

Original Research

Longitudinal Associations Between Stressful Life Events and Online Trolling: The Chain Mediating Effect of Depression and Social Networking Site Addiction

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Abstract

Background: Stressful life events (SLEs) can trigger psychological and behavioral problems among college students. Existing research has established a preliminary cross-sectional association between SLEs and online trolling. However, the longitudinal mechanisms underlying this relationship remain unclear. **Methods:** This study employed a structural equation modeling approach to conduct a three-wave longitudinal survey over six months, with three-month intervals, among 501 Chinese college students. This work aimed to develop a chain mediation model to examine the association between SLEs and online trolling, with a specific focus on the mediating roles of depression (emotional factor) and social networking site (SNS) addiction (behavioral factor). Participants completed validated scales measuring SLEs, depression, SNS addiction, and online trolling. **Results:** The findings suggest a direct correlation between SLEs and the phenomenon of online trolling among Chinese college students. Additionally, depression not only independently mediated the longitudinal relationship between SLEs and online trolling but also served as a serial mediator in conjunction with SNS addiction. **Conclusions:** This investigation focused on the influence of environmental stressors, as well as individual emotional and behavioral factors, on online trolling among college students, providing longitudinal evidence to clarify the mechanisms underlying online trolling and offering insights for its prevention and intervention.

Keywords: college students; stressful life events; depression; social networking site addiction; online trolling

1. Introduction

Online trolling refers to the behavior of individuals who maliciously create conflict and provoke others by making inflammatory, provocative and destructive statements on the internet (Buckels et al., 2014; Sest and March, 2017), and it is essentially an individual behavioral problem. Unlike cyberbullying, which involves persistent attacks targeting specific individuals, online trolling is not directed at particular targets but is characterized by provocation and self-amusement (Buckels et al., 2014; Dynel, 2016; Navarro-Carrillo et al., 2021). Trolls initiate purposeless harassment to provoke broader discussion and attract attention (March and Marrington, 2019), potentially inciting multiparty conflicts. Online trolling often severely affects victims' well-being, heightening the risk of anxiety, depression, self-harm, and suicidal tendencies (March and Marrington, 2019; Rodway et al., 2023). In recent years, there has been a noticeable trend toward online trolling among younger demographics. In a study by March and Marring-

ton (2019), 25% of participants reported having engaged in online trolling against others. However, this figure is substantially lower than the strikingly greater prevalence reported by Hong and Cheng (2018), who reported that 71.2% of Chinese college students engage in online trolling on a weekly basis. It is therefore necessary to conduct an in-depth investigation into this phenomenon among college students in the context of Chinese culture.

Previous studies have focused primarily on the impact of common factors influencing online aggressive behavior on online trolling, such as the Dark Tetrad and anonymity (Buckels et al., 2014; Nitschinsk et al., 2022). In recent years, with increased attention given to the influencing factors of online trolling, scholars have begun to focus on specific environmental factors, including peer victimization and antisocial online content (Qiu et al., 2024; Santos et al., 2023). However, compared with being associated with specific stressors, stress tends to be more diverse among college students (Pariat et al., 2014). Therefore, we pay



special attention to stressful life events (SLEs), a variable representing the multiple cumulative stresses faced by college students (Liu et al., 1997). A study has shown that SLEs significantly affect adolescent cyberbullying (a form of online aggressive behavior) (Wang and Shi, 2024), but their impact on online trolling, a broader form of online aggressive behavior, remains unclear. Furthermore, while existing findings have established direct links between emotions (e.g., depression), behavioral factors [e.g., social networking site (SNS) addiction], and online trolling (Li et al., 2024; Xu, 2025), the combined mechanism of these factors remains unexplored. Consequently, whether and how SLEs influence online trolling among college students through these internal pathways remain unclear. Longitudinal studies have demonstrated developmental changes in SLEs, depression, and SNS addiction (Li et al., 2019; Wijbenga et al., 2022; Wu et al., 2024). Given this temporal variability, cross-sectional studies face methodological constraints in establishing temporal sequences among these variables. Therefore, establishing a chain mediation model is warranted to examine how SLEs directly and indirectly influence individuals' online trolling over time.

On the basis of problem behavior theory (Jessor, 1987), which posits that problematic behaviors are influenced by the combined effects of the social–environmental system, personality system, and behavioral system, and according to general strain theory (GST), environmental stressors can induce negative emotions among individuals, thereby increasing their risk of developing problematic behaviors (Agnew, 1992). Integrating these two theoretical perspectives, environmental stressors (e.g., SLEs) lead to the occurrence of other problematic behaviors (e.g., online trolling) through emotions (e.g., depression) and behavioral issues (e.g., SNS addiction), forming a chain transmission path. On the basis of these theoretical foundations, the present study aimed to delineate the temporal sequence and underlying mechanisms linking SLEs to online trolling. This work examined whether SLEs, as the independent variable, influenced subsequent online trolling (the dependent variable) through the chain mediation of depression (an emotional factor) and SNS addiction (a behavioral factor) over time.

1.1 SLEs and Online Trolling

SLEs refer to negative life changes in daily living that may induce psychological stress (March-Llanes et al., 2017). These events encompass multiple domains, including academic, familial, and peer relationships, representing the aggregate of all negative influences in an individual's life (Liu et al., 1997). Importantly, SLEs may constitute significant risk factors for online trolling. The frustration–aggression hypothesis provides a foundational framework for understanding how SLEs may directly lead to online trolling. This hypothesis posits that frustration, often stemming from blocked goals (like those encountered in SLEs),

can trigger aggressive behavior (Berkowitz, 1989). We propose that online trolling can be one manifestation of such aggression when individuals encounter SLEs in their daily lives. An empirical study has supported the strong link between SLEs and online aggressive behavior; a cross-sectional study has shown that SLEs significantly and positively predict cyberbullying (Geng and Lei, 2021). Given that online trolling exhibits aggressive behavioral traits similar to those of cyberbullying (Craker and March, 2016), it can be hypothesized that online trolling may likewise be influenced by SLEs. Wilson and Seigfried-Spellar (2023) further reported that economic and social stress were significantly and positively associated with online trolling. Moreover, research has indicated that those individuals facing SLEs often have elevated anxiety and depression levels coupled with diminished self-esteem (Lee, 2020) and individual psychological characteristics that are highly consistent with those typical of online trolls (Hong and Cheng, 2018). Therefore, SLEs may be positively correlated with online trolling.

1.2 Mediating Role of Depression and SNS Addiction

First, depression is a common negative emotional response in individuals and is characterized mainly by low mood, worry, and pessimism (Liu and Wang, 2022). GST suggests that stressors cause individuals to develop negative emotions, which in turn produce problematic behaviors (Agnew, 1992). On the basis of this theoretical framework, SLEs—significant environmental stressors—can induce negative emotional experiences such as depression among individuals. In anonymous online settings, people may use unhealthy coping mechanisms such as online provocation to ease psychological discomfort. On the one hand, a consistent body of research has indicated that the frequency and intensity of SLEs positively correlate with elevated depression levels (Chang, 2001; Xie et al., 2022). This finding suggests that college students who are exposed to SLEs are more prone to experiencing depressive emotions, including feelings of despair and disappointment, than are those who are not exposed to SLEs. On the other hand, cross-sectional analyses have revealed that depression is a major factor in predicting engagement in online trolling (Hong and Cheng, 2018; Li et al., 2024). Over time, negative emotional states such as depression may have persistent adverse effects on individuals. As depression accumulates, individuals may exhibit heightened anger and hostility during online interactions (Riley et al., 1989), thereby increasing their susceptibility to online trolling. Therefore, we propose that depression plays a potential role as a mediator that links SLEs to online trolling.

Additionally, SNS addiction is an unhealthy form of SNS use that manifests itself in the user's inability to self-control and persistent and compulsive use of SNSs, a specific form of internet addiction (Andreassen and Pallesen, 2014; Koc and Gulyagci, 2013). Problem behavior theory

posits that problematic behaviors are not caused by a single factor but rather result from the combined influence of personality, social-environmental, and behavioral systems (Jessor, 1987). From this perspective, SLEs from the environmental system, acting as external stressors, and SNS addiction from the behavioral system together constitute risk factors for the problematic behavior of online trolling. Research has shown that stress directly and positively predicts SNS addiction (Hou et al., 2019; Li et al., 2010). As individuals experience increased stress, they may become more inclined to immerse themselves in social networks as a means of escaping real-world difficulties. Furthermore, SNS addiction increases an individual's exposure to anti-social online content. Prolonged exposure to such violent or fraudulent material can gradually shape subsequent mental schemas and behavioral patterns, thereby increasing the likelihood of initiating trolling during online interactions (Santos et al., 2023). Critically, individuals with SNS addiction typically exhibit diminished self-regulatory capacity (Błachnio and Przepiorka, 2016), which compromises their impulse control and consequently predisposes them to engaging in provocative and disruptive behaviors. Empirical studies demonstrate that SNS addiction positively predicts online trolling (Howard et al., 2019; Li et al., 2025). In summary, SNS addiction may mediate the relationship between SLEs and online trolling.

Furthermore, depression and SNS addiction may exhibit a chain mediating effect between SLEs and online trolling. On the one hand, an empirical study has demonstrated a close association between depression and SNS addiction (Elhai et al., 2017). On the other hand, compensatory internet use theory explains how individuals often turn to the internet to escape real-life problems and alleviate negative emotions (e.g., depression), thereby increasing the risk of problematic behaviors (e.g., SNS addiction). Specifically, individuals exposed to a larger number of SLEs show elevated depression levels compared to their unexposed counterparts (Xie et al., 2022). To cope, these individuals may increasingly turn to social networks for psychological compensation and emotional catharsis as a way to temporarily escape real-life stressors (Kim and Bae, 2022), a behavior that ultimately exacerbates SNS addiction. Li et al. (2025) reported a long-term correlation between increased SNS addiction and subsequent online trolling. Therefore, we hypothesize that SLEs may first increase depression levels, subsequently triggering SNS addiction, thereby increasing the likelihood of their participation in online trolling.

1.3 Present Study

On the basis of the literature review, this study constructed a chain mediation model to examine the direct and indirect effects of SLEs on online trolling among Chinese college students. Longitudinal data from three waves of

surveys conducted over a six-month period were used in this study. The following hypotheses are proposed:

Hypothesis 1: SLEs are positively correlated with online trolling over time.

Hypothesis 2: Depression mediates the relationship between SLEs and online trolling.

Hypothesis 3: SNS addiction mediates the relationship between SLEs and online trolling.

Hypothesis 4: Depression and SNS addiction play a chain mediating role in the relationship between SLEs and online trolling.

2. Materials and Methods

2.1 Participants and Procedures

The study participants originated from extensive research examining elements linked to online trolling (Li et al., 2025). A convenience sampling method was employed to recruit college students from one university in each of three Chinese provinces (Sichuan, Hubei, and Hunan) for a six-month longitudinal study. Specifically, the questionnaires were distributed at Sichuan Normal University, Hubei University of Technology, and Hunan University of Finance and Economics. This approach enhanced the representativeness of the sample by broadening its geographical distribution. Data were collected in September 2023, December 2023, and March 2024, and a 3-month interval was chosen because this was considered an appropriate period in a previous study (Li et al., 2019). At both the T1 and T2 stages, all the study variables were measured. Specifically, 714 valid questionnaires were collected at T1, and 583 valid questionnaires were collected at T2. Considering the existing participant attrition after T2, remeasuring all the variables at T3 would further exhaust participants' patience due to the excessive number of items and exacerbate the risk of attrition. Therefore, we decided to measure only online trolling at T3, which resulted in a final sample of 501 valid questionnaires. The final questionnaire retention rate was 70.17%. At baseline (T1), participants' average age was 18.95 ± 1.58 years. The sample was composed of 52.1% females and 50.3% urban residents, with a grade distribution of 53.5% freshmen, 6.4% sophomores, 25.5% juniors, and 14.6% seniors.

Given that some participants bailed midway through the study, we ran an attrition analysis to determine whether there were any major differences at the outset (T1) between those who stuck it out and completed all three surveys (the retention group) and those who dropped out after the first survey (the attrition group). Specifically, we wanted to compare their initial levels of SLEs, depression, SNS addiction, and online trolling. Statistical analyses, including both chi-square and independent sample *t* tests, revealed no significant differences between the two groups on key variables, including SLEs ($t = -1.343$, $p = 0.180$), depression ($t = 1.460$, $p = 0.145$) and online trolling ($t = -1.219$, $p = 0.223$). Men were more likely to withdraw from the test

than were women ($\chi^2 = 12.316, p < 0.001$), a pattern that may stem from men's generally lower patience in completing questionnaires (Porter and Whitcomb, 2005), making them more prone to dropout in longitudinal designs requiring repeated assessments. The retention group [Mean (M) = 20.824, SD = 7.441] showed significantly higher levels of SNS addiction than did the attrition group (M = 19.493, SD = 7.808), $t = 2.155, p = 0.031$, which may be because individuals with greater SNS addiction were more motivated to complete the study because of its relevance to their daily online experiences. Although this difference was significant, the effect size was small (Cohen's $d = 0.174 < 0.5$). Overall, the assessment of systematic bias suggests that the potential bias introduced by participant attrition is at a low level.

The research protocol received ethical approval from the author's institutional ethics committee (Ethics Approval Number: SCNU-230904). Research questionnaires were administered to participants via the wxj.cn online platform by professionally trained instructors and psychological practitioners from each participating university. Prior to the survey, our research staff provided detailed instructions to participants. Participants then scanned a quick response code using their personal mobile devices to sign an electronic informed consent form, indicating their voluntary participation on the basis of their clear understanding of the research procedures. We collected each participant's student ID in the questionnaire for data matching across the three waves of tracking. All the data were transmitted directly to the principal investigator's backend system on wxj.cn to maximize the participant anonymity. Participants retained the unconditional right to discontinue their involvement at any point during the data collection process without penalty. As an incentive, small monetary compensation was provided to those participants who completed all three waves of the survey. The entire data collection procedure remained strictly consistent across the three waves of follow-up surveys (T1, T2, and T3) conducted over the six-month period.

2.2 Measures

2.2.1 SLEs

SLEs were quantified via Xin and Yao's (2015) revised Adolescent Life Events Scale. The scale consists of five dimensions—punishment, loss, interpersonal stress, academic stress, and adaptation—with a total of 26 items (e.g., "Disputes with classmates or friends"). Responses were scored on a 6-point Likert scale ranging from 0 (the event did not occur) to 5 (the event occurred and had a heavy impact on one's self), with higher scores indicating that the negative event had a greater effect on the individual. Confirmatory factor analysis demonstrated acceptable model fit [$\chi^2/df = 3.348$, Root Mean Square Error of Approximation (RMSEA) = 0.069, Comparative Fit Index (CFI) = 0.916, Tucker-Lewis Index (TLI) = 0.901], supporting the con-

struct validity of the scale. As the most widely used measure for measuring SLEs among Chinese college students, this scale has shown strong reliability and validity (An et al., 2024). In this study, the internal consistency reliability of the scale was high at T1 (Cronbach's $\alpha = 0.943$).

2.2.2 Depression

Depression was measured using the depression subscale of the Depression Anxiety Stress Scale (DASS-21), which was translated and revised by Gong et al. (2010). This subscale includes 7 items (e.g., "I do not seem to be able to feel any more joy or comfort") rated on a 4-point Likert scale, where 1 means "does not meet" and 4 means "always meets". Higher total scores reflect more pronounced depression. Confirmatory factor analysis demonstrated acceptable model fit ($\chi^2/df = 1.804$, RMSEA = 0.040, GFI = 0.987, CFI = 0.995, TLI = 0.991), providing strong evidence for the construct validity of the scale. The scale has been well established to be suitable for Chinese college students, with good reliability and validity (Gong et al., 2010). In this study, the internal consistency reliability of the scale was satisfactory at T2 (Cronbach's $\alpha = 0.902$).

2.2.3 SNS Addiction

SNS addiction was measured using the Social Networking Site Addiction Scale developed by Koc and Gulyagci (2013) and translated by Chen et al. (2018). The scale consists of eight items (e.g., "I have tried to reduce the time spent on SNSs but ultimately failed to do so") and is scored on a 5-point Likert scale ranging from 1 (not at all compliant) to 5 (fully compliant), with higher scores indicating a stronger degree of SNS addiction among individuals. The construct validity was supported by confirmatory factor analysis, with all key indices meeting acceptable model fit ($\chi^2/df = 3.780$, RMSEA = 0.075, GFI = 0.971, CFI = 0.980, TLI = 0.966). This scale has shown good reliability and validity in a previous study (Yan et al., 2023). The internal consistency reliability of the scale was good at T2, with a Cronbach's $\alpha = 0.913$.

2.2.4 Online Trolling

Online trolling was measured using the Revised Global Assessment of Internet Trolling Scale (GAIT-Revised) developed by Sest and March (2017) and translated by Li et al. (2024). The scale consists of eight items on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with the 6th items scored in the reverse direction (e.g., "I do not like to start arguments or cause trouble online") and the rest scored in the positive direction. Higher scores reflect greater individual engagement in online trolling. The findings from the confirmatory factor analysis indicated adequate construct validity for the scale, with good fit indices at T1 ($\chi^2/df = 4.750$, RMSEA = 0.087, CFI = 0.980, TLI = 0.967) and T3 ($\chi^2/df = 4.472$,

Table 1. Means, standard deviations, and correlation analysis between variables.

	M	SD	1	2	3	4	5	6
1. T1 Gender	-	-	-					
2. T1 Online trolling	12.545	5.293	-0.183***	-				
3. T1 SLEs	55.878	18.963	0.045	0.366***	-			
4. T2 Depression	10.251	3.770	0.024	0.196***	0.329***	-		
5. T2 SNS addiction	21.126	7.180	0.217***	0.114*	0.245***	0.440***	-	
6. T3 Online trolling	11.190	4.091	-0.169***	0.383***	0.179***	0.215***	0.151***	-

Note. * $p < 0.05$, *** $p < 0.001$, T = Time, 1 = T1 Gender, 2 = T1 Online trolling, 3 = T1 SLEs, 4 = T2 Depression, 5 = T2 SNS addiction, 6 = T3 Online trolling.

M, mean; SNS, Social Networking Site; SLEs, Stressful life events.

Table 2. Significance test of mediating effects.

Model path	Effect	SE	95% CI
1. T1 SLEs → T2 depression → T3 online trolling	0.054	0.021	[0.013, 0.095]
2. T1 SLEs → T2 SNS addiction → T3 online trolling	0.010	0.006	[-0.001, 0.021]
3. T1 SLEs → T2 depression → T2 SNS addiction → T3 online trolling	0.015	0.007	[0.001, 0.029]
4. Total indirect effect	0.079	0.029	[0.022, 0.136]

Note. SE, standard error.

RMSEA = 0.083, CFI = 0.961, TLI = 0.943). The Cronbach's α values of this scale at T1 and T3 were 0.809 and 0.717, respectively.

2.3 Data Analyses

SPSS (Version 26.0; License: 10.21.6.66; IBM Corp., Armonk, NY, USA) and Mplus (Version 8.3; Serial Number: SABC8012019; Muthén & Muthén, Los Angeles, CA, USA) were used to analyze the data. The steps were as follows: (1) the data were analyzed using SPSS 26.0 for common method bias testing, descriptive statistics, and Pearson's correlation analyses, and (2) Mplus 8.3 (Muthén and Muthén, 2000) was used to develop a structural equation model to examine the longitudinal association between SLEs and online trolling, as well as the mediating roles of depression and SNS addiction. All latent variables were modeled as follows: SLEs were modeled using the five dimensions of the scale, while the unidimensional constructs of depression, SNS addiction, and online trolling were modeled using the balanced item parceling strategy (Wu and Wen, 2011), resulting in 3, 2, and 2 parcels, respectively. In the analysis, we accounted for baseline (T1) online trolling and gender. The significance level for all the statistical tests was set at $\alpha = 0.05$ (two-tailed). To rigorously test these mediation pathways, we employed a bias-corrected bootstrap method with 95% confidence intervals and regarded indirect effects as significant if the intervals excluded zero.

3. Results

3.1 Common Method Bias

The common method bias test conducted on the data revealed 8 factors with eigenvalues greater than 1. The first factor accounted for 26.046% of the variance, which is be-

low the critical threshold of 40%. This finding indicates that common method bias does not affect the results.

3.2 Descriptive Statistics and Correlation Analysis

The descriptive statistics and correlations for the key and control variables are presented in Table 1. Specifically, T1 SLEs were positively correlated with T2 depression ($r = 0.329, p < 0.001$), T2 SNS addiction ($r = 0.245, p < 0.001$), and T3 online trolling ($r = 0.179, p < 0.001$). T2 depression was positively correlated with T2 SNS addiction ($r = 0.440, p < 0.001$) and T3 online trolling ($r = 0.215, p < 0.001$), and T2 SNS addiction was also positively correlated with T3 online trolling ($r = 0.151, p < 0.001$).

3.3 Analysis of the Longitudinal Mediating Effects of Depression and SNS Addiction

To verify whether the longitudinal mediation model was valid, a structural equation model was constructed with SLEs as the independent variable, depression and SNS addiction as the mediator variables, and online trolling as the dependent variable. The model was found to have a goodness of fit of $\chi^2/df = 4.49$, RMSEA = 0.084, CFI = 0.936, and TLI = 0.913. The results of the mediation model are shown in Fig. 1; T1 SLEs significantly and positively predicted T2 depression ($\beta = 0.376, p < 0.001$) and T2 SNS addiction ($\beta = 0.111, p = 0.007$) but did not significantly predict T3 online trolling ($\beta = -0.027, p = 0.759$). T2 depression significantly and positively predicted T2 SNS addiction ($\beta = 0.431, p < 0.001$) and T3 online trolling ($\beta = 0.143, p = 0.006$). T2 SNS addiction significantly predicted T3 online trolling ($\beta = 0.091, p = 0.036$).

The results of the significance tests for the mediating effects are presented in Table 2. The data revealed that the 95% confidence interval of the path T1 SLEs → T2 depres-

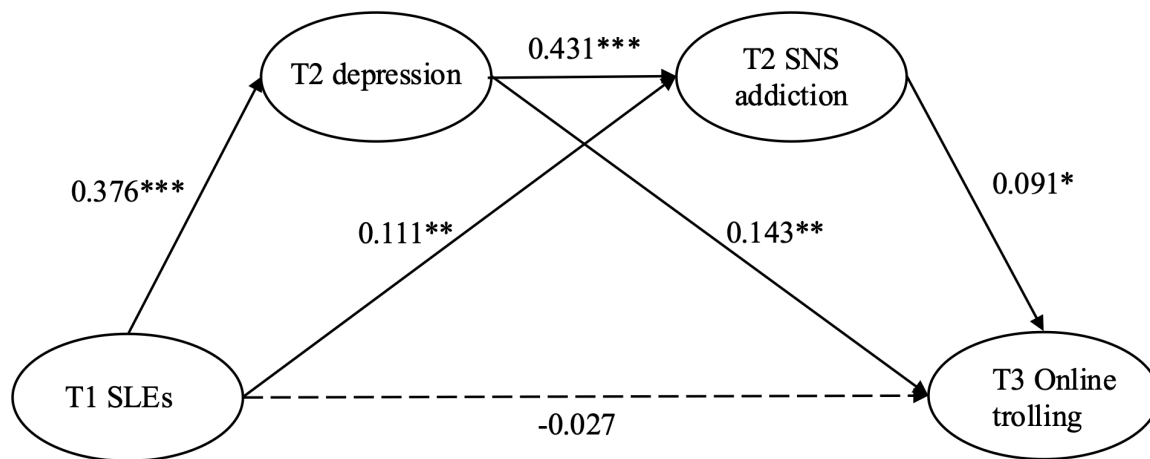


Fig. 1. Mediation effect plots for Depression and SNS addiction. Note. $*p < 0.05$, $**p < 0.01$, $***p < 0.001$. Solid lines mean the coefficients of those paths are significant, while dashed lines mean the coefficients of those paths are not significant. The observed variables and control variables are not shown for brevity.

sion $\rightarrow$ T3 online trolling did not contain 0, indicating a significant mediating role of depression. The 95% confidence interval for the path T1 SLEs $\rightarrow$ T2 SNS addiction $\rightarrow$ T3 online trolling contained 0, indicating that the mediating effect of SNS addiction was not significant. The 95% confidence interval for the path T1 SLEs $\rightarrow$ T2 depression $\rightarrow$ T2 SNS addiction $\rightarrow$ T3 online trolling did not contain 0, indicating a significant chain mediation effect of depression and SNS addiction.

4. Discussion

This research was groundbreaking in its application of a longitudinal approach to investigating the correlation between SLEs and the phenomenon of online trolling. Additionally, this work further explored the potential mediating roles of depression (an emotional factor) and SNS addiction (a behavioral factor) in this relationship. The study revealed that SLEs were positively correlated with online trolling over time, that depression mediated the relationship between SLEs and college students' online trolling, and that a chain mediating effect between depression and SNS addiction existed.

4.1 Relationship between SLEs and Online Trolling

The results indicated that college students' SLEs were significantly and positively associated with online trolling, and Hypothesis 1 was validated. This study demonstrates that SLEs, as pervasive environmental stress factors, serve as a significant predictor of online trolling among college students. Furthermore, this study provides reliable longitudinal evidence for the first time, demonstrating the association between SLEs and an increase in online trolling. These findings further support the frustration-aggression hypothesis (Berkowitz, 1989) and are in line with past research showing that SLEs can be viewed as antecedents to the on-

set of online trolling (Wilson and Seigfried-Spellar, 2023). College students navigate the shift from late adolescence into early adulthood, a time marked by heightened exposure to difficult experiences (Hurst et al., 2013), and their lack of social experience often makes it difficult for them to effectively cope with complex stressors from interpersonal, academic, familial, and social sources. In the context of collectivist culture, given the expectations of the group and social evaluation, aggressive behaviors that violate social norms in reality can be carried out in the anonymous online space (Rösner and Krämer, 2016). Specifically, the aggressive tendencies generated under the influence of SLEs can shift from offline to safer online environments, manifesting as online trolling. Moreover, online trolling may become their predominant mode of aggression. The reasons for this are twofold. First, in online interactions, trolls often employ ambiguous rhetoric rather than overtly hostile attacks (Scriven, 2025), making it difficult for victims to discern their true intent. Consequently, this behavior is associated with a lower perceived risk of punishment, rendering it highly convenient to execute. Second, trolling has been characterized as a form of "dark leisure" (Scriven, 2025), enabling perpetrators to garner broader discussion and attention (March and Marrington, 2019). Therefore, individuals who experience chronic stress are more inclined to utilize this approach to achieve satisfaction and relaxation, thereby alleviating negative psychological experiences, than are other individuals.

4.2 The Chain Mediation Effect of Depression and SNS Addiction

Depression functioned as a mediator, linking SLEs and online trolling among university undergraduates, supporting Hypothesis 2. It was suggested that SLEs may exacerbate an individual's depression, which in turn is associ-

ated with higher levels of online trolling. This finding supports GST (Agnew, 1992) and aligns with that of previous research, indicating that as a negative emotional response generated when individuals encounter SLEs, depression has a sequential temporal relationship with an increase in online aggressive behavior (Zhang et al., 2020). When individuals are subjected to SLEs, their psychological coping abilities may become impaired, consequently triggering mental health problems such as depression (Nonterah et al., 2015; D'Angelo and Wierzbicki, 2003). Individuals with high levels of depression may feel powerless to cope with stressors in real life, leading them to seek a sense of power that is lacking in reality through online provocation—a method of instigating conflict, controlling others' emotions, and attracting attention—in virtual online environments (Zhou et al., 2023). This situation can divert their attention from real-life stressors and alleviate depression. Consequently, college students experiencing SLEs may face an increased likelihood of engaging in online trolling due to depression-driven behavioral responses.

This study revealed that depression and SNS addiction act as chain mediators between SLEs and online trolling, supporting Hypothesis 4. The implication is that SLEs may first be associated with increased online trolling by increasing individual college students' depression levels and then SNS addiction, which is ultimately associated with increased online trolling. These results provide important support for the exploration of the underlying mechanisms of online trolling, suggesting that individual emotional factors (depression) not only affect the longitudinal relationship between SLEs and online trolling alone but also play a chain-mediating role in combination with behavioral factors (SNS addiction). Furthermore, on a theoretical level, these findings support compensatory internet use theory (Kardefelt-Winther, 2014), suggesting that when the challenges brought about by SLEs exceed an individual's coping capacity, they usually trigger depression. The interactive features of social networks can compensate for the social support that individuals lack in reality and provide social rewards as a form of psychological compensation (Meshi and Ellithorpe, 2021), thereby diverting attention from real-life stress and alleviating depression. Consequently, individuals with depression are more likely to overrely on social networks than are those without depression, leading to SNS addiction. This problematic pattern of online behavior can damage an individual's mental health (Hanna et al., 2017), leading to the accumulation of aggressive emotions and eventual externalization into online trolling.

Notably, the research revealed no substantial intermediary role of SNS addiction in the relationship between SLEs and online trolling. Hypothesis 3 was not confirmed, suggesting that SLEs do not affect online trolling through SNS addiction. One plausible interpretation is that while online trolls are driven by the thrill of causing harm

through deception (Liao et al., 2025), those addicted to SNSs engage with these platforms primarily for leisure and amusement (Wang et al., 2021). The underlying motivations significantly differ across groups. They maintain and expand interpersonal relationships through interactions on SNSs, which results in substantial psychological satisfaction (LaRose et al., 2001; Shin and Yang, 2019). Online trolling may damage individuals' social relationships and user experience, exposing them to the risk of exclusion and condemnation. Therefore, SNS addiction does not necessarily result in online trolling.

4.3 Implications

Theoretically, this study contributes to the literature by introducing SLEs, a comprehensive environmental stressor, as a core independent variable, thereby broadening the research on the factors influencing online trolling. Furthermore, this work extends the current research by elucidating a chain mediation mechanism that incorporates both emotional (depression) and behavioral (SNS addiction) pathways through which SLEs influence online trolling. This approach helps expand the explanatory scope of GST and problem behavior theory from traditional deviant behaviors to the domain of online trolling. Moreover, the findings offer substantial insights for educators seeking to devise strategies for combating and intervening in the online trolling of college students. These results demonstrate that SLEs can increase the likelihood of online trolling by exacerbating depression and SNS addiction. Thus, it is recommended that schools establish a comprehensive intervention system that integrates psychological support and behavioral guidance. Specifically, diversified stress management programs such as stress relief group counseling and mindfulness meditation training could be offered to help students recognize symptoms of stress while enhancing their self-awareness and emotional regulation skills. Additionally, peer support initiatives, including psychological salons, should be organized to provide an outlet for depressive emotions through companionship and mutual support. Schools should also actively promote healthy and moderate internet usage and encourage participation in on- and off-campus offline activities to prevent SNS addiction. These integrated measures would effectively reduce the risk of online trolling by simultaneously addressing both the emotional and the behavioral pathways triggered by SLEs.

4.4 Limitations and Future Research Directions

This study has several limitations. First, although a longitudinal design was adopted, the substantial attrition of participants at T2 precluded the measurement of all the variables at every time point. This limitation restricted our ability to examine potential bidirectional relationships between the variables. Future research should aim to collect data on all core variables at each wave, thereby enabling the application of a cross-lagged panel model to better establish

causal directions. Second, since this research focused exclusively on Chinese college students, the findings may not be broadly applicable. To enhance the relevance of these results, future studies should incorporate more diverse demographic groups and actively conduct cross-cultural comparative studies. Third, the study sample consisted primarily of lower-division undergraduates, with limited representation of upper-division students. Given that upperclassmen face distinct pressures related to employment and further education, their psychological characteristics may differ from those of their younger counterparts. Future studies should incorporate more balanced academic-year sampling to further validate the generalizability of the findings. Finally, the model in this study focused primarily on risk factors for online trolling and did not incorporate protective factors (such as positive coping strategies) that may reduce its likelihood. Therefore, a key direction for future research is to integrate positive psychological factors into the existing model. Experimental designs and qualitative research methods could be employed to achieve a more comprehensive understanding of online trolling.

5. Conclusions

This study revealed that SLEs are associated with a greater incidence of online trolling among college students and can indirectly increase online trolling by increasing depression and SNS addiction. It is suggested that SLEs may be key risk factors for online trolling. This study further suggests that comprehensive interventions focusing on stress management, mental health education and SNS addiction prevention can offer new practical approaches for the prevention and intervention of online trolling.

Availability of Data and Materials

The data is available on request from the corresponding author.

Author Contributions

FL, QW, BW: study conception and design, data collection. WZ: data analysis, results interpretation, manuscript drafting and revision. MY: data analysis, results interpretation. YD: results interpretation, research implication analysis, manuscript revision. JL: results interpretation, provision of data analysis tools, academic suggestions, manuscript revision. SW: results interpretation, manuscript drafting, manuscript format checking. All authors contributed to critical revision of the manuscript for important intellectual content. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

The research protocol was approved by the Ethics Committee of Sichuan Normal University (Ethic Approval Number: SCNU-230904). All human subject protocols adhered to the 1964 Declaration of Helsinki, its revisions, and equivalent ethical guidelines. Informed consent was obtained from all participants.

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Conflicts of Interest

The authors declare no conflicts of interest.

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