



OPEN ACCESS

EDITED BY

Carla Maria Santos De Carvalho,
University of Coimbra, Portugal

REVIEWED BY

Silvia Lopes,
University of Coimbra, Portugal
Valentina Baldini,
University of Bologna, Italy

*CORRESPONDENCE

Lv Shaobo
✉ lvshaobokk@163.com

†These authors have contributed equally to
this work and share first authorship

RECEIVED 15 June 2024

ACCEPTED 15 January 2025

PUBLISHED 18 February 2025

CITATION

Anan L, Yaoyao L, Kunhang X, Yong Y,
Xiaoyan W, Lina L and Shaobo L (2025)
Adolescent campus bullying and non-suicide
self-injury: chain mediating effect of negative
affect and sleep quality.
Front. Psychol. 16:1449646.
doi: 10.3389/fpsyg.2025.1449646

COPYRIGHT

© 2025 Anan, Yaoyao, Kunhang, Yong,
Xiaoyan, Lina and Shaobo. This is an
open-access article distributed under the
terms of the [Creative Commons Attribution
License \(CC BY\)](#). The use, distribution or
reproduction in other forums is permitted,
provided the original author(s) and the
copyright owner(s) are credited and that the
original publication in this journal is cited, in
accordance with accepted academic
practice. No use, distribution or reproduction
is permitted which does not comply with
these terms.

Adolescent campus bullying and non-suicide self-injury: chain mediating effect of negative affect and sleep quality

Li Anan[†], Li Yaoyao[†], Xie Kunhang[†], Yuan Yong, Wang Xiaoyan,
Li Lina and Lv Shaobo*

School of Psychology and Mental Health, Hebei Key Laboratory of Mental Health and Brain Science, North China University of Science and Technology, Tangshan, Hebei, China

Aim: This study aimed to explore the chain mediating role of negative affect and sleep quality between campus bullying and non-suicidal self-injury (NSSI) among adolescents.

Methods: 569 adolescents were selected through convenience sampling. Participants completed the Olweus Bully/Victim Questionnaire, Positive and Negative Affect Schedule, Pittsburgh Sleep Quality Index, and Adolescent Non-suicidal Self-injury Assessment Questionnaire.

Results: Our result showed significant positive correlations among campus bullying, negative affect, sleep quality and NSSI. Negative affect and sleep quality were identified as independent and sequential mediators in the relationship between campus bullying and NSSI.

Conclusion: These findings elucidate the mechanisms linking campus bullying to NSSI, providing a preliminary basis for exploring the causal relationships among these variables. This study offers theoretical support for future research and inform the development of targeted interventions to reduce NSSI and improve the overall mental health of adolescents in China.

KEYWORDS

campus bullying, negative affect, sleep quality, non-suicidal self-injury, mediation effect

Highlights

- Negative affect mediates the relationship between campus bullying and NSSI.
- Sleep quality mediates the relationship between campus bullying and NSSI.
- Negative affect and sleep quality played a chain mediating role in the relationship between campus bullying and non-suicidal NSSI.

Introduction

Non-suicidal self-injury (NSSI) encompasses a range of socially unacceptable behaviors where individuals intentionally and repeatedly harm their body tissues without suicidal intent and without causing death ([American Psychiatric Association and Association, 2013](#)). A meta-analysis found that the global lifetime prevalence of NSSI among adolescents is 22.1% ([Lim](#)

et al., 2019). However, the incidence of NSSI among Chinese adolescents is as high as 27.4%, surpassing the global average and showing an annual increase Han et al. (2017). The prevalence of NSSI among Chinese adolescents is higher than that in Western countries. Studies have demonstrated that this behavior results in significant physical and psychological harm to adolescents (Baer et al., 2017; Wilkinson et al., 2011), and increases the risk of future suicide behavior sevenfold (Zhang et al., 2023). Currently, NSSI has emerged as a global adolescent health issue. Therefore, investigating the factors and mechanisms influencing NSSI is crucial for the development of effective intervention strategies.

The risk factors for adolescent NSSI remain unclear (Liu et al., 2025), but the experience of campus bullying has been identified as one of them (Liu et al., 2024). Campus bullying is intentional aggression by one or more students toward another student who is unable to defend themselves, resulting in physical or psychological harm or discomfort (Olweus, 1994). Research has shown that both bullies and victims of bullying are associated with higher levels of NSSI (Claes et al., 2015). Adolescents who have experienced bullying report a likelihood of engaging in NSSI that is twice as high as those without a history of bullying (Van Geel et al., 2015). A longitudinal study involving 813 Chinese adolescents found that prior bullying experiences influence the subsequent occurrence of NSSI (Wu et al., 2021). Similarly, a study found a dose–response relationship between experiencing campus bullying and the occurrence of NSSI among adolescents, indicating that even occasional bullying can impact the onset of NSSI (Vanessa et al., 2015).

Negative affect is a significant component of subjective wellbeing and represents the emotional dimension reflecting an individual's subjective experience of tension and unpleasant engagement, typically including feelings of loneliness, pessimism, depression, anxiety, tension, anger, frustration, and distress (Diener and Emmons, 1984). Research has shown that campus bullying is significantly associated with negative affect, such as loneliness and anxiety, with bullied adolescents exhibiting more negative emotions (Neupane et al., 2020). Negative affect is related to NSSI (Jin et al., 2023). The Experiential Avoidance Model (EAM) posits that the primary function of NSSI is to avoid and escape from internal experiences and behaviors that individuals are unwilling to face (Chapman et al., 2006). According to this model, the mechanism underlying the formation of NSSI involves an aversive emotional response to a particular situation or behavior. To avoid and alleviate this negative affect, individuals may choose to engage in NSSI (Horgan and Martin, 2016). Based on this theoretical model, bullied adolescents may use NSSI to relieve the negative affect caused by bullying, which subsequently reinforces the connection between campus bullying and NSSI as an automatic response (Nock, 2010).

Sleep quality may play a mediating role in the relationship between campus bullying and NSSI as it is correlated with the occurrence of NSSI and has a negative relationship with campus bullying (Liu et al., 2019; Sampasa-Kanyinga et al., 2018). Sleep results from the synchronization between the human biological rhythm and the natural circadian rhythm that has developed over the course of evolution, serving as a self-regulating process to better adapt to the natural environment, especially among adolescents (Saper et al., 2005). According to the Cognitive Arousal Model of Insomnia, emotional, somatic, cognitive, and cortical arousal can all lead to sleep problems (Harvey, 2002). Bullying, as a specific form of aggression, can trigger anger in adolescents, leading to somatic and emotional arousal, which may ultimately result in sleep

disturbances. Research indicates that campus bullying significantly predicts sleep problems among adolescents (Carvalho et al., 2022; Tu and Cai, 2020). Sleep quality is closely related to NSSI, and it can predict future self-harm within 30 days (Khazaie et al., 2021; Asarnow et al., 2020; Hysing et al., 2015). A significant association between increased likelihood of NSSI and insomnia symptoms in adolescents has been found (Bandel and Brausch, 2020).

Emotion is a significant factor that influences sleep problems (Shen et al., 2018). Adolescents face numerous external pressures and challenges, and their mental development is not yet mature, making them psychologically vulnerable, emotionally unstable, and relatively poor in self-control. This makes them prone to emotional and sleep problems (Zhou and Dou, 2019). Studies targeting adolescents have found that those with tendencies toward depression and anxiety are more likely to report poor sleep quality, difficulty falling asleep, and insomnia (Vandekerckhove and Cluydts, 2010). Previous research on adolescent NSSI has focused on negative affect and sleep quality, but these studies have not explicitly identified these two variables as part of a chain mediation mechanism. This implies that both variables mediate the relationship between campus bullying and NSSI, with an interaction existing between the two mediators.

Numerous studies have shown that negative affects and sleep quality not only directly affect non-suicidal self-injury (NSSI), but can also indirectly influence it through mediating effects. However, there is a lack of research on the relationship between campus bullying, negative affects, sleep quality, and NSSI. In the context of Agnew's General Strain Theory (GST) (Agnew, 1998), this study posits that campus bullying serves as a significant strain that adolescents experience, which can lead to negative emotional responses such as anger, frustration, and anxiety. These negative affects, along with poor sleep quality, are seen as consequences of the strain and can mediate the relationship between bullying and NSSI. GST suggests that when individuals perceive themselves to be negatively treated or unable to meet their goals, they experience strain, leading to emotional distress that may manifest in maladaptive coping mechanisms like NSSI. This study, using Chinese children and adolescents as subjects, campus bullying as an independent variable, risk of NSSI as a dependent variable, and negative affects and sleep quality as mediator variables, intends to explore the relationship between campus bullying and NSSI. It will also examine how negative affects and sleep quality mediate this relationship, further elucidating the mechanisms underlying the development of NSSI in children and adolescents. This research is expected to provide valuable insights for the prevention and intervention of NSSI. A moderated chain mediation model was developed in this study based on the relevant theories and empirical studies reviewed above. We make the following hypotheses:

Hypotheses 1: Campus bullying will positively predicts NSSI.

Hypotheses 2: Negative affect will mediate the relationship between campus bullying and NSSI.

Hypotheses 3: Sleep quality will mediate the relationship between campus bullying and NSSI.

Hypotheses 4: Negative affect and sleep quality will function as chain mediators in the relationship between campus bullying and NSSI.

The sequential mediation model was as follows: campus bullying → negative affect → sleep quality → NSSI.

Methods

Participants

In April 2024, students from schools located in Qinhuangdao City, China, were selected using a convenience sampling approach. The survey was designed considering students' comprehension of the questions, and therefore, only students from grades 6 to 9 were included. In total, 569 valid responses were retained after screening out responses based on lie detection questions and extreme or unusual data. The sample consisted of 295 males and 274 females, with an average age of 13.04 years ($SD = 1.08$, range = 12–16).

Measures

Campus bullying

Campus bullying was assessed using the Olweus Bully/Victim Questionnaire (Olweus, 1993), adapted by Zhu (2005). This scale is based on the premise that bullying victimization and perpetration are relatively independent systems. It consists of 12 items, with the frequency of occurrence replaced by specific instances. A 4-point Likert scale (0 = Never, 3 = More than 4 times) is used to rate the items. Higher scores indicate more frequent bullying behaviors. In this study, the Cronbach's alpha was 0.765 for bullying victimization and 0.883 for bullying others (Zhu, 2005).

Negative affect

Negative affect was measured using the Positive and Negative Affect Schedule (Watson et al., 1988), which is based on the idea that positive and negative emotions are relatively independent systems. It consists of 20 items, with a 5-point Likert scale (1 = Never, 5 = Always) used to rate the items. Higher scores indicate more intense corresponding emotions. The scale has shown good reliability and validity in studies with Chinese samples (Huang et al., 2003). In this study, the Cronbach's alpha was 0.600 for the positive affect and 0.609 for the negative affect.

Sleep quality

Sleep quality was assessed using the Pittsburgh Sleep Quality Index, developed by Buysse et al. (1989) and revised by Liu et al. (1996), which includes 19 self-rated questions and five questions rated by a sleep partner, with only the self-rated questions being scored. The index covers aspects such as sleep quality, sleep latency, and changes in sleep duration. Each component consists of four questions, and participants are required to evaluate their sleep over the past month and select an appropriate rating according to a standardized scale. Each component score ranges from 0 to 3, with a total score ranging from 0 to 21. Higher scores indicate poorer sleep quality. In this study, the Cronbach's alpha for the scale was 0.671.

Non-suicidal self-injury

Non-suicidal self-injury was measured using the Adolescent Non-suicidal Self-injury Assessment Questionnaire (Wan et al., 2018), which includes two dimensions: self-injury without significant tissue damage and self-injury with significant tissue damage. It consists of 12 items, with a 5-point Likert scale (1 = Never, 5 = Always) used to rate the items. Higher scores indicate more frequent occurrences of NSSI. In this study, the Cronbach's alpha for the scale was 0.924.

Data analysis

Data analysis was performed using SPSS version 23.0 and AMOS version 23.0. Descriptive statistics (mean, standard deviation) were calculated for all variables. The reliability of the scales was assessed using Cronbach's alpha, with values above 0.70 considered acceptable. Pearson correlation analysis was conducted to examine the relationships between variables. The SPSS macro PROCESS Model 6 (Hayes, 2013) was used to test the mediation model, estimating direct, indirect, and total effects. Bootstrapping with 5,000 resamples was applied to calculate 95% confidence intervals for the indirect effects. The fit of the model was evaluated using AMOS, with model fit indices (e.g., chi-square, GFI) indicating the goodness of fit. Statistical significance was set at $p < 0.05$.

Results

Preliminary analyses

Correlation analysis showed high correlations among the study variables. Thus multiple linear regression was used to test for multicollinearity. The results indicated that all VIF values were between 1.239 and 1.553, and tolerance values were between 0.644 and 0.807, indicating no multicollinearity issues.

We assessed common method bias using Harman's single-factor test (Harman, 1976). An unrotated exploratory factor analysis extracted 27 factors with eigenvalues greater than 1, with the largest factor explaining 27.66% of the variance, which is below the 40% threshold. Thus, common method bias is not a significant concern in this study.

The fit of the chain mediation model was assessed using AMOS 23.0, with a chi-square value of 0 and a GFI of 1, indicating a good fit between the data and the model.

Descriptive statistics and correlation analysis

As shown in Table 1, campus bullying is positively correlated with negative affect, sleep quality, and NSSI. Additionally, negative affect is positively correlated with NSSI and sleep quality, and NSSI is positively correlated with sleep quality.

Mediating effects test

Given the significant correlations among campus bullying, negative affect, sleep quality, and NSSI, the requirements for testing chain mediation effects are satisfied. We used the SPSS PROCESS

TABLE 1 Means, standard deviations, and Pearson's correlations of all variables.

	M	SD	1	2	3	4
1. Campus bullying	0.35	1.61	1			
2. Negative affect	22.05	7.13	0.153**	1		
3. NSSI	1.33	4.12	0.140**	0.380**	1	
4. Sleep quality	3.11	3.23	0.123**	0.555**	0.479**	1

***p* < 0.001.

TABLE 2 Mediating effect and effect sizes.

Effect	Path	Effect	SE	95%CI		Relative mediating effect
				LL	UL	
Direct effect	Campus bullying → NSSI	0.146	0.040	0.068	0.249	43.45%
Indirect effect	Campus bullying → Negative affect → NSSI	0.049	0.018	0.016	0.087	14.58%
	Campus bullying → Sleep quality → NSSI	0.082	0.030	0.034	0.148	24.40%
	Campus bullying → Negative affect → Sleep quality → NSSI	0.059	0.021	0.026	0.107	17.56%
Total indirect effect		0.190	0.049	0.108	0.296	56.54%
Total effect		0.336	0.040	0.259	0.414	100%

CI, confidence interval; LL, lower limit; UL, upper limit.

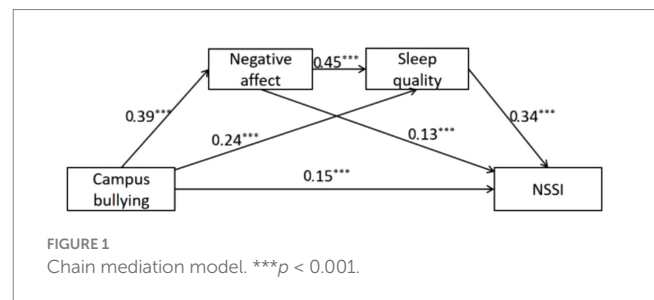
macro model 6, with campus bullying as the independent variable, NSSI as the dependent variable, and negative affect and sleep quality as mediating variables, to test the chain mediation effects among these variables. The results are shown in Table 2. Before including the mediating variables, campus bullying significantly and positively predicted NSSI, thus supporting Hypothesis 1.

As shown in Table 2, negative affect and sleep quality mediate the relationship between campus bullying and NSSI, and all three indirect effect paths reached significance. Therefore, Hypotheses 2, 3, and 4 are supported. The mediation effect values are illustrated in Figure 1.

Discussion

In this study, we examined the relationship between campus bullying and NSSI and explored the influence of negative affect and sleep quality toward this relationship. Our findings indicate a significant positive correlation between campus bullying and NSSI, consistent with previous research (Claes et al., 2015; Van Geel et al., 2015). Adolescents who are bullied may view self-harm as a way of seeking help (Huang et al., 2022) or may resort to extreme behaviors such as self-injury or even suicide as a way to cope with the unresolved stress of bullying (Baetens et al., 2021).

We found that negative affect mediates the relationship between campus bullying and NSSI. This aligns with previous studies, indicating that campus bullying significantly and positively predicts negative affect in adolescents (Neupane et al., 2020), and that negative affect significantly and positively predicts NSSI (Chapman et al., 2006; Nock, 2010). Extensive research has confirmed that bullying induces negative emotions, leading to NSSI (Cao and Du, 2021; Zhang et al., 2021). NSSI is usually resorted to as a dysfunctional coping strategy for emotional regulation. When adolescents face bullying, they may experience a range of negative emotions, such as anxiety, helplessness, and stress. Adolescence is a critical period in life, and individuals may



lack the physiological and psychological foundation to cope with intense emotions (Wang et al., 2017). Consequently, emotional dysregulation and compensatory behaviors may arise, making adolescents more likely to engage in NSSI to alleviate the distress of negative emotions (Van Geel et al., 2015).

We also found that sleep quality mediates the relationship between campus bullying and NSSI. This finding is consistent with prior research, showing that campus bullying predicts sleep quality in adolescents (Carvalho et al., 2022; Tu and Cai, 2020) and that sleep quality significantly negatively predicts NSSI (Khazaie et al., 2021). Sleep quality is crucial for adolescents, impacting their growth, psychological health, academic performance, and more. Previous studies have indicated that bullying affects sleep quality (Shi et al., 2020), which in turn increases the likelihood of NSSI (Shi et al., 2023). Our findings further confirm that bullying affects NSSI through sleep quality. Bullying induces emotional distress and a sense of interpersonal threat, which can decrease sleep quality by increasing perceptions of threat and arousal. Poor sleep quality and insufficient sleep can impair problem-solving and emotional regulation, thereby increasing impulsive behaviors and the risk of NSSI (Anderson and Platten, 2011).

Furthermore, we found that negative affect and sleep quality function as chain mediators in the relationship between campus bullying and NSSI, similar to previous research findings. The General

Strain Theory suggests that bullying, as a source of negative stress, can lead to negative emotional states such as loneliness and depression (Agnew, 1992). Campus bullying, as an aggressive behavior, can elicit negative emotions like anger and anxiety in adolescents, triggering adverse physiological and emotional responses that may result in sleep disorders (Harvey, 2002). NSSI is associated with various sleep problems, including short sleep duration, insomnia symptoms, poor sleep quality, and dissatisfaction with sleep. Adolescents' sleep quality significantly predicts NSSI. It is worth noting that there is a positive U-shaped correlation between sleep duration and total NSSI, which suggests that we should maintain appropriate sleep duration and improve the quality of sustained nighttime sleep (Tang et al., 2021).

This study aims to explore the relationship between campus bullying and adolescent NSSI, as well as the mediating roles of negative affect and sleep quality. This enriches the research on the relationship between campus bullying and NSSI and their underlying mechanisms. This finding suggests that students, school staff, and families should pay attention to the occurrence and prevention of bullying and a series of chain reactions. These insights emphasize the importance and necessity of eliminating campus bullying, thereby reducing extreme negative emotions among adolescents and improving sleep quality, ultimately minimizing the occurrence of NSSI. Furthermore, understanding these interconnections has broader social implications, particularly highlighting the crucial role of policy in addressing campus bullying. Effective policies and interventions at the institutional and governmental levels can create safer school environments, foster positive mental health outcomes, and ultimately contribute to the overall wellbeing of adolescents.

Limitations and future research directions

In this study, we could not infer causal relationships between the variables. Future research could adopt longitudinal follow-up or experimental intervention designs to address this limitation. The form of student self-report used in the study is easily influenced by factors such as the emotions, attitudes, and memories of the participants, and there are some sensitive items in the questionnaire that may affect the authenticity of the information filled in by the survey subjects.

The use of convenience sampling may be affected by sample selection bias, limiting the generalizability of the research results. At the same time, the wood research survey adopts questionnaire survey and quantitative statistical analysis. In future research, in-depth and detailed qualitative materials can be considered as a supplement to the quantitative results.

Secondly, the influence of different forms of campus bullying on NSSI has not been reported, such as physical bullying and verbal bullying. With the important of this difference kind of bullying being measured (Huang et al., 2022), future studies should further estimate the relationship between NSSI and physical, verbal or indirect bullying experiences.

Future research can use wearable detection devices to evaluate the sleep quality of participants, in order to obtain more objective physiological indicators such as AHI index, sleep structure, and sleep latency.

Moreover, the use of convenience sampling in this study limits the generalizability of the results. Future research should aim to use more

representative sampling methods to ensure that the findings can be applied to a wider population.

Additionally, we only considered the mediating roles of negative affect and sleep quality. Other potential mediating variables, such as rumination and personality traits, need further exploration.

Possible complications of NSSI have not been controlled. Future research could complete this deficiency by including measuring mental disorders like depression or schizophrenia to disentangle their effects on NSSI.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors without undue reservation.

Ethics statement

The studies involving humans were approved by The Ethics Committee of North China University of Science and Technology. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

LA: Formal analysis, Investigation, Writing – original draft. LY: Data curation, Writing – review & editing. XK: Data curation, Writing – original draft. YY: Validation, Writing – review & editing. WX: Conceptualization, Writing – review & editing. LL: Resources, Writing – review & editing. LS: Supervision, Writing – review & editing.

Funding

The author(s) declare that financial support was received for the research, authorship, and/or publication of this article. This study was funded by the Humanities and Social Science Research Project of Hebei Education Department (No. SQ2021066), National College Students' Innovation and Entrepreneurship Training Program (No. 202410081062).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

- Agnew, R. (1992). Foundation for a general strain theory of crime and delinquency*. *Criminology* 30, 47–88. doi: 10.1111/j.1745-9125.1992.tb01093.x
- Agnew, R. (1998). The approval of suicide: a social-psychological model. *Suicide Life Threat. Behav.* 28, 205–225. doi: 10.1111/j.1943-278x.1998.tb00640.x
- American Psychiatric Association, D., and Association, A. P. (2013). Diagnostic and statistical manual of mental disorders, vol. 5. Washington, DC: American Psychiatric Association.
- Anderson, C., and Platten, C. R. (2011). Sleep deprivation lowers inhibition and enhances impulsivity to negative stimuli. *Behav. Brain Res.* 217, 463–466. doi: 10.1016/j.bbr.2010.09.020
- Asarnow, J. R., Bai, S., Babeva, K. N., Adrian, M., Berk, M. S., Asarnow, L. D., et al. (2020). Sleep in youth with repeated self-harm and high suicidality: does sleep predict self-harm risk? *Suicide Life Threat. Behav.* 50, 1189–1197. doi: 10.1111/sltb.12658
- Baer, M. M., Lacroix, J. M., Browne, J. C., Hassen, H. O., and Holloway, M. G. (2017). Non-suicidal self-injury elevates suicide risk among United States military personnel with lifetime attempted suicide. *Arch. Suicide Res.* 22, 453–464. doi: 10.1080/13811118.2017.1358225
- Baetens, I., Greene, D., Van Hove, L., Van Leeuwen, K., Wiersema, J. R., Desoete, A., et al. (2021). Predictors and consequences of non-suicidal self-injury in relation to life, peer, and school factors. *J. Adolesc.* 90, 100–108. doi: 10.1016/j.adolescence.2021.06.005
- Bandel, S. L., and Brausch, A. M. (2020). Poor sleep associates with recent nonsuicidal self-injury engagement in adolescents. *Behav. Sleep Med.* 18, 81–90. doi: 10.1080/15402002.2018.1545652
- Buysse, D. J., Iii, C. F. R., Monk, T. H., Berman, S. R., and Kupfer, D. J. (1989). The Pittsburgh sleep quality index: a new instrument for psychiatric practice and research. *Psychiatry Res.* 28, 193–213. doi: 10.1016/0165-1781(89)90047-4
- Cao, Y., and Du, Y. (2021). Research progress on the relationship between non-suicidal self-injury and depressive disorder in adolescents [in Chinese]. *Chin. J. Health Psychol.* 29, 1437–1440. doi: 10.13342/j.cnki.cjhp.2021.09.032
- Carvalho, F., Vilaça, J., Carvalho, A. L., Pontes, T., and Carvalho, S. (2022). Sleep quality and bullying – prevalence in a cohort of Portuguese students. *Int. J. Adolesc. Med. Health* 34, 163–169. doi: 10.1515/ijamh-2020-0018
- Chapman, A., Gratz, K., and Brown, M. (2006). Solving the puzzle of deliberate self-harm: the experiential avoidance model. *Behav. Res. Ther.* 44, 371–394. doi: 10.1016/j.brat.2005.03.005
- Claes, L., Luyckx, K., Baetens, I., Van de Ven, M., and Witteman, C. (2015). Bullying and victimization, depressive mood, and non-suicidal self-injury in adolescents: the moderating role of parental support. *J. Child Fam. Stud.* 24, 3363–3371. doi: 10.1007/s10826-015-0138-2
- Diener, E., and Emmons, R. A. (1984). The independence of positive and negative affect. *J. Pers. Soc. Psychol.* 47, 1105–1117. doi: 10.1037/0022-3514.47.5.1105
- Han, A., Xu, G., and Su, P. (2017). A meta-analysis of characteristics of non-suicidal self-injury among middle school students in mainland China [in Chinese]. *Chin. J. School Health* 38, 1665–1670. doi: 10.16835/j.cnki.1000-9817.2017.11.019
- Harman, H. H. (1976). Modern factor analysis. Chicago: University of Chicago Press.
- Harvey, A. (2002). A cognitive model of insomnia. *Behav. Res. Ther.* 40, 869–893. doi: 10.1016/s0005-7967(01)00061-4
- Hayes, A. F. (2013). Introduction to mediation, moderation, and conditional process analysis: a regression-based approach. New York: The Guilford Press.
- Horgan, M., and Martin, G. (2016). Differences between current and past self-injurers: how and why do people stop? *Arch. Suicide Res.* 20, 142–152. doi: 10.1080/13811118.2015.1004479
- Huang, H., Ding, Y., Wan, X., Liang, Y., Zhang, Y., Lu, G., et al. (2022). A meta-analysis of the relationship between bullying and non-suicidal self-injury among children and adolescents. *Sci. Rep.* 12:17285. doi: 10.1038/s41598-022-22122-2
- Huang, L., Yang, T., and Ji, Z. (2003). Applicability of the positive and negative affect scale in Chinese [in Chinese]. *Chin. Ment. Health J.* 17, 54–56. doi: 10.3321/j.issn:1000-6729.2003.01.018
- Hysing, M., Sivertsen, B., Stormark, K. M., and O'Connor, R. C. (2015). Sleep problems and self-harm in adolescence. *Br. J. Psychiatry* 207, 306–312. doi: 10.1192/bjp.bp.114.146514
- Jin, M., Wang, X. Y., Wang, R. X., Cheng, S. Y., Yang, S. Y., Zhang, S. L., et al. (2023). A systematic review and meta-analysis of factors related to non-suicidal self-injury among Chinese adolescents. *Psychiatry Res.* 326:115329. doi: 10.1016/j.psychres.2023.115329
- Kahn, M., Sheppes, G., and Sadeh, A. (2013). Sleep and emotions: bidirectional links and underlying mechanisms. *Int. J. Psychophysiol.* 89, 218–228. doi: 10.1016/j.ijpsycho.2013.05.010
- Khazaie, H., Zakiei, A., McCall, W. V., Noori, K., Rostampour, M., Bahmani, D. S., et al. (2021). Relationship between sleep problems and self-injury: a systematic review. *Behav. Sleep Med.* 19, 689–704. doi: 10.1080/15402002.2020.1822360
- Lim, K.-S., Wong, C. H., McIntyre, R. S., Wang, J., Zhang, Z., Tran, B. X., et al. (2019). Global lifetime and 12-month prevalence of suicidal behavior, deliberate self-harm and non-suicidal self-injury in children and adolescents between 1989 and 2018: a meta-analysis. *Int. J. Environ. Res. Public Health* 16:4581. doi: 10.3390/ijerph16224581
- Liu, X., Liu, Z. Z., Chen, R. H., Cheng, X. Z., Bo, Q. G., Wang, Z. Y., et al. (2019). Nightmares are associated with future suicide attempt and non-suicidal self-injury in adolescents. *J. Clin. Psychiatry* 80:18m12181. doi: 10.4088/JCP.18m12181
- Liu, X., Tang, M., Hu, L., Wang, A., Wu, H., Zhao, G., et al. (1996). Reliability and validity of the Pittsburgh sleep quality index. *Chinese J. Psychiatry* 11, 615–621. doi: 10.1007/BF02951625
- Liu, Y., Xu, X., Huang, X., Hong, Q., Li, L., Xie, X., et al. (2024). The mediating effects of school bullying victimization in the relationship between childhood trauma and NSSI among adolescents with mood disorders. *BMC Pediatr.* 24:524. doi: 10.1186/s12887-024-04986-7
- Liu, Y., Yang, Y., Li, R., Shen, Q., Yuan, X., Shang, J., et al. (2025). Interaction among negative mood, sleep, and diet habits in adolescents with non-suicidal self-injury: a cross-sectional network analysis. *J. Affect. Disord.* 370, 313–320. doi: 10.1016/j.jad.2024.11.007
- Neupane, T., Pandey, A. R., Bista, B., and Chalise, B. (2020). Correlates of bullying victimization among school adolescents in Nepal: findings from 2015 global school-based student health survey Nepal. *PLoS One* 15:e0237406. doi: 10.1371/journal.pone.0237406
- Nock, M. K. (2010). Self-injury. *Ann. Rev. Clin. Psychol.* 6, 339–363. doi: 10.1146/annurev.clinpsy.121208.131258
- Olweus, D. (1993). Bullying at school: What we know and what we can do. Cambridge, MA: Blackwell Publishing.
- Olweus, D. (1994). Annotation - bullying at school - basic facts and effects of a school-based intervention program. *J. Child Psychol. Psychiatry Allied Discip.* 35, 1171–1190. doi: 10.1111/j.1469-7610.1994.tb01229.x
- Sampasa-Kanyinga, H., Chaput, J. P., Hamilton, H. A., and Colman, I. (2018). Bullying involvement, psychological distress, and short sleep duration among adolescents. *Soc. Psychiatry Psychiatr. Epidemiol.* 53, 1371–1380. doi: 10.1007/s00127-018-1590-2
- Saper, C. B., Scammell, T. E., and Lu, J. (2005). Hypothalamic regulation of sleep and circadian rhythms. *Nature* 437, 1257–1263. doi: 10.1038/nature04284
- Shen, L., van Schie, J., Ditchburn, G., Brook, L., and Bei, B. (2018). Positive and negative emotions: differential associations with sleep duration and quality in adolescents. *J. Youth Adolesc.* 47, 2584–2595. doi: 10.1007/s10964-018-0899-1
- Shi, X., Xu, L., Wang, Z., Wang, S., Wang, A., Hu, X., et al. (2023). Poor sleep quality and suicidal ideation among Chinese community adults: a moderated mediation model of mental distress and family functioning. *Curr. Psychol.* 42, 4936–4947. doi: 10.1007/s12144-021-01845-x
- Shi, X., Zhu, Y., Zhang, Y., Wang, S., and Qi, B. (2020). Relationship between cybervictimization and suicidality: a multiple mediation model. *Chin. J. Clin. Psych.* 28, 1125–1129. doi: 10.16128/j.cnki.1005-3611.2020.06.009
- Tang, Y., Wan, Y., Xu, S., Zhang, S., Hao, J., and Tao, F. (2021). Nonlinear relationship between sleep duration and non-suicidal self-injurious behaviour among Chinese adolescents. *BMC Psychiatry* 21:521. doi: 10.1186/s12888-021-03539-x
- Tu, K. M., and Cai, T. (2020). Reciprocal associations between adolescent peer relationships and sleep. *Sleep Health* 6, 743–748. doi: 10.1016/j.sleh.2020.01.019
- Van Geel, M., Goemans, A., and Vedder, P. (2015). A meta-analysis on the relation between peer victimization and adolescent non-suicidal self-injury. *Psychiatry Res.* 230, 364–368. doi: 10.1016/j.psychres.2015.09.017
- Vandekerckhove, M., and Cluydts, R. (2010). The emotional brain and sleep: an intimate relationship. *Sleep Med. Rev.* 14, 219–226. doi: 10.1016/j.smrv.2010.01.002
- Vanessa, J., Johann, H., Peter, P., Franz, R., and Michael, K. (2015). Does parental monitoring moderate the relationship between bullying and adolescent nonsuicidal self-injury and suicidal behavior? A community-based self-report study of adolescents in Germany. *BMC Public Health* 15:583. doi: 10.1186/s12889-015-1940-x
- Wan, Y., Liu, W., Hao, J., and Tao, F. (2018). Development and evaluation on reliability and validity of adolescent non-suicidal self-injury assessment questionnaire [in Chinese]. *Chin. J. School Health* 39, 170–173. doi: 10.16835/j.cnki.1000-9817.2018.02.005
- Wang, Q., Wei, M., and Liu, X. (2017). The psychological mechanism and influential factors of adolescent NSSI: an emotion regulation perspective. *Psychol. Dev. Educ.* 33, 759–768. doi: 10.16187/j.cnki.issn1001-4918.2017.06.15
- Watson, D., Clark, L., and Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect - the PANAS scales. *J. Pers. Soc. Psychol.* 54, 1063–1070. doi: 10.1037/0022-3514.54.6.1063
- Wilkinson, P., Kelvin, R., Roberts, C., Dubicka, B., and Goodyer, I. (2011). Clinical and psychosocial predictors of suicide attempts and nonsuicidal self-injury in the adolescent depression antidepressants and psychotherapy trial (adapt). *Am. J. Psychiatry* 168, 495–501. doi: 10.1176/appi.ajp.2010.10050718

- Wu, N., Hou, Y., Zeng, Q., Cai, H., and You, J. (2021). Bullying experiences and nonsuicidal self-injury among Chinese adolescents: a longitudinal moderated mediation model. *J. Youth Adolesc.* 50, 753–766. doi: 10.1007/s10964-020-01380-1
- Zhang, W., Wang, H., and Yu, C. (2021). The internet bullying and adolescents' non-suicidal self injury: the role of depression and parent-child communication [in Chinese]. *J. Chinese Youth Soc. Sci.* 40, 88–96. doi: 10.16034/j.cnki.10-1318/c.2021.05.014
- Zhang, B., Zhang, W., Sun, L., Jiang, C., Zhou, Y., and He, K. (2023). Relationship between alexithymia, loneliness, resilience and non-suicidal self-injury in adolescents with depression: a multi-center study. *BMC Psychiatry* 23:445. doi: 10.1186/s12888-023-04938-y
- Zhou, S., and Dou, D. (2019). The new trend of the emotional characteristics of college students under background of social change and the corresponding measure: a case study of a university in Beijing [in Chinese]. *J. Chinese Youth Soc. Sci.* 38, 59–66. doi: 10.16034/j.cnki.10-1318/c.2019.04.026
- Zhu, X. (2005). The relationship between middle school students' perceived school climate and bullying [in Chinese]. (Master's thesis): Shandong Normal University.