model were systematically evaluated. Examination of univariate normality indicated acceptable skewness and kurtosis values for all study variables, consistent with recommended thresholds [50]. Multivariate normality was assessed through standardized residuals and the Kolmogorov–Smirnov test, which supported the assumption of normality ( $Z = 0.04$ ,  $df = 297$ ,  $p > 0.05$ ). Potential common method bias was evaluated using Harman's single-factor test, which showed that the first factor accounted for 16.82% of the variance, well below the 50% threshold, thereby indicating no serious bias. Multicollinearity diagnostics further supported the robustness of the data. Tolerance values for the predictor variables ranged from 0.82 to 0.90, and variance inflation factors (VIFs) were between 1.11 and 1.22, both within the acceptable ranges [51]. The assumption of independence of errors was also

confirmed, as the Durbin–Watson statistic was 1.98, falling within the recommended interval of 1.5 to 2.5 [52]. Collectively, these results demonstrated that the data met the necessary assumptions for conducting mediation analysis.

Descriptive statistics for all study variables are presented in Table 1.

As presented in Table 1, all study variables were significantly correlated ( $p < 0.01$ ). Among these associations, bullying victimization demonstrated the strongest correlation with non-suicidal self-injurious behaviors ( $r = 0.41$ ,  $p < 0/01$ ). Out of the total sample, 115 participants (38.7%) reported experiencing victimization at least two to three times per month. Regarding the specific forms of victimization, the prevalence rates were 30.0% for verbal victimization, 18.2% for social victimization, 10.4% for physical victimization, and 9.4% for cyber victimization.

The serial mediation model was tested using Hayes' PROCESS macro (Model 6) in SPSS. As shown in Table 2, rejection sensitivity was a significant positive predictor of bullying victimization ( $\beta = 0.29$ ,  $p < 0.001$ ). Victimization, in turn, significantly predicted NSSI ( $\beta = 0.29$ ,  $p < 0.001$ ). These results suggest that adolescents with higher rejection sensitivity were more likely to experience victimization, which subsequently increased their likelihood of engaging in self-injurious behaviors. The direct effect of rejection sensitivity on NSSI was not statistically significant ( $\beta = 0.10$ ,  $p > 0.05$ ), indicating that its influence operated primarily through indirect pathways. Likewise, rejection sensitivity was not a significant predictor of socio-emotional loneliness ( $\beta = 0.09$ ,  $p > 0.05$ ). In contrast, loneliness was significantly associated with NSSI ( $\beta = 0.24$ ,  $p < 0.001$ ), suggesting its independent role as a risk factor. Finally, victimization significantly predicted loneliness ( $\beta = 0.33$ ,  $p < 0.001$ ), supporting its mediating role between rejection sensitivity and self-injurious behaviors. Figure 1 presents the path model with the estimated coefficients.

**Table 1. Descriptive Statistics and Correlation between Study Variables**

Variable	1	2	3	4
1. Rejection Sensitivity	1			
2. Victimization	0.30**	1		
3. Loneliness	0.19**	0.36**	1	
4. Non-suicidal self-injury	0.24**	0.41**	0.37**	1
Mean	48.32	6.19	28.85	4.23
Standard Deviation	15.63	6.81	9.79	4.19

\*\* $P < 0.01$

**Table 2. Standardized Regression Weights for Predicting NSSI**

Regression Equation (N = 297)		Fit Indicator			Coefficient and Significance	
Outcome Variable	Predictor Variables	R	R <sup>2</sup>	F	$\beta$	t
Victimization	Rejection Sensitivity	0.29	0.08	28.27	0.29***	5.31
	Loneliness	0.37	0.13	23.44	0.09	1.66
Non-suicidal self-injury	Victimization	0.23	0.05	17.55	0.33***	5.85
	Rejection Sensitivity	0.23	0.05	17.55	0.23***	4.18
Non-suicidal self-injury	Rejection Sensitivity				0.10	1.91
	Victimization	0.48	0.23	30.21	0.29***	5.26
	Loneliness				0.24***	4.39

\*\*\* $p < 0.001$

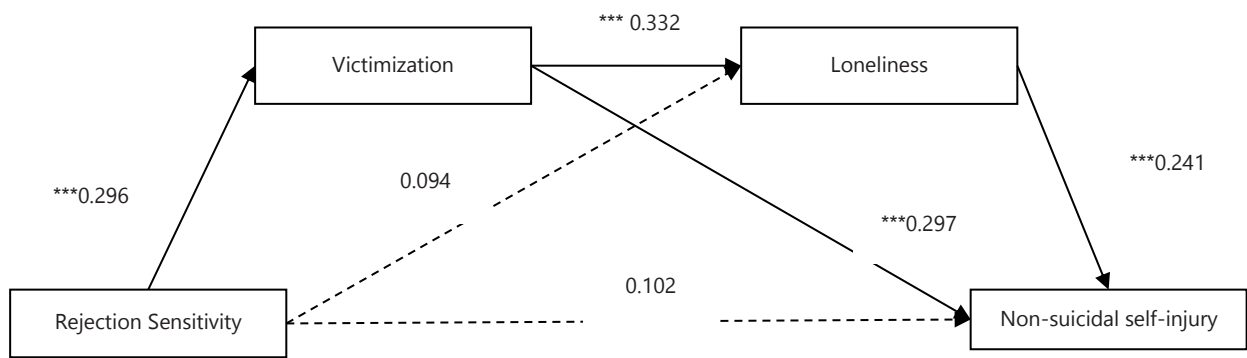


Figure 1. Model predicting NSSI.

Table 3. The Total, Direct, and Indirect Effects

	Effects	Boot SE	Boot LLCI	Boot ULCI
Total effect	0.06	0.01	0.03	0.09
Direct effect	0.02	0.01	-0.0008	0.05
Total indirect effect	0.13	0.03	0.07	0.20
Indirect effect 1	0.08	0.02	0.04	0.14
Indirect effect 2	0.02	0.01	-0.006	0.05
Indirect effect 3	0.02	0.008	0.009	0.04

Note: Boot SE indicates the standard error, and Boot LLCI and Boot ULCI denote the lower and upper bounds, respectively, of the 95% confidence intervals for the indirect effects as estimated by the bootstrap method. Indirect effect 1: rejection sensitivity → victimization → self-injury; indirect effect 2: rejection sensitivity → loneliness → self-injury; indirect effect 3: rejection sensitivity → victimization → loneliness → self-injury

Bootstrap analyses were conducted with 5,000 resamples to test the indirect effects, and the results are presented in Table 3. The findings indicated that bullying victimization and loneliness fully mediated the relationship between rejection sensitivity and NSSI. Three specific indirect pathways were identified. First, rejection sensitivity had a significant indirect effect on NSSI through bullying victimization, which accounted for 64.92% of the total indirect effect. Second, the indirect pathway from rejection sensitivity to NSSI through loneliness alone was not significant. Third, a significant serial mediation pathway was observed, such that rejection sensitivity predicted bullying victimization, which in turn predicted loneliness, and this sequence significantly predicted NSSI. This indirect pathway accounted for 17.16% of the total indirect effect.

**Discussion**

This study examined whether victimization and loneliness mediated the association between rejection sensitivity and NSSI. The findings showed that the direct effect of rejection sensitivity on NSSI was not significant, consistent with prior research showing that the relationship is often indirect rather than direct [7, 8]. According to the Interpersonal Theory of Suicide [38], proximal interpersonal stressors, such as peer victimization, and intrapersonal factors, such as loneliness, serve as key mechanisms linking vulnerability factors to self-injury. Adolescents with high rejection sensitivity may interpret ambiguous social interactions as rejection, increasing their risk of peer victimization, which in turn fosters loneliness and emotional distress, ultimately elevating the

likelihood of engaging in NSSI. These findings emphasize the importance of considering indirect pathways and multiple psychosocial processes when examining risk factors for adolescent self-injury.

The results indicated that victimization functioned as a significant independent mediator in the association between rejection sensitivity and NSSI. This outcome is consistent with prior research that has documented the link between rejection sensitivity and victimization [53], as well as the association between victimization and NSSI [54]. Theoretically, according to the Rejection Sensitivity Model [9], adolescents who are highly rejection-sensitive interpret ambiguous peer behaviors as hostile, increasing their vulnerability to victimization. These adverse peer experiences, in turn, trigger self-injurious behavior as a maladaptive emotion regulation strategy, consistent with the Affect Regulation Model of NSSI [3]. In collectivist cultural settings such as Iran, the value placed on maintaining social reputation and family honor can heighten adolescents' emotional responses to perceived rejection. From this perspective, when peer interactions feel dismissive or excluding, the experience may carry added interpersonal weight, making hostile interpretations of ambiguous social cues more likely. This heightened sensitivity could, in turn, increase vulnerability to peer victimization and its psychological consequences. Another finding was that loneliness did not play a significant independent mediating role in the relationship between rejection sensitivity and NSSI. This finding is consistent with studies showing that loneliness often exerts its influence indirectly or in interaction with other risk factors rather than as a standalone mediator [55]. From a theoretical perspective, interpersonal models of NSSI [3] suggest that experiences of rejection may contribute to self-injurious behaviors primarily when combined with additional interpersonal stressors, such as bullying victimization, rather than through loneliness alone. Loneliness may amplify vulnerability but may not directly account for NSSI without the presence of acute

external triggers, supporting the view that indirect pathways better explain the association between rejection sensitivity and NSSI.

The present study found that the relationship between rejection sensitivity and NSSI was fully and serially mediated by victimization and loneliness. This pathway can be understood through established theoretical perspectives. Rejection sensitivity, increases the likelihood of hostile attribution biases and maladaptive responses in peer interactions [9]. Such patterns may elicit negative reactions from peers, thereby elevating the risk of being targeted for victimization [28]. Victimization, in turn, contributes to social withdrawal and erosion of perceived belongingness, which are core antecedents of loneliness [56]. Loneliness has been linked to social isolation, depression, and anxiety [57, 58], all of which may increase vulnerability to maladaptive coping strategies such as NSSI [59]. From an interpersonal perspective [1], experiences of exclusion and loneliness amplify psychological pain, which adolescents may attempt to regulate through self-injurious behaviors. Thus, the serial mediation observed in this study highlights how rejection sensitivity indirectly fosters NSSI through a cascading process involving peer victimization and the development of loneliness.

## Conclusion

This study investigated the serial mediating roles of bullying victimization and loneliness in the relationship between rejection sensitivity and NSSI among in-school adolescents. Results indicated that rejection sensitivity indirectly influenced NSSI through increased victimization and subsequent loneliness, highlighting the complex interpersonal mechanisms underlying self-injurious behaviors. Strengths include the use of a serial mediation model that integrates peer relational and emotional processes. Limitations involve the cross-sectional design, reliance on self-report measures, convenience sampling, and the lack of control for contextual factors such as socioeconomic status. Future studies should use longitudinal designs, multi-informant measures, and probabilistic sampling to improve causal inference and generalizability. Controlling for contextual factors, such as socioeconomic status, could clarify their role in NSSI. Despite these constraints, the findings provide theoretical support for interpersonal and developmental models emphasizing peer rejection and social disconnection. Practically, the results underscore the importance of school-based interventions targeting bullying, social isolation, and emotion regulation to reduce adolescents' risk for NSSI.

## Conflict of Interest

The author declares no conflicts of interest.

## Ethical Approval

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Participation was voluntary, and informed written consent was obtained from all participants and their parents or legal guardians. Measures were taken to ensure confidentiality, anonymity,

and the psychological well-being of all participants throughout the research process.

## Declaration of Generative AI and AI-Assisted Technologies

During the preparation of this manuscript, generative AI tools (ChatGPT, OpenAI, 2025) were used solely for language editing, paraphrasing, and improving clarity. The final content was reviewed and edited by the author to ensure accuracy, scientific rigor, and integrity. The author takes full responsibility for the content of the final manuscript.

## Acknowledgment

The author sincerely thanks all participating students, their parents, and the school staff for their cooperation in this study.

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