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ORIGINAL RESEARCH

Cyberbullying Victimization on Non-Suicidal Self-Injury Among College Students: A Moderated Mediation Model

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Purpose: This study aimed to examine the impact of cyberbullying on non-suicidal self-injury (NSSI) among college students, and to explore the roles of ambivalence over emotional expression, psychological resilience, and positive illusion in this relationship. The goal was to identify potential pathways through which cyberbullying influences NSSI, to provide theoretical support for psychological intervention in college students.

Patients and Methods: This study employed a cross-sectional design. A total of 683 college students from Yunnan Province, China were surveyed using the Cyberbullying Questionnaire, Ambivalence Over Emotional Expression Questionnaire, Conner Davidson Resilience Scale, Adolescent Non-Suicidal Self-Injury Assessment Questionnaire, and the College Students' Positive Illusion Questionnaire.

Results: (1) Positive illusion, cyberbullying victimization, ambivalence over emotional expression, and NSSI were positively correlated with each other, while psychological resilience was negatively correlated with all these variables. (2) Cyberbullying victimization directly predicted NSSI. (3) Cyberbullying victimization indirectly predicted NSSI through the mediating effects of ambivalence over emotional expression and psychological resilience, both separately and sequentially as a chain mediator. (4) Positive illusion moderated the effect of cyberbullying victimization on NSSI: individuals with higher levels of positive illusion showed a more pronounced increase in NSSI as cyberbullying victimization increased.

Conclusion: The pathway from cyberbullying victimization to non-suicidal self-injury is mediated by ambivalence over emotional expression and psychological resilience, while positive illusion exacerbates this process. These findings hold significant implications for the development of prevention and intervention strategies targeting non-suicidal self-injury among college students.

Keywords: cyberbullying victimization, non-suicidal self-injury, ambivalence over emotional expression, psychological resilience, college students' positive illusion

Introduction

With the rapid development of communication technologies such as smartphones and social platforms, traditional bullying behaviors like school bullying have permeated virtual spaces through the internet, giving rise to a new form of harm known as cyberbullying. According to the latest research from UNICEF, this type of bullying has become increasingly prevalent in the global online ecosystem.[1] This technological transformation has reconfigured the landscape of interpersonal aggression, demanding renewed attention to its psychological consequences among young adults. As the country with the largest number of internet users worldwide, China has reported that 26.45% of surveyed college students have experienced cyberbullying.[2] Prior research has documented that cyberbullying has emerged as a salient stressor contributing to a range of mental health difficulties, including non-suicidal self-injury (NSSI).[3] Moreover, a recent qualitative systematic review focusing on developing countries revealed that cyberbullying is particularly prevalent in

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sociocultural contexts marked by rigid interpersonal norms, with countries such as India and Brazil reporting disproportionately high rates.[4] Notably, female students show elevated vulnerability, with approximately 38.7% reporting victimization.[4] These findings underline the urgency of examining the psychological mechanisms of cyberbullying among Chinese college students.

Cyberbullying is defined as repeated and intentional humiliation, threats, or harassment perpetrated by an individual or group using electronic means against a victim who cannot easily defend themselves.[5] This phenomenon manifests unique characteristics: temporal/spatial dissociation, perpetual accessibility, and perpetrator anonymity,[6] collectively amplifying its detrimental impact compared to traditional bullying.[7] In contrast, cyber victimization refers to the phenomenon where an individual is repeatedly bullied by other groups or individuals during online communication (eg, receiving threatening messages or being targeted by rumors).[8]

Experiencing cyberbullying can lead to various mental health, psychosocial, and behavioral issues,[9] with non-suicidal self-injury emerging as a significant behavioral consequence.[10] Non-suicidal self-injury (NSSI) refers to intentional, repetitive self-inflicted damage to body tissue without suicidal intent or social sanction.[11] Common forms of NSSI include cutting, burning, biting, scratching the skin, and hitting oneself against walls or other objects.[12] Lifetime prevalence demonstrates a marked age-related gradient, with young adults aged 18–24 showing significantly higher rates (13.4%) compared to general adult populations (5.5%).[13] This behavior is closely associated with depressive disorders, anxiety disorders, eating disorders, substance use disorders, and borderline personality disorder,[14] highlighting the importance of elucidating its risk and protective mechanisms. Currently, cyberbullying has emerged as an emerging stressor significantly associated with NSSI.[3] The absence of protective factors may also contribute to the occurrence of NSSI. Following victimization, individuals are more likely to develop internalizing problems, feel a lack of respect from others, and experience negative emotions such as frustration, anger, helplessness, and sadness.[9] These can further lead to behavioral issues, including declining academic performance, sleep difficulties, school dropout, absenteeism, and even suicide.[10] Psychological resilience, though understudied as a mitigating variable for adverse outcomes, has been empirically validated as a protective factor.[15] Over the past two decades, research conceptualizing resilience as an adaptive mechanism for adversity has expanded significantly.[16] It is defined as the ability to adapt positively or recover in the face of significant adversity[17] and consists of two core elements: exposure to major threats and the occurrence of positive adaptation. On the other hand, King and Emmons proposed the concept of ambivalence over emotional expression, which refers to a conflict regarding how to express emotions rather than the emotions themselves. It reflects a competing impulse between the desire to express and not to express emotions. This conflict can occur in both positive and negative emotional states and is distinct from emotional suppression.[18,19] A study has indicated a positive correlation between ambivalence over emotional expression and NSSI among adolescents.[20]

Recent research on Chinese youth has increasingly utilized longitudinal designs, revealing that college students'stress, depressive symptoms, and academic self-efficacy fluctuate dynamically over time. Longitudinal evidence shows that stress can exert persistent negative effects on self-perception, while depressive symptoms and learning difficulties interact to influence academic achievement.[21] These findings suggest that when exploring the mechanisms linking cyberbullying and NSSI, developmental and process-oriented perspectives are essential.[22] Although the present study employs a cross-sectional design, identifying potential mediating psychological processes offers an important foundation for future longitudinal research.

While existing studies have confirmed the association between cyberbullying victimization and NSSI among college students,[22,23] the underlying mechanisms remain unclear. First, prior research has often examined emotional factors (eg, ambivalence over emotional expression) and resource-based factors (eg, psychological resilience) in isolation, leaving it uncertain whether they function as parallel or sequential mediators in a unified model. Second, little attention has been paid to how cognitive factors—particularly positive illusion—might moderate this psychological pathway. Third, there is a scarcity of research investigating these mechanisms specifically among Chinese college students, whose sociocultural context may shape unique risk and protective processes.

The transactional model of stress and coping posits cyberbullying as an external stressor that initiates appraisal and coping processes, potentially leading to maladaptive outcomes—a sequence influenced by personal vulnerabilities and resources.[24] In contrast, the Cognitive-Emotional Model underscores that an individual's appraisal of a stressful event

and the resulting emotional response are central drivers of subsequent behavior.[25] Integrating these perspectives, the present study proposes a moderated mediation model to unpack how cyberbullying victimization contributes to NSSI. Specifically, we hypothesize that cyberbullying may heighten NSSI risk through two distinct pathways: (1) an emotional pathway, by exacerbating ambivalence over emotional expression, and (2) a resource pathway, by undermining psychological resilience. Furthermore, we posit that positive illusion—an unrealistically favorable cognitive bias regarding the self—serves as a critical moderator that can attenuate or amplify these mediating effects.[26]

This study constructs and tests an integrated model to examine the mechanisms linking cyberbullying victimization to NSSI among Chinese college students, focusing on the mediating roles of ambivalence over emotional expression and psychological resilience, as well as the moderating role of positive illusion. By doing so, it aims to advance theoretical understanding of cyberbullying's psychological consequences and provide empirical grounding for early identification and targeted intervention in high-risk student populations.

Material and Methods

Survey Subjects

Through offline questionnaire distribution, a total of 693 university students from a medical college in Yunnan Province, China, were invited to participate in the survey. For the collected questionnaires, invalid data were excluded based on the following criteria: (1) excessively short completion time (less than one-third of the average response time), indicating a possible lack of careful reading; (2) answers displaying obvious patterned response tendencies (eg, consecutive selection of the same option, wave-like alternating patterns, etc). Based on these criteria, 10 invalid questionnaires were excluded, resulting in 683 valid questionnaires retained, with an effective response rate of 98.5%. The final sample consisted of 208 males (30.5%) and 475 females (69.5%), with a mean age of 20.00 ± 1.12 years. Prior to the survey, all participants were informed of the study's purpose, anonymity, and their right to withdraw at any time. Informed consent was obtained from both teachers and the students themselves.

Research Questionnaires

Cyberbullying Questionnaire

This instrument was adapted from the European Cyberbullying Intervention Project Questionnaire.[27] The original 22-item scale underwent translation and cultural adaptation, resulting in a 14-item, two-dimensional scale that measures cyberbullying victimization (7 items) and cyberbullying aggression (7 items). Items were scored using a five-point Likert scale (0 = never to 4 = almost every day). In this study, Cronbach's α was 0.87 for the victimization subscale and 0.93 for the aggression subscale.

Ambivalence Over Emotional Expression Questionnaire (AEQ)

The revised Chinese version by Feng Keman (2017) was used, comprising 23 items across five dimensions: inhibition of positive emotional expression (AEQ-IPEE), inhibition of negative emotional expression (AEQ-INEE), emotional rumination (AEQ-ER), desire to be understood (AEQ-DTU), and regret after expressing (AEQ-RE).[28,29] Responses are scored on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree), with higher scores indicating greater ambivalence. Cronbach's α for the total scale was 0.97.

10-Item Connor-Davidson Resilience Scale (CD-RISC-10)

This abbreviated version was derived by Campbell-Sills et al from the original 25-item CD-RISC.[30,31] The 10-item measure uses a 5-point Likert-type scale (0 = Never to 4 = Almost always), with total scores ranging from 0–40 (higher scores = greater resilience). Cronbach's α was 0.93.

Adolescent Non-Suicidal Self-Injury Assessment Questionnaire

This instrument, developed by Wan et al (2018), was utilized to assess NSSI behaviors. It consists of two dimensions: behavior (12 items) and function (19 items).[32] The behavior subscale assesses self-injurious acts with or without visible tissue damage, and the function subscale evaluates three dimensions: intrapersonal negative reinforcement, self-positive

reinforcement, and interpersonal emotion expression. Items are rated on a 5-point Likert scale from 0 to 4. Cronbach's α was 0.93 for the behavior subscale and 0.95 for the function subscale.

College Students' Positive Illusion Questionnaire (CPIQ)

Developed by Ma,[33] this 11-item measure assesses positive fantasy tendencies through three dimensions: Idealization (3 items: 1–3), Controllability (3 items: 4–6), and Optimism (5 items: 7–11). The instrument uses a 7-point Likert-type scale (1 = Completely Agree to 7 = Completely Disagree), with Items 1–3 reverse-scored. The scale has demonstrated sound construct validity and reliability in prior studies with Chinese student samples.[34] In the present study, internal consistency was good, with Cronbach's α = 0.79 for this scale and α values ranging from 0.90 to 0.97 for the other measures.

Statistical Analysis

Data were analyzed using SPSS 26.0. Common method bias was assessed using Harman's single-factor test. Pearson correlation analysis was conducted to examine relationships among positive illusion, cyberbullying victimization, ambivalence over emotional expression, psychological resilience, and non-suicidal self-injury. Regression analysis and the PROCESS macro developed by Hayes were used for mediation analysis and Bootstrap testing.

Results

Common Method Bias Test

Harman's single-factor test was conducted to evaluate potential common method bias. The results extracted 13 factors with eigenvalues greater than 1, and the maximum factor explained 23.95% of the variance. This value remains below the conventional 40% critical threshold, indicating negligible common method variance in the dataset.

Correlation Analysis Among Variables

Positive illusion was positively correlated with cyberbullying victimization ($r = 0.258$, $P < 0.01$), ambivalence over emotional expression ($r = 0.325$, $P < 0.01$), and NSSI ($r = 0.180$, $P < 0.01$), but negatively correlated with psychological resilience ($r = -0.350$, $P < 0.01$). Cyberbullying victimization was positively correlated with ambivalence over emotional expression ($r = 0.193$, $P < 0.01$) and NSSI ($r = 0.348$, $P < 0.01$), and negatively correlated with psychological resilience ($r = -0.140$, $P < 0.01$). Ambivalence over emotional expression was negatively correlated with psychological resilience ($r = -0.238$, $P < 0.01$) and positively correlated with NSSI ($r = 0.247$, $P < 0.01$). Psychological resilience was negatively correlated with NSSI ($r = -0.216$, $P < 0.01$), as outlined in Table 1.

Serial Multiple Mediator Model

Using Model 6 in the PROCESS macro, with cyberbullying victimization as the independent variable and NSSI as the dependent variable, and ambivalence over emotional expression and psychological resilience as sequential mediators. As depicted in Table 2, regression results showed that cyberbullying victimization significantly and positively predicted ambivalence over emotional expression ($\beta = 0.193$, $P < 0.001$) and NSSI ($\beta = 0.299$, $P < 0.001$). Cyberbullying victimization ($\beta = -0.098$, $P < 0.01$) and ambivalence over emotional expression ($\beta = -0.219$, $P < 0.001$) significantly

Table 1 Means, Standard Deviations, and Correlation Matrix (N = 683)

Variable	M (SD)	1	2	3	4	5
1. Positive illusion	2.58(0.85)	1				
2. Cyberbullying victimization	0.20(0.44)	0.258**	1			
3. Ambivalence over emotional expression	3.40(1.33)	0.325**	0.193**	1		
4. Psychological resilience	2.48(0.78)	−0.350**	−0.140**	−0.238**	1	
5. NSSI	0.09(0.29)	0.180**	0.348**	0.247**	−0.216**	1

Notes: **$P < 0.01$.
Abbreviation: NSSI, Non-suicidal self-injury.

Table 2 Results of Mediation Analysis

Variable	Ambivalence Over Emotional Expression		Psychological Resilience		NSSI	
	β	t	*β*	t	*β*	t
Cyberbullying victimization	0.193	5.130***	−0.098	−2.582**	0.299	8.350***
Ambivalence over emotional expression			−0.219	−5.791***	0.157	4.294***
Psychological resilience					−0.137	−3.786***
R2	0.037		0.066		0.172	
F	26.317***		23.871***		47.019***	

Notes: **$P < 0.01$, ***$P < 0.001$.

and negatively predicted psychological resilience. Ambivalence over emotional expression significantly and positively predicted NSSI ($\beta = 0.157$, $P < 0.001$), while psychological resilience negatively predicted NSSI ($\beta = -0.137$, $P < 0.001$).

Bootstrap testing with 5000 resamples was used to examine the mediation effects and establish a chain mediation model. As shown in Figure 1, results indicated that the indirect effect through ambivalence over emotional expression was 0.030, through psychological resilience was 0.013, and through both mediators in sequence was 0.006. Detailed coefficients and confidence intervals are presented in Table 3.

Moderation Effect Analysis

Regression analysis was used to examine the moderating role of positive illusion in the relationships among cyberbullying victimization, ambivalence over emotional expression, psychological resilience, and NSSI. The results showed that positive illusion significantly moderated the relationship between cyberbullying victimization and ambivalence over emotional expression ($\beta = -0.096$, $t = -3.637$, $P < 0.001$), and between cyberbullying victimization and NSSI ($\beta = 0.170$, $t = 6.634$, $P < 0.001$). Positive illusion also significantly moderated the relationship between ambivalence over emotional expression and NSSI ($\beta = 0.119$, $t = 3.690$, $P < 0.001$). No significant moderating effects were observed for the remaining pathways (Table 4).

Standardized positive illusion scores were divided into high and low groups based on ±1 standard deviation. Simple slope analysis examined the moderating effect of positive daydreaming on relationships between cyberbullying victimization, ambivalence over emotional expression, psychological resilience, and NSSI. As shown in Figure 2, when positive illusion was at −1 SD, cyberbullying strongly predicted ambivalence over emotional expression ($\beta = 0.303$, $t = 4.803$, $P < 0.001$).This predictive effect weakened at +1 SD positive illusion ($\beta = 0.134$, $t = 3.590$, $P < 0.001$).

When positive illusion was at +1 SD above the mean, cyberbullying victimization positively predicted NSSI ($\beta = 0.240$, $t = 6.770$, $P < 0.001$). This predictive effect became non-significant at −1 SD (Figure 3). Furthermore, under high positive illusion conditions, ambivalence over emotional expression positively predicted NSSI ($\beta = 0.294$, $t = 6.613$, $P < 0.001$). Under low positive illusion, the prediction was not significant. See Figure 4.

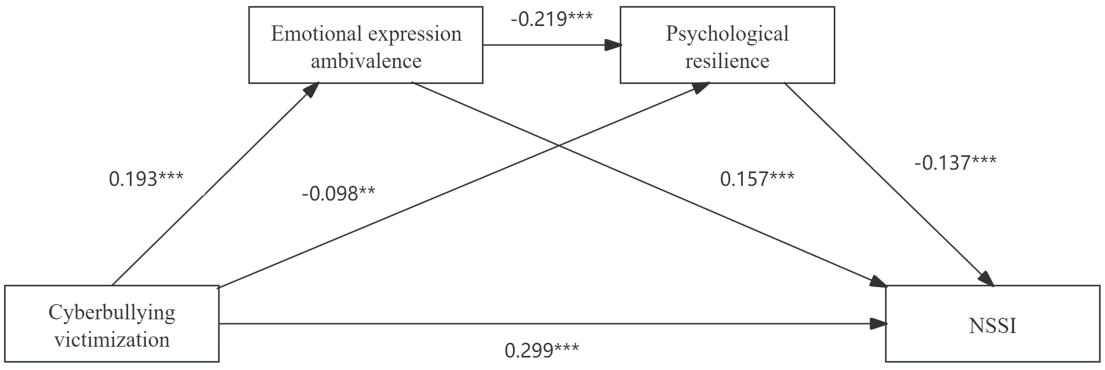

Figure 1 Shows the relationship between Cyberbullying Victimization, Emotional Expression Ambivalence, Psychological Resilience, and NSSI. **P<0.01, ***P<0.001.

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Table 3 Results of Serial Mediation Analysis Using Bootstrap

	Path	Standardized Effect	SE	95% CI [LL, UL]	Relative Effect (%)
Direct effect	Cyberbullying victimization → NSSI	0.299	0.036	[0.228, 0.369]	85.92
Indirect effect	Cyberbullying victimization → Emotional expression ambivalence → NSSI	0.030	0.008	[0.016, 0.047]	8.62
	Cyberbullying victimization → Psychological resilience → NSSI	0.013	0.008	[0.004, 0.031]	3.74
	Cyberbullying victimization → Emotional expression ambivalence → Psychological resilience → NSSI	0.006	0.003	[0.002, 0.012]	1.72

Table 4 Results of Moderation Analysis

Variable	Emotional Expression Ambivalence		Psychological Resilience		NSSI	
	β	t	*β*	t	*β*	t
Positive illusion	0.302	8.169***	−0.301	−7.513***	0.030	0.772
Cyberbullying victimization	0.211	4.682***	0.014	0.301	0.102	2.390*
Cyberbullying victimization*Positive illusion	−0.096	−3.637***	−0.046	−1.707	0.170	6.634***
Emotional expression ambivalence			−0.144	−3.781***	0.197	5.489***
Emotional expression ambivalence*Positive illusion			−0.038	−1.118	0.119	3.690***
Psychological resilience					−0.109	−3.036**
Psychological resilience*Positive illusion					−0.036	−1.284
R^2	0.135		0.147		0.261	
F	35.314***		23.368***		34.058***	

Notes: *$P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

Discussion

This study found that cyberbullying victimization significantly and positively predicted NSSI among college students, consistent with findings from previous studies.[35,36] A longitudinal investigation indicated that cyberbullying

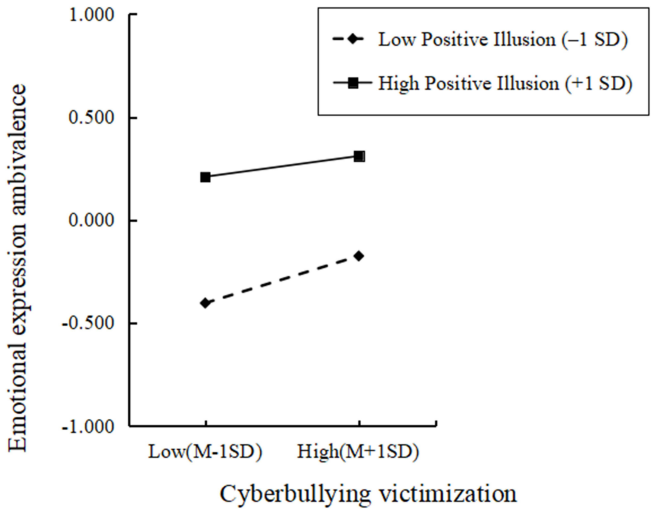

Figure 2 Model of the test for simple slopes showing the moderating effect of positive illusion on the relationship between cyberbullying victimization and emotional expression ambivalence.

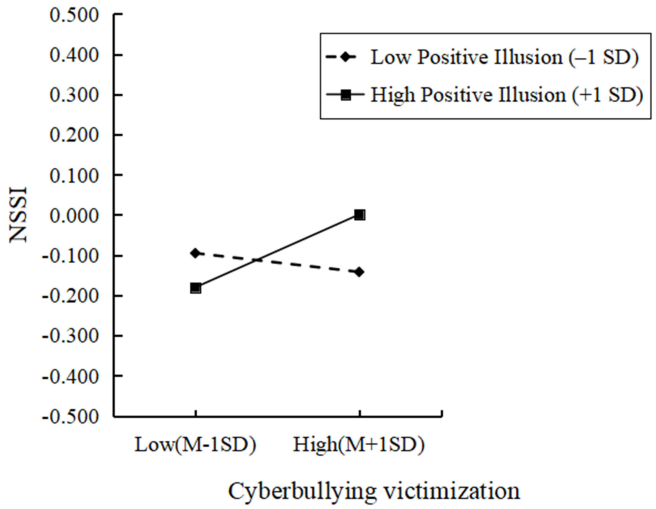

Figure 3 Model of the test for simple slopes showing the moderating effect of positive illusion on the relationship between cyberbullying victimization and NSSI.

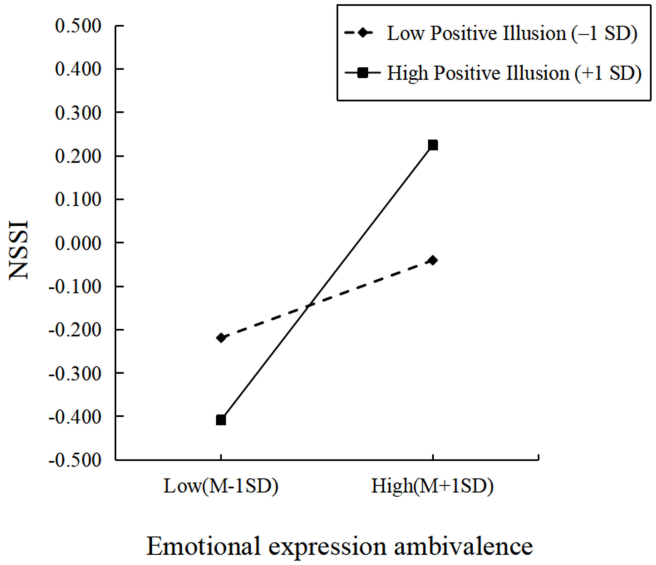

Figure 4 Model of the test for simple slopes showing the moderating effect of positive illusion on the relationship between emotional expression ambivalence and NSSI.

victimization serves as a significant predictor of NSSI, with evidence suggesting this influence may intensify over time,[3] further underscoring the severe harm of cyberbullying as a psychological stressor. According to General Strain Theory, the persistent, anonymous, and pervasive nature of cyberbullying renders it an inescapable negative life event.[37] When individuals experience such stress, they are more prone to intense negative emotions such as anger, depression, anxiety, shame, and helplessness, which are significant triggers of NSSI.[10] Confronted with unbearable emotional distress, some college students may adopt maladaptive coping strategies such as NSSI. Using physical pain to divert, alleviate, or punish themselves, thereby temporarily escaping psychological torment.[10,38]

Ambivalence over emotional expression played a partial mediating role between cyberbullying victimization and NSSI. Cyberbullying increases the risk of NSSI by exacerbating ambivalence over emotional expression. Victims of cyberbullying often face an "expression dilemma": on one hand, they experience intense inner distress and grievance and have a strong desire to confide and seek help; on the other hand, due to fear of secondary victimization, concerns about being misunderstood, or feelings of shame. They often choose to suppress and conceal their true feelings, reflecting a conflict between "wanting to express" and "daring not to express." The Cognitive-Emotional Model posits that when

individuals facing external stress cannot express their emotions in healthy ways, they are more likely to choose NSSI as a means of emotional regulation.[39] Studies have indicated that emotion dysregulation, particularly the non-acceptance of emotional responses and a lack of emotional clarity, is associated with an increased frequency of NSSI.[40] Chronic emotional suppression leads individuals to adopt maladaptive coping strategies,[18] where self-harm serves as a direct bodily means to release accumulated emotional pressure, bypassing verbal expression barriers and providing temporary relief.

Furthermore, psychological resilience also mediated the relationship between cyberbullying victimization and NSSI. Psychological resilience, which encompasses positive adaptation and recovery capabilities, helps individuals resist emotional and behavioral problems in adversity.[16] Cyberbullying victimization, as a persistent negative stimulus, continuously depletes psychological resources, weakens their self-confidence and self-efficacy, and consequently impairs their psychological resilience.[41] This erosion of resources aligns with the Conservation of Resources (COR) theory, which posits that sustained stress leads to resource depletion and increased vulnerability to negative outcomes.[42] A lower level of psychological resilience means a reduced ability to cope with adversity and recover from trauma. When faced with the significant psychological impact of cyberbullying, individuals with low resilience find it more difficult to mobilize effective cognitive and behavioral strategies to cope, making them more susceptible to despair and helplessness, thereby increasing the risk of engaging in maladaptive behaviors such as NSSI. Research on college student populations has found that academic stress significantly impairs academic self-efficacy, and low self-efficacy is in turn associated with poorer psychological adjustment outcomes.[21] Whether traditional academic stress or emerging stressors like cyberbullying, both may increase behavioral risks by undermining individuals' psychological resources —such as self-efficacy and psychological resilience. A cross-lagged panel study conducted among Chinese adolescents also indicates that depressive symptoms and learning difficulties mutually influence each other and jointly contribute to declines in academic achievement.[22] Impairments in adaptive capacities (eg, psychological resilience) may constitute a key mediating pathway from stress to adverse outcomes. It is important to acknowledge that this study is based on cross-sectional data. Although the directional associations identified among the variables are theoretically grounded and consistent with existing frameworks, reverse causation cannot be ruled out. For instance, pre-existing NSSI behaviors may heighten individuals' ambivalence over emotional expression or lead them to perceive their psychological resilience as lower, rather than these psychological mechanisms necessarily preceding NSSI. Future research employing longitudinal or cross-lagged designs is needed to clarify the temporal ordering of these variables and to unravel potential bidirectional or dynamic relationships among them.

This study's findings reveal that cyberbullying victimization can influence NSSI through the chain mediating effects of ambivalence over emotional expression and psychological resilience. The Broaden-and-Build Theory of Positive Emotions suggests that positive emotions can broaden an individual's scope of cognition and action and build long-term personal resources, such as psychological resilience.[43] Cyberbullying initially triggers ambivalence over emotional expression in victimized college students, causing them in persistent negative emotions and limiting opportunities for positive affect. Moreover, prolonged inner struggle and emotional suppression consume substantial cognitive and psychological resources, thereby diminishing the individual's ability to build and maintain psychological resources, leading to a continuous loss of resources and a significant decline in psychological resilience.[41] Individuals with lower psychological resilience find it more challenging to employ effective coping strategies, maintain a positive self-perception, or seek social support when facing persistent cyberbullying pressure. Consequently, maladaptive coping mechanisms such as NSSI may activate as a desperate means to alleviate helplessness and psychological anguish. This chain mediation model integrates variables at emotional, cognitive, and coping ability levels, providing a more comprehensive and profound perspective for understanding the mechanisms underlying NSSI. This integrated model highlights the cumulative nature of risk. Contemporary developmental psychopathology models posit cascading effects, suggesting that early emotional dysregulation predicts later deficits in coping resources, thereby elevating the risk of harmful behaviors such as NSSI.[44]

Although the model in the present study accounted for 17.2% of the variance in NSSI ($R^2 = 0.172$), confirming the important roles of ambivalence over emotional expression and psychological resilience, it also indicates that a substantial proportion of variance is attributable to other unexamined factors. This is consistent with the contemporary conceptualization of NSSI as a multifactorial and multidetermined behavior. Recent systematic reviews have highlighted the significant contributions of additional domains—including deficits in specific emotion regulation strategies (eg, rumination), genetic and epigenetic mechanisms, histories of childhood maltreatment, and various forms of social disconnection.[44,45] Future research should therefore

incorporate a broader spectrum of both protective and risk factors to develop a more comprehensive and theoretically refined model of NSSI.

Positive illusion played a moderating role in the pathway from cyberbullying victimization to NSSI. Specifically, individuals with high levels of positive illusion were more likely to engage in NSSI when exposed to cyberbullying. This finding suggests that positive illusion is not entirely a positive psychological resource. According to positive illusion theory, although moderate positive illusions (such as overly optimistic self-evaluations) may benefit mental health, excessively idealized illusions can distort reality perception. When individuals encounter negative feedback or real-life setbacks, this cognitive bias can exacerbate cognitive dissonance and even lead to maladaptation.[46] This study expands the understanding of positive illusion, indicating that moderate levels foster optimism, whereas excessive illusion may increase NSSI risk following cyberbullying victimization.

The findings provide insights for the prevention and intervention of NSSI in universities. Firstly, interventions should not only focus on anti-bullying education but also address the internal psychological processes of victims. Encouraging students to express and manage negative emotions in safe and healthy ways can help break the vicious cycle of ambivalence over emotional expression. Additionally, resilience training programs can be implemented to cultivate students' positive cognition, interpersonal skills, and problem-solving abilities, thereby building a robust psychological "immune system".

This study has several limitations. First, the use of a convenience sampling method with participants drawn from a single regional medical school may limit the generalizability of the findings to broader populations and diverse age groups. This choice was primarily driven by practical constraints during data collection, and potential selection biases warrant further investigation. Second, reliance on self-report questionnaires may introduce social desirability bias, particularly for sensitive constructs like positive illusion. Future research could benefit from incorporating multi-source data (eg, peer reports) to mitigate this limitation. Third, although the cross-sectional design is suitable for initial hypothesis testing, it precludes definitive causal inferences. To better elucidate the temporal dynamics of the psychological processes involved, future studies should consider employing longitudinal tracking or experimental intervention methods. Further research could also expand the current model by including additional mediators such as social support or emotion regulation, thereby offering a more comprehensive understanding of the mechanisms through which cyberbullying victimization influences psychological and behavioral outcomes. Furthermore, the concept of positive illusion requires more precise definition and measurement tools. Developing and validating a positive illusion scale suitable for the Chinese cultural context would be a valuable direction for future research.

Conclusions

This study shows that cyberbullying victimization is linked to higher levels of NSSI among college students. The link is partly explained by ambivalence over emotional expression and psychological resilience, which act as individual mediators and also operate in sequence. Positive illusion moderates this relationship, with the association between cyberbullying victimization and NSSI becoming stronger at higher levels of positive illusion. These findings are based on cross-sectional data and reflect observed associations rather than causal effects. They point to specific psychological factors that may help explain how cyberbullying relates to NSSI in this sample.

Abbreviations

NSSI, Non-suicidal self-injury; AEQ, Ambivalence Over Emotional Expression Questionnaire, AEQ-ER, AEQ-emotional rumination; AEQ-IPEE, AEQ-inhibit positive emotional expression; AEQ-INEE, AEQ-inhibit negative emotional expression; AEQ-DTU, AEQ-desire to be understood; AEQ-RE, AEQ-regret expressing; CPIQ, College Students' Positive Illusion Questionnaire; CPIQ-A, CPIQ-idealization; CPIQ-C, CPIQ-controllability; CPIQ-O, CPIQ-optimism.

Data Sharing Statement

The datasets generated and/or analyzed during the current study are not publicly available due to ethical reasons but are available from the corresponding author, Yong Zeng, upon reasonable request via email.

Ethics Approval and Consent to Participate

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or

comparable ethical standards. The study protocol was approved by the ethical committee of the Second Affiliated Hospital of Kunming Medical University. Ethical review approval number: audit-PJ-Co-2025-145. Informed consent for this study was obtained from all participants, parents, and the schools concerned.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare no conflicts of interest in this work.

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