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The Mediating Role of Stress and Loneliness in the Relationship Between Peer Bullying and Quality of Life in Adolescents

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Abstract

Objective

This study aims to investigate the mediating roles of perceived stress and loneliness in the relationship between peer victimization and quality of life in adolescent students.

Method

Employing a quantitative research design based on a relational survey model, the study was conducted with data obtained from 471 adolescents (266 male, 205 female; mean age = 13.96 ± 2.15). Data were collected using a Personal Information Form, the Peer Bullying Scale, the Perceived Stress Scale, the UCLA Loneliness Scale (Short Form), and the KIDSCREEN-27 (13–18 years adolescent form). Data were analyzed using IBM SPSS and Hayes' PROCESS Macro (Model 4) to perform mediation analyses.

Results

The findings revealed that peer victimization significantly exacerbates issues affecting quality of life. Furthermore, perceived stress and loneliness were found to have significant and partial parallel mediating effects on the relationship between peer victimization and quality of life. Notably, loneliness was identified as a more powerful psychosocial mechanism in diminishing quality of life during the process of peer victimization.

Conclusion

The results indicate that peer victimization is not merely a behavioral issue but a multidimensional risk factor threatening the psychological well-being of adolescents. The study emphasizes the importance of integrating stress management and the strengthening of social support networks into school-based psychological intervention programs aimed at mitigating these risk factors.

Introduction

Adolescence is a critical transitional period characterized by rapid and profound biological, cognitive, emotional, and social transformations, during which identity formation takes shape. In this phase, peer relationships gain central importance as individuals move beyond the family unit, establishing more intensive and decisive interactions with their peer groups (Deng et al., 2023). However, the peer environment is not always supportive; "peer bullying," which manifests as intentional and repeated aggressive behaviors based on power imbalances, emerges as a significant concern. Peer bullying is defined as intentional, repetitive, and harmful behaviors directed by a student or group of students toward a peer who is perceived as weaker (Olweus, 1994; Gökkaya & Tekinsav Sütcü, 2020). Emerging in physical, verbal, and social/relational forms, bullying is a prevalent phenomenon at the international level. According to OECD PISA 2018 data, approximately 24% of students in Turkey reported being bullied at least a few times a month (OECD, 2019). Talu and Gümüş (2022), in their meta-analytic study on the prevalence of peer bullying among adolescents, found that in a sample of 8,221 individuals, adolescents were bullied and engaged in bullying behavior at least twice throughout the academic year.

Peer bullying is not merely an immediate school-related problem but a phenomenon that leaves deep and lasting traces on an individual's general health and well-being. Quality of life refers to individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns. It is a multidimensional construct complexly linked to physical health, psychological status, level of independence, social relationships, personal beliefs, and salient features of the environment (WHO, 2020). The negative effects of bullying victimization on quality of life weaken an individual's physical, emotional, and social functioning through both direct and indirect pathways. Ding and Zhang (2022), in their study of 1,278 adolescents, revealed that bullying victimization not only directly impairs quality of life but also maintains this effect through mediating mechanisms such as internet addiction and social withdrawal. Similarly, Deng et al. (2023) stated that peer victimization negatively affects quality of life, while resilience and past experiences serve as protective factors in this relationship.

The impact of bullying on quality of life is shaped by various intervening psychological processes, with stress being foremost among them. According to the Stress Process Theory developed by Pearlin et al. (1981), negative life events to which individuals are exposed trigger psychological stress responses, and these stress processes lead to adverse consequences for health and well-being over time. In this context, peer bullying can be considered a significant chronic source of stress for adolescents. Constant exposure to threats, rejection, and

negative social experiences increases individuals' stress levels, thereby adversely affecting their psychological adjustment and quality of life. Therefore, it is hypothesized that perceived stress may constitute a significant psychological mechanism in the relationship between peer bullying and quality of life. Peer bullying victimization is a significant source of life stress that triggers chronic stress responses in adolescents. In their study with adolescents aged 14–15, Mikkelsen et al. (2020) found that health-related quality of life is strongly and negatively associated with stress; they identified stress as one of the most decisive predictors of quality of life, alongside self-esteem and self-efficacy. According to Forsberg and Thorvaldsen (2022), anxiety and loneliness are also critical factors that diminish quality of life.

Alongside stress, loneliness also emerges as a key mediator in the relationship between bullying and quality of life. According to the Belongingness Theory by Baumeister and Leary (1995), individuals possess a fundamental need for persistent and positive social relationships. Peer acceptance and the sense of belonging are among the primary determinants of psychosocial development, particularly during adolescence. Peer bullying threatens an individual’s need for acceptance and belonging, potentially increasing feelings of social exclusion and loneliness. The weakening of social bonds and the reduction of support resources negatively impact the individual's psychological well-being and quality of life. Therefore, it is posited that loneliness is one of the significant psychosocial mechanisms explaining the negative effects of peer bullying on quality of life. Loneliness is a state of "social disconnection"—experiencing a qualitative and quantitative mismatch between the social relationships an individual desires and those they possess, which has physical, psychological, and social consequences for general health (Warren, 2026; Akinyemi et al., 2025).

Research shows that adolescents exposed to peer bullying encounter psychosocial issues such as anxiety, depression, and loneliness more frequently (Gökkaya & Tekinsav Sütcü, 2020; Talu & Gümüş, 2022). Taştekin and Alıcı (2025) reported a significant negative relationship between adolescents' levels of loneliness and quality of life, further noting the mediating role of school burnout in this relationship. Liu et al. (2025) examined the relationship between social and emotional loneliness and peer bullying in adolescents, revealing significant correlations between them. While existing literature indicates that stress and loneliness are related to the consequences of peer bullying, there is a lack of research that simultaneously considers the effects of these variables as independent yet concurrent psychosocial mechanisms on quality of life. Examining the relationships between peer bullying, stress, loneliness, and quality of life within a holistic framework, particularly in an adolescent sample, will contribute to a better understanding of the underlying mechanisms of these processes. Considering all these findings, it is understood that the impact of peer bullying on quality of life is not limited to a direct relationship but may also manifest through stress and loneliness. Given that existing literature lacks studies examining these two psychosocial mechanisms simultaneously, this research aims to investigate the parallel mediating roles of perceived stress and loneliness in the relationship between peer bullying victimization and quality of life in adolescent students.

Research Hypotheses

In this study, the parallel mediating roles of perceived stress and loneliness in the relationship between peer bullying and quality of life in adolescent students were examined. Accordingly, the following hypotheses were developed:

H1

Peer bullying significantly increases issues related to quality of life.

H2: Peer bullying increases perceived stress.

H3

Peer bullying increases levels of loneliness.

H4

Perceived stress increases issues related to quality of life.

H5

Loneliness increases issues related to quality of life.

H6

Perceived stress plays a mediating role in the relationship between peer bullying and quality of life.

H7

Loneliness plays a mediating role in the relationship between peer bullying and quality of life.

H8

Perceived stress and loneliness function as parallel mediators in the relationship between peer bullying and quality of life.

Methods

Research Design

This study was conducted to investigate the mediating roles of perceived stress and loneliness in the impact of peer bullying on the quality of life in adolescent students. In this research, peer bullying was addressed as the independent variable, and quality of life as the dependent variable. The concurrent effects of perceived stress (specifically the stress/perceived distress sub-dimension) and loneliness were examined within the scope of a parallel multiple mediation model using the Hayes PROCESS Macro (Model 4). The study was designed based on the relational survey model, one of the quantitative research methods aimed at determining relationships between variables (Karasar, 2005; Creswell & Creswell, 2023). In this context, to examine the direct and indirect effects between the independent and dependent variables, process-based mediation models (Hayes, 2022) and bootstrapping strategies (Preacher & Hayes, 2008), which explain the causal mechanisms between variables, were utilized. Data processing and analysis standards recommended by Field (2018) were followed throughout the statistical analysis process.

Participants

The research group consisted of adolescent students between the ages of 10 and 18 studying in Turkey. A total of 471 volunteer students (266 male, 56.5%; 205 female, 43.5%), selected through convenient sampling, were included in the study. The mean age of the participants was 13.96 ± 2.15 years. Inclusion criteria were determined as being between the ages of 10 and 18, being enrolled in formal education, possessing the cognitive competence to comprehend the data collection instruments, and providing informed consent to participate voluntarily. Students who submitted incomplete or inaccurate forms, as well as those who did not consent to participate, were excluded from the study. Prior to the data collection process, the participants and their parents were informed about the purpose, scope, and confidentiality principles of the research, and informed consent was obtained based on voluntary participation. Throughout the research process, the principles of the Declaration of Helsinki published by the World Medical Association (2013) were adhered to, ensuring the privacy of the participants and the confidentiality of personal data.

Table 1
Sociodemographic Characteristics and Descriptive Findings of the Participants

		n	%
Gender	**Male**	**266**	**56.5%**
	Female	**205**	**43.5%**
Family Structure	Parents living together	443	94.1%
	Parents separated	12	2.5%
	Single parent	16	3.4%
Regular Physical Activity Status	Yes	211	44.8%
	No	52	11.0%
	Sometimes	208	44.2%
Maternal Education Level	Primary school	312	66.2%
	High school	103	21.9%
	Undergraduate	44	9.3%
	Postgraduate	12	2.5%
Paternal Education Level	Primary school	198	42.0%
	High school	172	36.5%
	Undergraduate	73	15.5%
	Postgraduate	28	5.9%
Perceived Economic Status	Low	68	14.4%
	Middle	376	79.8%
	High	27	5.7%
		Mean ± SD	Upper and Lower Value
Age (years)		13.96 ± 2.15	10–18
Height (cm)		160.18 ± 12.70	130–190
Body Weight (kg)		51.55 ± 13.29	24–99
Grade Level		8.09 ± 2.17	3–12
Daily Screen Time (hours)		3.61 ± 2.53	1–14
Daily Sleep Duration (hours)		8.44 ± 1.21	6–13
Daily Phone Usage Time (hours)		3.47 ± 2.61	1–14

Table 1 presents the findings regarding the sociodemographic characteristics and certain descriptive variables of the participants. The study included a total of 471 adolescent students, consisting of 266 males (56.5%) and 205 females (43.5%). It was determined that the vast majority of the participants lived with both parents (94.1%) and perceived their economic status as middle-level (79.8%). The mean age of the participants was 13.96 ± 2.15 years, the mean height was 160.18 ± 12.70 cm, and the mean body weight was 51.55 ± 13.29 kg. The mean daily screen time was 3.61 ± 2.53 hours, mean daily sleep duration was 8.44 ± 1.21 hours, and mean daily phone usage was 3.47 ± 2.61 hours.

Data Collection Instruments

Personal Information Form

A personal information form created by the researchers was used to determine sociodemographic and descriptive characteristics, including gender, age, grade level, family structure, regular physical activity status, parental education level, perceived economic status, as well as daily screen time, sleep duration, and phone usage time.

Peer Bullying Scale

The Peer Bullying Scale, developed by Kutlu and Aydın (2010) to assess bullying behaviors in peer relationships, is a 19-item, five-point Likert-type instrument (1 = Never, 5 = Always). The scale consists of three sub-dimensions: bully, victim, and filler. Higher scores on the scale indicate an increase in the individual's bullying behaviors and level of exposure to bullying. In the study where the scale was developed, Cronbach's alpha internal consistency coefficients were reported as 0.86 for the victim sub-dimension, 0.83 for the bully sub-dimension, and 0.70 for the filler sub-dimension (Kutlu & Aydın, 2010). The filler items are not included in the scoring procedure, and the total score is calculated based solely on the bully and victim subscales. Therefore, analyses in the present study were conducted using the bully and victim subscale scores as well as the overall peer bullying score.

Perceived Stress Scale

Developed by Cohen et al. (1983) and adapted into Turkish by Eskin et al. (2013), the Perceived Stress Scale is a 14-item, five-point Likert-type instrument (0 = Never, 4 = Very often) designed to assess the degree to which individuals perceive situations in their lives as stressful. The scale comprises two sub-dimensions: perceived insufficient self-efficacy and perceived stress/distress. Higher scores indicate a higher level of perceived stress. The Cronbach's alpha internal consistency coefficient for the Turkish form was reported as 0.84 (Eskin et al., 2013).

UCLA Loneliness Scale (RULS-6)

The 6-item UCLA Loneliness Scale-Short Form (RULS-6), developed by Wongpakaran et al. (2020) to evaluate individuals' loneliness levels from a unidimensional perspective, is a practical tool that preserves the psychometric properties of the original 20-item scale. The Turkish adaptation, validity, and reliability studies were conducted by Elbi et al. (2025); during this process, a content validity index of 0.98 was obtained via expert consensus (n = 9), and cognitive interviewing was applied to the target group. Scoring on a four-point Likert scale (1 = Never, 4 = Often) with total scores ranging from 6 to 24, higher scores indicate higher levels of loneliness. The Cronbach's alpha internal consistency coefficient in the adaptation study was reported as 0.73.

Pediatric Quality of Life Inventory (PedsQL) 13–18 Year Adolescent Form

The Pediatric Quality of Life Inventory (PedsQL) was developed by Varni et al. (1999). Its Turkish validity and reliability study was conducted by Çakın-Memik et al. (2007). The scale is structured for age groups 2–4, 5–7, 8–12, and 13–18, including parent and child forms for the 8–12 age group. It consists of four sub-dimensions—physical health, emotional, social, and school functioning—comprising 23 items in total. Items are scored on a scale of 0–100 (Never: 100, Rarely: 75, Sometimes: 50, Often: 25, Almost always: 0). Higher scores indicate higher perceived quality of life in children. In the original study by Varni et al. (1999), Cronbach's alpha internal consistency coefficients were 0.83 for the child form and 0.86 for the parent form. In the adaptation study by Çakın-Memik et al. (2007), these values were reported as 0.86 and 0.84, respectively.

Research Ethics

The research was conducted in Turkey. Ethical approval for this study was obtained from the Siirt University Scientific Research and Publication Ethics Committee (Decision No: 116119; Date: May 13, 2026). This approval covers all procedures carried out during the study, and the research was performed in full accordance with the principles of the Declaration of Helsinki. Participants and their parents were informed about the study, and informed consent was obtained based on voluntary participation. Privacy of the participants and confidentiality of personal data were maintained throughout the research process.

Data Analysis

The data obtained from the study were analyzed using IBM SPSS Statistics and Hayes PROCESS Macro v4.2. The adequacy of the sample size was evaluated through a power analysis conducted with G*Power 3.1. Assuming a medium effect size ($f^2 = 0.15$), a significance level of $\alpha = 0.05$, and a statistical power of 95% ($1 - \beta = 0.95$), the minimum required sample size was calculated as 138 participants (Faul et al., 2007). Given that the study included 471 participants, the sample was considered to provide sufficient statistical power for the multiple regression-based mediation analyses employed in this research. The normality of continuous variables was assessed using skewness and kurtosis coefficients, as well as visual inspection of histograms and Q–Q plots. Since the skewness and kurtosis values fell within the range

of ± 1.5, the data were assumed to satisfy the normality assumption (Tabachnick & Fidell, 2013). Internal consistency of the measurement instruments was evaluated using Cronbach's alpha coefficients, and the interpretation of reliability estimates was based on criteria recommended in the literature (Taber, 2018). Statistical significance was set at $p < .05$ for all analyses. In addition, Harman's single-factor test was conducted to assess potential common method bias arising from the use of self-report measures. Principal component analysis including all scale items yielded 16 factors with eigenvalues greater than 1, and the first factor accounted for 15.94% of the total variance. Since the first factor explained less than 50% of the total variance, common method bias was not considered a serious threat to the study findings (Podsakoff et al., 2003). Nevertheless, although Harman's single-factor test suggested that common method bias was unlikely to be substantial, this procedure cannot completely rule out the possibility of method effects. Therefore, the findings should be interpreted with caution. Descriptive statistics were presented as mean ± standard deviation (M ± SD) and minimum–maximum values for continuous variables, and as frequencies (n) and percentages (%) for categorical variables. Relationships among the study variables were examined using Pearson correlation analysis. Correlation coefficients were interpreted according to Cohen's (1988) guidelines, whereby $r = .10$ was considered small, $r = .30$ moderate, and $r \geq .50$ large. The mediating roles of perceived stress and loneliness in the relationship between peer bullying and quality of life were examined using Model 4 of Hayes PROCESS Macro v4.2 (Hayes, 2022). In this model, the Peer Bullying Scale was entered as the independent variable, the Pediatric Quality of Life Inventory as the dependent variable, and the Stress/Distress Perception subdimension of the Perceived Stress Scale together with the UCLA Loneliness Scale–Short Form as parallel mediators. The statistical significance of indirect effects was evaluated using 95% bootstrap confidence intervals (CIs) based on 5,000 resamples. Indirect effects were considered statistically significant when the confidence interval did not include zero (Preacher & Hayes, 2008).

Table 2
Descriptive Statistics, Normality, and Reliability Findings of the Scales

Peer Bullying Scale	**n**	**M**	**SD**	**Min**	**Max**	**Skewness**	**Kurtosis**	**Cronbach Alpha**
	471	**23.19**	**8.19**	**14**	**56**	**1.108**	**1.199**	**0.877**
Victimization	471	13.96	5.59	8	38	1.051	.846	0.851
Bullying	471	9.23	3.93	6	24	1.361	1.289	0.850
Perceived Stress Scale	471	28.67	7.05	2	44	− .871	1.382	0.702
Perceived Insufficient Self-Efficacy	471	14.89	4.29	0	26	− .628	.808	0.644
Perceived Stress/Distress	471	13.78	4.46	2	24	− .145	− .210	0.637
UCLA Loneliness Scale-SF	471	12.85	4.24	6	24	.272	− .637	0.801
Pediatric Quality of Life Inventory	471	43.90	10.58	14	83	.294	.489	0.768
Problems Related to Physical Functioning	471	19.93	4.48	4	32	.019	− .136	0.570
Problems Related to Emotional Functioning	471	8.50	3.78	0	20	.317	.027	0.687
Problems Related to Social Functioning	471	8.99	3.15	0	19	.043	.499	0.357
Problems Related to School	471	6.47	3.73	0	20	.461	− .200	0.696

Note: Since mediation analyses were conducted using total PedsQL scores, interpretations are based on the general scale rather than individual sub-dimensions.

Table 2 presents the descriptive statistics, skewness-kurtosis values, and internal consistency coefficients for the scales and sub-dimensions used in the research. It was observed that the skewness values of the scale scores ranged from − 0.871 to 1.361, and the kurtosis values ranged from − 0.637 to 1.382. Since the skewness and kurtosis coefficients were within the ± 1.5 range, it was accepted that the data met the assumption of normal distribution (Tabachnick & Fidell, 2013). When the internal consistency coefficients were examined, it was seen that the Cronbach's alpha coefficient was 0.877 for the Peer Bullying Scale total score, 0.851 for the Victimization sub-dimension, and 0.850 for the Bullying sub-dimension, indicating that the scale has a high level of reliability. It was observed that the Cronbach's alpha coefficient for the Perceived Stress Scale total score was 0.702, and values of 0.644 for Perceived Insufficient Self-Efficacy and 0.637 for Perceived Stress/Distress were obtained in the sub-dimensions. The Cronbach's alpha coefficient of the UCLA Loneliness Scale-SF was seen to be 0.801, and the total score of the Pediatric Quality of Life Inventory was 0.768. In the sub-dimensions of the Pediatric Quality of Life Inventory, Cronbach's alpha coefficients were observed to range between 0.357 and 0.696. Excluding the Problems Related to Social Functioning sub-dimension, other sub-dimensions showed acceptable levels of internal consistency. The low alpha coefficient obtained in the Problems Related to Social Functioning sub-dimension may have stemmed from sample-specific variance.

However, since the primary analyses in this study were conducted based on the total quality of life score, the results were interpreted on the basis of the total score (Taber, 2018).

Results

Table 3
Relationships Between Peer Bullying, Perceived Stress, Loneliness, and Quality of Life in Adolescent Students

		1	2	3	4	5	6	7	8	9	10	11	12
1- Peer Bullying Scale	r	1											
	p												
2- Victimization	r	.906***	1										
	p	< .001											
3- Bullying	r	.798***	.467***	1									
	p	< .001	< .001										
4- Perceived Stress Scale	r	.097*	.084	.082	1								
	p	.036	.068	.077									
5-Perceived Insuff. Self-Efficacy	r	.016	.014	.014	.796***	1							
	p	.724	.757	.767	< .001								
6-Perceived Stress/Distress	r	.137**	.119**	.116*	.813***	.295***	1						
	p	.003	.010	.012	< .001	< .001							
7-UCLA Loneliness Scale-SF	r	.242***	.257***	.139**	.198***	− .117*	.425***	1					
	p	< .001	< .001	.002	< .001	.011	< .001						
8- PedsQL	r	.244***	.217***	.200***	.350***	.010	.543***	.585***	1				
	p	< .001	< .001	< .001	< .001	.829	< .001	< .001					
9- Prob. Rel. to Physical Func.	r	− .043	− .014	− .069	.283***	.149**	.305***	.319***	.629***	1			
	p	.357	.766	.134	< .001	.001	< .001	< .001	< .001				
10- Prob. Rel. to Emotional Func.	r	.228***	.192***	.203***	.294***	− .096*	.557***	.573***	.783***	.262***	1		
	p	< .001	< .001	< .001	< .001	.036	< .001	< .001	< .001	< .001			
11- Prob. Rel. to Social Func.	r	.216***	.188***	.183***	.247***	.065	.327***	.250***	.701***	.261***	.440***	1	
	p	< .001	< .001	< .001	< .001	.157	< .001	< .001	< .001	< .001	< .001		
12- Prob. Rel. to School	r	.329***	.278***	.291***	.145**	− .108*	.333***	.485***	.695***	.098*	.521***	.385***	1
	p	< .001	< .001	< .001	.002	.019	< .001	< .001	< .001	.033	< .001	< .001	

Note: Correlations are represented as Pearson's r. *** p < 0.001, p < 0.01, * p < 0.05.

Table 3 presents the relationships between peer bullying, perceived stress, loneliness, and quality of life variables in adolescent students, examined using Pearson correlation analysis. According to the analysis results, a weak, positive, and statistically significant relationship was observed between the Peer Bullying Scale total score and the Perceived Stress Scale (r = 0.097; p = 0.036). When sub-dimensions were examined, a weak, positive relationship was identified specifically between Perceived Stress/Distress and peer bullying (r = 0.137; p = 0.003). No significant relationship was observed between Perceived Insufficient Self-Efficacy and peer bullying (p > 0.05). Regarding the relationship between peer bullying and loneliness, a weak, positive, and statistically significant relationship was found between the Peer Bullying Scale total score and the UCLA Loneliness Scale-SF (r = 0.242; p < 0.001). Similarly, the sub-dimensions of Victimization (r = 0.257; p < 0.001) and Bullying (r = 0.139; p = 0.002) were also positively correlated with loneliness levels. These findings indicate that as the level of

peer bullying increases, the level of loneliness also increases. When examining the relationships with quality of life, a weak, positive, and significant relationship was found between the Peer Bullying Scale total score and the Pediatric Quality of Life Inventory (PedsQL) total score ($r = 0.244$; $p < 0.001$). Since higher scores on the PedsQL indicate more problems, this finding shows that as peer bullying increases, problems related to quality of life increase. When sub-dimensions were evaluated, a weak-to-moderate, positive relationship was identified between peer bullying and the "Problems Related to School" sub-dimension ($r = 0.329$; $p < 0.001$). The sub-dimensions of "Problems Related to Emotional Functioning" ($r = 0.228$; $p < 0.001$) and "Problems Related to Social Functioning" ($r = 0.216$; $p < 0.001$) were also positively correlated with peer bullying. Given that higher scores signify more problems, it was observed that problems related to quality of life increase as peer bullying increases. A positive and significant relationship was observed between the Perceived Stress Scale and the UCLA Loneliness Scale-SF ($r = 0.198$; $p < 0.001$). A moderate, positive relationship was found between loneliness and the PedsQL total score ($r = 0.585$; $p < 0.001$). Similarly, a positive and significant relationship was observed between perceived stress and the PedsQL total score ($r = 0.350$; $p < 0.001$). Correlation analyses confirmed the systematic interaction between these structures by revealing the direction and strength of the relationships between the variables. However, the correlation between the variables remains insufficient to explain the causal mechanisms between them. Therefore, to test the possible explanatory processes (mechanisms) behind the significant relationships identified in Table 3, a parallel mediation analysis was conducted to examine the mediating roles of stress and loneliness in the impact of peer bullying on quality of life (Table 4 and Fig. 1). Figure 1 illustrates the parallel mediation model constructed to test our research hypotheses.

Table 4
Mediation Analysis Results Regarding the Mediating Role of Stress and Loneliness in the Impact of Peer Bullying on Quality of Life

Path / Effect	**B**	**SE**	**t**	**p**	**LLCI**	**ULCI**
Direct Effect						
PBS → QoL	0,124	0,047	2,619	,009	0,031	0,217
Indirect Effects	**Effect**	**Boot SE**			**Boot LLCI**	**Boot ULCI**
Total Indirect Effect	0,191	0,037	-	-	0,123	0,269
PBS → Loneliness → QoL	0,161	0,033	-	-	0,101	0,230
PBS →PSS → QoL	0,029	0,014	-	-	0,006	0,062

Note: N = 471. B = Unstandardized regression coefficient; SE = Standard Error; LLCI = 95% Confidence Interval Lower Limit; ULCI = 95% Confidence Interval Upper Limit. PBS = Peer Bullying Scale; QoL = Quality of Life (Pediatric Quality of Life Inventory); PSS = Perceived Stress Scale; UCLA = UCLA Loneliness Scale-Short Form. Bootstrap sample size = 5000. *p < .05, p < .01, *p < .001.

The parallel mediation analysis results, conducted to investigate the mediating roles of stress (PSS) and loneliness (UCLA) in the impact of peer bullying (PBS) on adolescents' quality of life (QoL), demonstrate that peer bullying significantly increases problems in quality of life both directly (*B* = 0.124; p<.01) and indirectly through loneliness (*Effect* = 0.161; 95% CI [0.101; 0.230]) and stress (*Effect* = 0.029; 95% CI [0.006; 0.062]). This suggests that the impact of peer bullying on the psychosocial well-being of adolescents can be partially explained through loneliness and stress. Consequently, the statistically significant total indirect effect (0.191) indicates that the loneliness variable plays a more dominant role in this process, and that bullying is associated with multidimensional psychosocial outcomes that threaten the quality of life of adolescents.

Table 5
PROCESS Model 4 Findings Regarding the Mediating Role of Perceived Stress/Distress in the Impact of Peer Bullying on the Pediatric Quality of Life Inventory

Path	**Effect Type**	**B**	**SE**	**t**	**p**	**95% Confidence Interval**
a path	PBS → Perceived Stress/Distress	0,074	0,025	2,990	0,003	0,026–0,123
b path	Perceived Stress/Distress→ PedsQL	1,231	0,091	13,528	< 0,001	1,053–1,410
c’ path	PBS → PedsQL (Direct Effect)	0,223	0,050	4,508	< 0,001	0,126–0,321
c path	PBS → PedsQL (Total Effect)	0,315	0,058	5,448	< 0,001	0,201–0,429
a×b path	Indirect Effect (via Perceived Stress/Distress)	0,092	0,033	—	—	0,032–0,160

Note: N = 471. B = Unstandardized regression coefficient; SE = Standard Error; CI = Confidence Interval; PBS = Peer Bullying Scale; PedsQL = Pediatric Quality of Life Inventory; PSS = Perceived Stress Scale. Indirect effects were calculated using 5000 bootstrap samples.

Table 5 presents the findings regarding the mediating role of perceived stress/distress in the impact of peer bullying on the Pediatric Quality of Life Inventory. The mediating role of perceived stress/distress in the effect of peer bullying on the pediatric quality of life was examined using PROCESS Macro Model 4, as illustrated in Fig. 2. The model used the Peer Bullying Scale as the independent variable, the Pediatric Quality of Life Inventory (PedsQL) as the dependent variable, and the "Perception of Stress/Distress" sub-dimension of the Perceived Stress Scale as the mediator. The significance of indirect effects was evaluated using 5000 bootstrap samples and a 95% confidence interval.The effect of the Peer Bullying Scale on the Perception of Stress/Distress was positive and statistically significant (*B* = 0.074; SE = 0.025; t = 2.990; p = 0.003; 95% CI: 0.026–0.123). This result indicates that as peer bullying scores increase, scores for the perception of stress/distress also increase. In other words, adolescent students with higher levels of peer bullying were found to have a higher perception of stress/distress.The effect of the Perception of Stress/Distress on the PedsQL was also positive and statistically significant (*B* = 1.231; SE = 0.091$; t = 13.528; p < 0.001; 95% CI: 1.053–1.410). As the perception of stress/distress increases, the score on the quality of life inventory also increases. Since higher scores on the PedsQL indicate that more problems are being experienced, this finding shows that as the perception of stress/distress increases, problems related to quality of life also increase.The total effect of the Peer Bullying Scale on the PedsQL was positive and statistically significant (*B* = 0.315; SE = 0.058; t = 5.448; p < 0.001; 95% CI: 0.201–0.429). This finding shows that before the mediator variable is included in the model, as the level of peer bullying increases, problems related to quality of life increase. When the mediator variable was included in the model, it was observed that the direct effect of peer bullying on quality of life decreased but remained significant (*B* = 0.223; SE = 0.050; $t = 4.508$; p < 0.001; 95% CI: 0.126–0.321).Upon examining the indirect effect, the effect of peer bullying on quality of life through the perception of stress/distress was found to be statistically significant (*B* = 0.092; BootSE = 0.033; 95% Boot CI: 0.032–0.160). The fact that the bootstrap confidence interval does not contain the zero value indicates that the perception of stress/distress is a significant mediator variable in this relationship. Since the direct effect remained significant, it was observed that the perception of stress/distress has a partial mediating role in the relationship between peer bullying and quality of life.

Table 6
PROCESS Model 4 Findings Regarding the Mediating Role of UCLA Loneliness Scale-SF in the Impact of Peer Bullying on the Pediatric Quality of Life Inventory

Path	Effect	B	SE	t	p	95% Confidence Interval
a path	PBS → UCLA Loneliness-SF	0,125	0,023	5,409	< 0,001	0,080–0,171
b path	UCLA Loneliness-SF→ PedsQL	1,395	0,096	14,593	< 0,001	1,207–1,583
c′ path	PBS → PedsQL (Direct Effect)	0,140	0,050	2,833	0,005	0,043–0,237
c path	PBS → PedsQL (Total Effect)	0,315	0,058	5,448	< 0,001	0,201–0,429
a×b path	PBS → UCLA Loneliness-SF→ PedsQL	0,175	0,034	—	—	0,111–0,246

Note: SE = Standard Error; CI = Confidence Interval; PBS = Peer Bullying Scale; UCLA = UCLA Loneliness Scale-Short Form; PedsQL = Pediatric Quality of Life Inventory. Indirect effects were calculated using 5000 bootstrap samples.

Table 6 presents the findings regarding the mediating role of the UCLA Loneliness Scale-SF in the impact of peer bullying on the Pediatric Quality of Life Inventory. The mediating role of loneliness in the effect of peer bullying on the pediatric quality of life was examined using PROCESS Macro Model 4, as illustrated in Fig. 3. The model used the Peer Bullying Scale as the independent variable, the Pediatric Quality of Life Inventory (PedsQL) as the dependent variable, and the UCLA Loneliness Scale-Short Form (UCLA Loneliness-SF) as the mediator. The significance of indirect effects was evaluated using 5000 bootstrap samples and a 95% confidence interval.The effect of the Peer Bullying Scale on the UCLA Loneliness-SF was found to be positive and statistically significant (*B* = 0.125; SE = 0.023; t = 5.409; p < 0.001; 95% CI: 0.080–0.171). This result indicates that as the level of peer bullying increases, the level of loneliness also increases.The effect of the UCLA Loneliness-SF on the PedsQL was also found to be positive and statistically significant (*B* = 1.395; SE = 0.096; t = 14.593; p < 0.001; 95% CI: 1.207–1.583). Since higher scores on the PedsQL indicate that more problems are being experienced, this finding shows that as the level of loneliness increases, problems related to quality of life also increase.The total effect of the Peer Bullying Scale on the PedsQL was found to be positive and statistically significant (*B* = 0.315; SE = 0.058; t = 5.448; p < 0.001; 95% CI: 0.201–0.429). When the mediator variable was included in the model, it was determined that the direct effect of peer bullying on quality of life decreased but remained significant (*B* = 0.140; SE = 0.050; t = 2.833; p = 0.005; 95% CI: 0.043–0.237).Upon examining the indirect effect, it was observed that loneliness has a significant mediating role in the effect of peer bullying on quality of life (*B* = 0.175; BootSE = 0.034; 95% Boot CI: 0.111–0.246). The fact that the bootstrap confidence interval does not contain the zero value indicates that the mediation effect is significant. Furthermore, because the direct effect maintained its significance, it was observed that the UCLA Loneliness-SF has a partial mediating role in the relationship between peer bullying and quality of life.

Discussion

In this study, the mediating roles of stress and loneliness in the relationship between peer bullying and quality of life in adolescent students were examined. The findings indicated that peer bullying increases problems related to quality of life, and this relationship is partially explained through both stress and loneliness. Furthermore, it was determined that loneliness exhibits a stronger indirect effect compared to the stress variable. These results reveal that peer bullying is not merely a temporary issue experienced in the school environment, but an important risk factor that affects adolescents' psychological well-being and quality of life.

The findings obtained in the study showed a significant positive relationship between peer bullying and perceived stress. This result is consistent with previous research indicating that adolescents exposed to peer bullying experience higher levels of stress. Peer bullying is evaluated as a chronic stressor that damages an individual's sense of security. Particularly during adolescence, due to the increasing need for social acceptance, negative experiences in peer relationships can significantly elevate an individual's stress level. Mikkelsen et al. (2020) reported that stress level in adolescents is one of the strongest predictors of health-related quality of life. Similarly, Forsberg and Thorvaldsen (2022) demonstrated that bullying victimization is closely associated with psychological distress and impairments in quality of life. Palamarchuk and Vaillancourt (2022) stated that bullying victimization simultaneously triggers cognitive and emotional stress processes, and that the experienced distress is not just an instantaneous emotional reaction but a chronic burden that affects life in a multidimensional way. Vacca et al. (2023) revealed that cognitive emotion regulation processes play an important role in the relationship between bullying victimization and symptoms of depression, anxiety, and stress.

Additionally, in the current study, it was determined that stress assumes a partial mediating role in the relationship between peer bullying and quality of life. This finding shows that the negative experiences of students exposed to bullying do not only directly affect their quality of life, but also deepen problems related to quality of life through increased stress levels. During adolescence, the fact that stress-coping skills are still in the developmental process can increase the psychological burden of negative experiences in peer relationships. Therefore, psychosocial interventions aimed at reducing stress levels and programs that strengthen coping skills can provide significant contributions to reducing the negative effects of peer bullying on quality of life (Hikmat et al., 2024; Kamalah et al., 2025; Hutson et al., 2022).

The findings obtained from the research reveal a significant positive relationship between peer bullying and loneliness. This result is consistent with the literature arguing that bullying victimization fosters social withdrawal and a deep sense of loneliness in the individual. Although loneliness is defined in classical literature as a subjective assessment of the quality rather than the quantity of an individual's social relationships (Perlman & Peplau, 1981), contemporary studies are deeply examining how this subjective experience is triggered by environmental factors such as bullying. For example, Madsen et al. (2024) proved that exposure to bullying has a strong and graded effect on loneliness, while Eid et al. (2023) emphasized that this relationship is partially mediated by problematic social media usage patterns in a digitalizing world. On the other hand, Wu et al. (2024) addressed this process not only through negative interactions but also from the perspective of how psychological resources such as perceived social support and hope can serve as a protective buffer. The findings also indicate that loneliness assumes a partial mediating role in the relationship between peer bullying and quality of life. Furthermore, the fact that the indirect effect obtained in the loneliness model is higher than in the stress model suggests that loneliness may be a more powerful psychosocial mechanism in explaining the negative effects of peer bullying on quality of life.

Adolescence is a critical developmental stage where a sense of belonging and peer acceptance play a central role in an individual's psychosocial development. According to the belongingness theory proposed by Baumeister and Leary (1995), individuals are driven by an innate desire to have lasting and positive social relationships; the inability to satisfy this need leads to serious disruptions in psychological adjustment processes. Contemporary studies support this theoretical framework by revealing how experiences of social exclusion and rejection derail adolescents' subjective well-being processes (Duran, 2026; Fabris et al., 2023; Reis et al., 2025; Orben et al., 2020; Chávez et al., 2022). In this context, students exposed to peer bullying experience a marked decline in quality of life due to their withdrawal from the social environment, the erosion of their sense of belonging, and the loss of function in social support mechanisms. Indeed, in a study conducted by González-Abaurrea et al. (2025), it was reported that loneliness is negatively correlated with quality of life. Therefore, the findings obtained from our research strongly support that loneliness is one of the most significant and destructive psychosocial consequences of peer bullying.

A significant relationship was found between peer bullying and quality of life in the study. The findings show that as the level of bullying increases, problems related to quality of life also increase. These results parallel studies revealing that bullying negatively affects an individual's functionality regarding physical, emotional, social, and school life. Ding and Zhang (2022) reported that bullying victimization directly reduces adolescents' quality of life. Similarly, Deng et al. (2023) stated that peer victimization negatively affects quality of life and that various psychological mechanisms play a role in this process. Marsh et al. (2023) emphasized that experiences of peer bullying are one of the primary risk factors negatively affecting adolescents' psychological adjustment and subjective well-being. The meta-analysis by Mullan et al. (2023) also showed that peer victimization is strongly associated with low self-esteem and internalized psychological problems. Meanwhile, Vieta-Piferrer et al. (2024) demonstrated that cyberbullying victimization negatively affects adolescents' subjective

well-being over time. Therefore, it can be said that the findings obtained in the current research regarding the mediating effects of stress and loneliness are consistent with the literature.

Limitations

There are several limitations to consider when evaluating the results of this research. First, the cross-sectional nature of the study makes it difficult to establish a causal relationship spanning time between variables; therefore, the findings obtained remain at the "relational" level. Second, the fact that data were collected via self-report scales raises the possibility of participants exhibiting "social desirability bias." As a third limitation, conducting the study in a single geographic region restricts the generalizability of the results to the entire adolescent sample across Turkey. Additionally, the low internal consistency coefficients obtained in some sub-dimensions of the Pediatric Quality of Life Inventory (particularly such as Social Functioning) require caution when interpreting the findings related to these dimensions. Finally, the study focused only on stress and loneliness variables, and the exclusion of other important predictors, such as self-esteem or psychological resilience, limits the scope of the research. In this regard, it is recommended that future longitudinal studies incorporate various psychosocial variables into the model to validate this mechanism from a broader perspective.

Conclusion

In conclusion, this research has shown that peer bullying negatively affects the quality of life of adolescents, and that stress and loneliness play significant partial mediating roles in this relationship. The findings reveal that peer bullying should be addressed not merely as a behavioral problem, but as a multidimensional risk factor affecting the psychological health and quality of life of adolescents. It is particularly important that school-based bullying prevention programs be supported by psychosocial interventions aimed at reducing loneliness and stress levels. Peer support programs, psychological counseling services, and practices aimed at strengthening social support networks may contribute to reducing the negative effects of peer bullying on quality of life.

Recommendations

- Longitudinal tracking studies should be conducted to observe the long-term effects of peer bullying, stress, and loneliness on quality of life.
- In future research, multi-source data designs should be preferred by consulting not only student reports but also parent and teacher perspectives.
- Modules aimed at reducing loneliness and strengthening coping skills must be integrated into school-based bullying prevention programs.
- The scope of the research should be expanded to different socioeconomic levels and geographic regions to increase the cultural comparability of the findings.
- School guidance activities focused on "emotion regulation training" should be organized to increase adolescents' stress-coping capacities and reduce peer bullying victimization.

Declarations

Ethics Approval and Consent to Participate

The research was conducted in Turkey. Ethical approval for this study was obtained from the Siirt University Scientific Research and Publication Ethics Committee (Decision No: 116119; Date: May 13, 2026). This approval covers all procedures carried out during the study, and the research was performed in full accordance with the principles of the Declaration of Helsinki. Participants and their parents were informed about the study, and informed consent was obtained based on voluntary participation. The privacy of the participants and the confidentiality of personal data were maintained throughout the research process.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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Author Contribution

OT, RE, BÖ, TT, MK, and AY designed the research study. All authors performed the research, provided help and advice on the study, and analyzed the data. All authors wrote the manuscript, contributed to editorial changes, and read and approved the final version.

Data Availability

The datasets generated and/or analyzed during the current study are not publicly available due to ethical and privacy restrictions involving adolescent participants but are available from the corresponding author on reasonable request.

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Figures

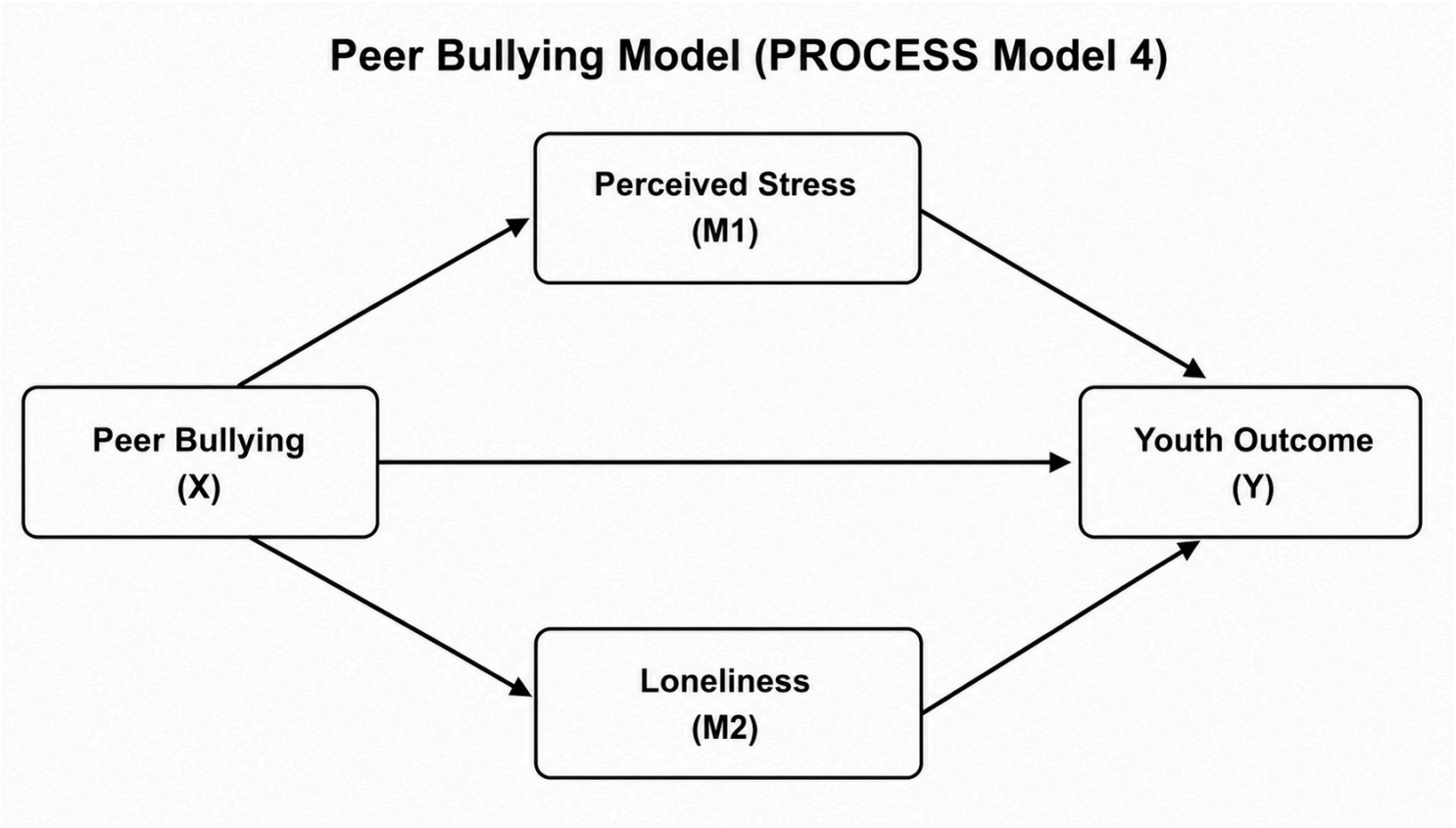


Figure 1

Parallel Mediation Model of Peer Bullying, Stress, Loneliness, and Quality of Life

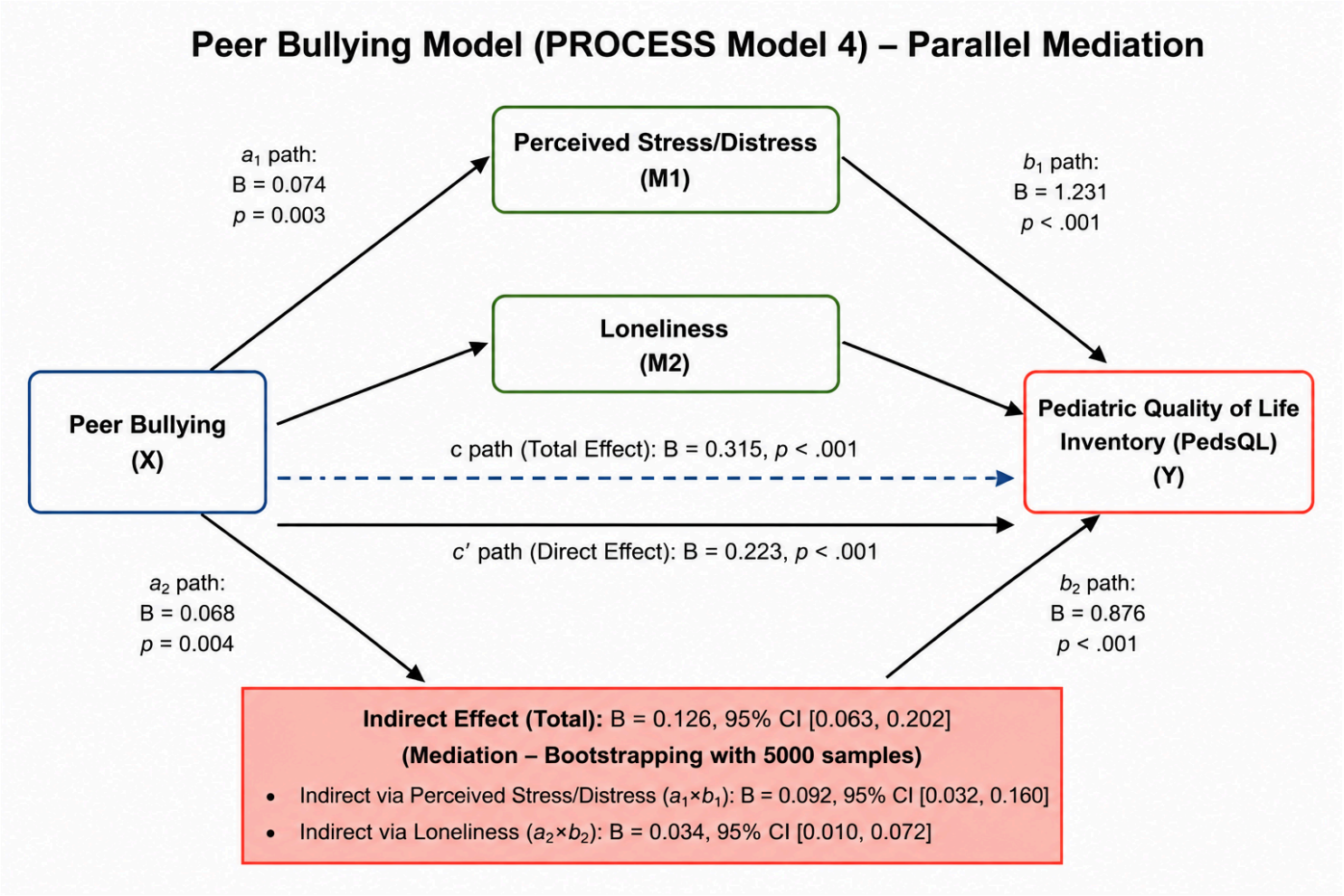


Figure 2

Mediating Effect of Perceived Stress/Distress on the Relationship Between Peer Bullying and Quality of Life in Children

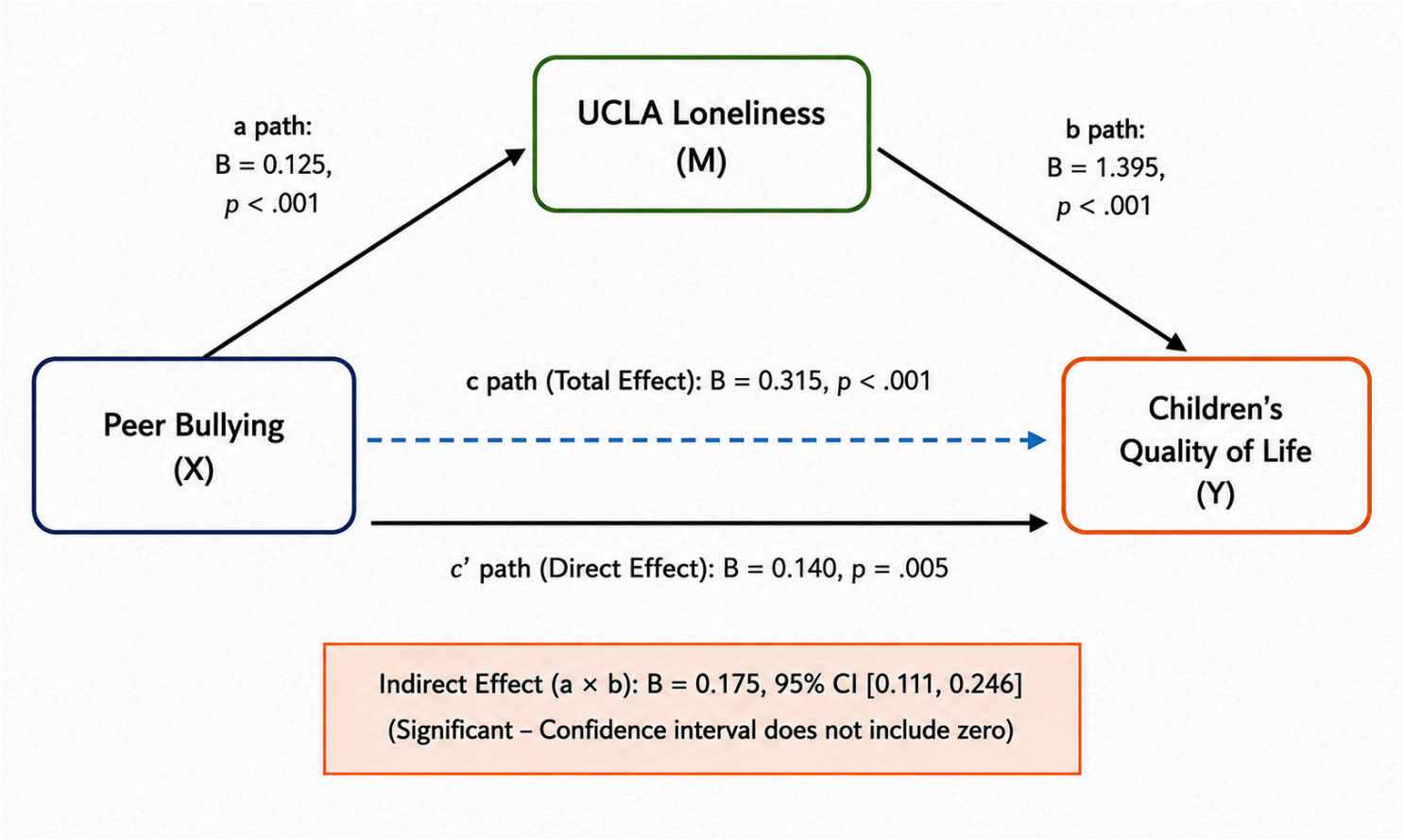


Figure 3

Mediating Effect of UCLA Loneliness on the Relationship Between Peer Bullying and Children's Quality of Life