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EMPIRICAL RESEARCH

Social Support and Non-Suicidal Self-Injury in Adolescents: The Differential Influences of Family, Friends, and Teachers

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Abstract

Non-suicidal self-injury (NSSI) is common among adolescents and is associated with a range of detrimental consequences. Family, teachers, and friends are essential sources of social support for adolescents. Increased social support from these sources may reduce NSSI behaviors among adolescents. However, it is uncertain if each source of social support retains its significance when their influences are evaluated simultaneously, and how each source influences the others to impact NSSI behaviors. To address this gap, this research investigated the direct and indirect effects of each source of social support on adolescent NSSI using cross-lagged panel model (CLPM), as well as whether these relationships varied by sex. A total of 3098 Chinese adolescents with a range of 10 to 15 years old (Mage = 13.27, SD = 0.73, 42.4% girls) completed assessments on three waves across approximately two years. The results indicated that teacher support compared to family and friend support showed the strongest association with NSSI behaviors and mediated the relationship between family support and NSSI. These findings highlight teacher support as a hub in the role of social support on NSSI and emphasize the importance of the connections between teacher and family support.

Keywords NSSI · Social support · Teacher support · Family support · Adolescents · Cross-lagged panel models

Introduction

Non-suicidal self-injury (NSSI) refers to the intentional and direct damage to one's own body tissue without suicidal intent (Nock, 2009). In the past decade, NSSI has grown to be a serious public health issue among youth (Jacobson & Gould, 2007). Adolescence is a particularly vulnerable period for NSSI, with annual incidence rates reported between 14.0 and 34.0% in this age group (Tang et al., 2016; Burke et al., 2015). According to the World Health Organization, individuals aged 10 to 24 are most at risk for engaging in NSSI (Curtis, 2015). Adolescents who engage in NSSI have an increased likelihood of developing psychological disorders and suicidal behaviors later in life (Daukantaite et al., 2020; Hamza et al., 2012). Given the high prevalence and detrimental long-term consequences of adolescent NSSI, this study examined the influences of family, friend, and teacher support on NSSI, as well as investigated how these sources of support interconnect to impact adolescent NSSI, aiming to better identify and understand protective factors that may reduce NSSI among adolescents.

Different Sources of Social Support and NSSI in Adolescents

Social support refers to the external support an individual perceives from family, friends, or other relationships and may derive from several distinct sources (Wu et al., 2011). Research suggests that social support can increase people's propensity to seek assistance before engaging in self-harm (Wu et al., 2011) and buffer against stress (Gong, 1994). Enhancing supportive relationships and providing access to a comprehensive network of community resources can aid in decreasing self-harm occurrences (Wu et al., 2011). According to previous studies, increasing social support was found to be an effective way to decrease the likelihood of NSSI behaviors among youth (Mogens et al., 2015; Xin et al., 2020). Despite the findings of prior studies, important limitations exist. Specifically, few studies have distinguished between various sources of social support, and

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little study has explored the relations between specific sources of social support and NSSI in adolescents.

Given that adolescents primarily spend their time with family, teachers, and friends (Pössel et al., 2018), these groups serve as the primary sources of social support. Although less studied, some studies demonstrate the positive impact family, friend, and teacher support has on NSSI behavior during adolescence. For example, a study revealed that family support positively impacted reducing NSSI behavior among adolescents—higher levels of family support correlated with a reduced likelihood of self-injury (Liu et al., 2021). Additionally, adolescents are less likely to engage in NSSI when parents provide support for their decisions, and keep communication open (Xia et al., 2016). Some research reported that higher peer support was negatively linked to engagement in NSSI behaviors (Esposito et al., 2021). Finally, previous research has demonstrated that having access to encouraging teachers at school is linked to developing effective coping skills and experiencing fewer somatic symptoms as a result of being victimized by peers (Rigby, 2000). This suggests that teacher support is a factor that provides protection for the psychological needs of adolescents that engage in NSSI behaviors (Madjar et al., 2017; Esposito et al., 2021). Although the abovementioned studies indicate that all three sources of social support may reduce adolescent NSSI behavior, it is possible that the three sources of support in preventing adolescent NSSI may vary in their effectiveness (Pössel et al., 2018).

Several studies have shown that the prominence of family, friend, and teacher support may differ throughout adolescence (Bokhorst et al., 2010; Rosenfeld et al., 2000). Specifically, while parents provide the primary support for children, their roles may become less prominent as the child reaches adolescence (Marini et al., 2006). Adolescence is a distinct phase of social development in which nonparental supporters (i.e., friends and teachers) become more crucial for autonomous social identities' development. Adolescents gradually place more value on peer and teacher support (Colarossi and Eccles, 2003). For instance, adolescents will look to others to validate their sense of self during identity formation if they perceive parental support and feedback about themselves as negative over time (Colarossi & Eccles, 2003). Adolescence is also a critical developmental stage as adolescents face the progression from primary school to middle school (Jaworska & MacQueen, 2015), with school becoming a dominant social arena (Madjar et al., 2021). During this time, early adolescents must deal with a surge in social and academic pressure, as well as an increase in the size, complexity, and significance of their peer group (Wenz-Gross et al., 1997). Compared to children, adolescents are more prone to experiencing insufficient support from, and more conflict with peers, even suffer violence, abuse, and bullying (Liu et al., 2021). When conflict with peers occurs in school, teachers are among the first adults available to offer help and support (Esposito et al., 2021). Teachers could be expected to play a significant role in providing support in the school setting (Hellfeldt et al., 2020). The roles of parents may thus become less prominent during adolescence (Marini et al., 2006), while the influence of friend and teacher becomes more significant (Colarossi and Eccles, 2003). This may lead to differences in the effectiveness of these three support sources in preventing NSSI behaviors. To determine which social support source is most beneficial, all three must be simultaneously examined within the same statistical model. If social support from different sources varies in effectiveness, all three sources of support may relate to NSSI when studied independently, yet one or more sources of support may no longer be related to NSSI when all three sources are examined at once.

Most studies examine each source of social support as a separate predictor of NSSI, and few have simultaneously examined the influence of three different sources of support (such as friends and family members) to determine which is most salient. For instance, one study examined if different sources of support are differentially protective against NSSI in a sample of 118 high-risk teenagers who were hospitalized due to a significant risk of self-harm (Kellerman et al., 2022). The research revealed an inverse relationship between family support and NSSI, but there was no correlation between NSSI and support from friends outside the unit (Kellerman et al., 2022). This study's sample consisted of adolescents who were hospitalized due to a serious risk of self-harm. The limited opportunities for hospitalized adolescents to interact with friends (i.e., limited phone usage time and phone calls rather than text messages, social media, or face-to-face interactions) might have influenced the effect of friend support on NSSI (Kellerman et al., 2022). This could have contributed to the study's failure to find a significant association between them. Moreover, the sample of hospitalized adolescents limited the generalizability of the findings to adolescents outside of an inpatient setting (Kellerman et al., 2022). Thus, additional research is necessary to further examine different sources of support while controlling for other sources of support in community samples. This will help determine which source of support is most beneficial.

Interconnected Influence across Different Sources of Social Support

Ecological theory is frequently applied to research on behavior problems (Richman et al., 2004). One of the primary strengths of this theory is its focus on the various social environments influencing youth development, especially the

primary microsystems including school, peer group, and family. Bronfenbrenner (2005) not only emphasized the impact of microsystems on youth development but also highlighted the significance of mesosystems, which refer to the interactions between these key microsystems, like the interconnected effects between family and peer group. As early adolescents go from elementary to middle school and face increasing school-related demands, these intersections seem to be especially crucial for them (Woolley et al., 2009). Studies have also demonstrated the importance of parent-school connections for adolescents (Chavkin et al., 2000; Rivera-Mosquera et al., 2007). In light of the potential importance of these mesosystem-level impacts, it is likely that one microsystem's social support may affect NSSI through the social support in another microsystem. Few studies have explored how different support sources interact with each other to ultimately influence adolescent behavior. Only one previous study found that parental support and friend support influenced the school behavior of Latino students through teacher support (Woolley et al., 2009). However, this study was conducted using only a cross-sectional design. Thus, the longitudinal effects of the interconnectedness of different social support sources on adolescent behavior remain unexplored. Taken together, a longitudinal study that examines the interconnected influences across family, friend, and teacher support and their impact on subsequent adolescent NSSI behaviors is warranted.

The Roles of Sex, Household Income and Age

Sex differences in NSSI, and family, friend, and teacher support have also been independently found among adolescents. Several studies have shown that girls perceive significantly more support from both friends and teachers compared to boys (Helsen et al., 2000; Pössel et al., 2018). However, results for family support are more variable. Research on family support has revealed that boys receive higher support from family members compared to girls (Colarossi, 2001; Cumsille and Epstein, 1994), while others have failed to identify any sex differences in the support given by immediate family members (Helsen et al., 2000; Vaux, 1985). The existing literature is also inconsistent regarding variations in NSSI rates between boys and girls. Some studies indicated no difference in NSSI rates between boys and girls (Xin et al., 2020; Liu et al., 2021), but others have found that girls report engaging in NSSI behavior more frequently than boys (Sornberger et al., 2012; Wang et al., 2022). Previous work has indicated differences between sexes in all the variables considered, but whether sex influences the simultaneous effects of each source of social support on NSSI behavior is still unclear. Overall, this suggests that more research is needed to clarify the role of sex in the relations among NSSI behaviors and family, friend, and teacher support.

Recent studies have also indicated that higher odds of NSSI were noted among respondents from impoverished backgrounds (Liu, 2023; Costa et al., 2021). Furthermore, prior meta-analyses found that the prevalence of NSSI significantly increased with age (Gillies et al., 2018). The household income and age in the current study were thus controlled.

Current Study

It is unknown whether the protective effects of different sources of social support and the interconnected of those sources differentially affect NSSI behaviors among adolescents. Thus, three main objectives were addressed in this study. First, the current study sought to longitudinally examine which source of support (e.g., teachers, friends, family members) is most salient in impacting NSSI behaviors. The second objective was to investigate the interconnected effects of family, friend, and teacher support on adolescent NSSI. By using a CLPM to analyze the indirect impacts of each source of social support on NSSI while controlling for age, sex, and household income, it was able to determine whether one source influenced NSSI through other sources. Finally, this study aimed to examine whether the direct and indirect effects of the three sources of social support on NSSI differed by sex. Given the overall lack of prior research exploring the simultaneous modeling of three sources of social support on NSSI, the present research is an exploratory investigation of the effectiveness of different sources of social support on NSSI behavior in adolescents.

Methods

Participants and Procedures

Survey data were gathered from a longitudinal study with three waves carried out in three middle schools in China's north. In winter 2021 (T1), a total of 3098 adolescents (57.6% boy; $M_{age} = 13.27 \pm 0.73$) in grades 7 and 8 were recruited. Of those who participated at T1, 3056 adolescents participated in the second wave in summer 2022 (T2, 98.6% of T1 sample), and 2980 participated in the third wave during the 2023 spring semester (T3, 96.2% of T1 sample). The pattern of missing data for each wave was ascertained using the Missing Completely at Random (MCAR) test, which produced a result of $\chi^2/df = 1.26$, $p = 0.194$ for missingness at T2 or/and T3 (Little & Rubin, 1989). According to MCAR results, the pattern of missing data in this research was random (Bollen, 1989). To manage the missing data, the full information maximum likelihood estimation (FIML) was employed (Enders and Bandalos

2001). The participating families' median household income ranged from 4000 to 6000 CNY (about US $ 550.81–826.22) per month.

Family, friend, teacher support and NSSI were measured at T1, T2, and T3. All covariates (described below) were measured at T1. Prior to the study, the participants and their parent(s) or caregivers gave signed informed permission. Individuals involved in the study were made aware that they were participating entirely of their own free will and could withdraw from the study at any time during data collection, and that all information gathered would be kept private. Completing the survey took about thirty minutes. During regular school hours, trained researchers gave the students in class the self-report questionnaires. Notebooks and pens as present were given to each participant after the survey. The Institutional Review Board and Ethics Committee of Human Participant Protection, Faculty of Psychology at Beijing Normal University have granted approval for this research.

Measures

Social support (T1–T3)

The Multidimensional Scale of Perceived Social Support-Chinese Version (MSPSS-C; Zimet et al., 1988) was used to evaluate social support from teachers, friends, and family. Three dimensions of social support from friends, family, and significant others are measured using the MSPSS-C. The current research changed significant others to teachers to measure teacher support. The modified scale consists of 12 items intended to assess family support (4 items; e.g., "I can talk to my family about my problems."), friend support (4 items; e.g., "My friends are all trying to help me.") and teacher support (4 items; e.g., "I can count on my teachers when things go wrong."). On a 5-point Likert scale ranging from 1 (*very strongly disagree*) to 5 (*very strongly agree*), students were instructed to assess their level of agreement with each statement. Higher support in the specific dimension is indicated by a higher score. The Cronbach's α coefficients for the subscales of family support, friend support, and teacher support were 0.65, 0.80, and 0.87 at T1, 0.75, 0.87, and 0.92 at T2, 0.85, 0.92, and 0.94 at T3, respectively.

NSSI (T1–T3)

The assessment of NSSI behaviors was conducted using a modified and condensed version of the Deliberate Self-Harm Inventory, which was initially developed by Gratz (2001) and later modified by Lundh et al. (2007). The scale is made up of 9 items, each one representing a different kind of self-harm (e.g., "In the last 6 months, I deliberately cut my arms and other areas to bleed."). On a 7-point Likert scale from 0 (*never*) to 6 (*five times more*), participants rated each item. The average scores were computed, with higher values illustrating increased engagement in NSSI. The shortened version of the Deliberate Self-Harm Inventory has been extensively utilized in Chinese samples, demonstrating good reliability and validity (Gao et al., 2024). In current research, the Cronbach's α coefficients were 0.84, 0.86 and 0.91 at T1, T2 and T3, respectively.

Covariates (T1)

Demographic information including self-reported sex (0 = boy, 1 = girl), age, and monthly household income was used as covariates. Household income was measured by asking, "What is your family's approximate monthly household income (Mom and Dad's income combined)?" Participants chose from the following six levels: (1) below 2000 CNY, (2) 2000–4000 CNY, (3) 4000–6000 CNY, (4) 6000–10,000 CNY, (5) 10,000–20,000 CNY, and (6) above 20,000 CNY. The division of the levels was determined based on the actual situation of the local economy.

Data Analytic Strategy

First, descriptive statistics and bivariate correlations were computed for each study variable using SPSS 26.0. Second, longitudinal associations between NSSI and three sources of social support (i.e., teachers, friends, and family) were tested through the CLPM in Mplus 8.3 (Muthén & Muthén, 2016). Since the study aimed to explore the prospective effects of between-person differences among research variables, CLPM was suitable for examining these key associations, based on previous recommendations in the literature (Orth et al., 2021). The CLPM assesses the consequences of between-person differences (e.g., whether adolescents receiving low social support are at a greater risk of NSSI onset than those receiving high social support?) and is valuable for understanding the longitudinal and reciprocal relationships among constructs (Hamaker et al., 2015; Orth et al., 2021). Its capacity to explain continuity in the constructs over time makes it an appropriate and effective method for testing developmental processes and directional associations (Quach et al., 2018; Masten et al., 2005). Because of these advantages, CLPM continues to be extensively utilized for examining longitudinal associations among study variables (Chen et al., 2023; Zhang et al., 2023). All adolescents were included in the analysis, regardless of their engagement in NSSI. Model parameters were estimated using the maximum likelihood robust estimator, which corrects for non-normally distributed data. To rule out potential confounds, demographic variables such as adolescents' age, sex, and household income were included

in preliminary analyses to determine if they ought to be added as covariates in each model. Covariates in each model were limited to variables that had significant relations with family support, friend support, teacher support, and NSSI at each time points. To prevent overfitting and reduce statistical power, non-significant covariates were excluded from the models (Becker, 2005). Third, this study investigated the indirect effects of the three forms of social support on NSSI across the three-time points. The total effect, indirect effects, and confidence intervals (CIs) were estimated using bootstrapping ($N = 5000$; Hayes, 2009). For the indirect effects, the bootstrapping-generated 95% CIs were presented. A statistically significant indirect effect is indicated by CIs without zero. Finally, multiple-group analysis was used to test sex differences through constraining coefficients to be equal across variables of interest. Satorra–Bentler scaled chi-square tests were used to evaluate the variances between the freely estimated models and the constrained models (Satorra & Bentler, 2001). The model fit was evaluated using the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), and the Standardized Root Mean Square Residual (SRMR). Model fit was acceptable if RMSEA ≤ 0.08, CFI ≥ 0.90, and SRMR ≤ 0.08.

Results

Descriptive Statistics

Descriptives and bivariate correlations for all variables from T1 to T3 are presented in Table 1. It was discovered that 19.3% of participants at T1, 21.9% at T2, and 16.6% at T3 reported having recently engaged in NSSI. All correlation coefficients among three forms of social support were positive and significant within and across waves. At each time point, NSSI was significantly negatively correlated with three forms of social support. As for the covariates, sex was negatively correlated with all three sources of social support at T1–T3, and positively correlated with NSSI at T1–T3, indicating that adolescent girls might perceive fewer social support from family, friends, and teachers and have more experiences of NSSI. Age was positively correlated with family support at T1, friend support at T1 and T2, and teacher support at T1 and T2. Household income was positively correlated with all three forms of social support at T1 and T2.

Cross-Lagged Panel Model

The CLPM was utilized to analyze the longitudinal direct and indirect effects of three forms of social support on NSSI across the three-time points while also estimating the stability in variables (i.e., autoregressive paths) and the within-time correlations among variables. The model showed adequate fit indices (χ^2 (37, $N = 3098$) = 243.109; RMSEA = 0.042 (90% CI [0.037, 0.048]); CFI = 0.977; and SRMR = 0.023). As shown in Fig. 1, the autoregressive paths for all variables were statistically significant ($p < 0.05$), indicating the stability of these variables over time.

Within time correlations between any one of three forms of social support and NSSI were significant at all time points ($p < 0.05$, see Fig. 1). Specifically, at T1, T2, and T3, more social support from family, friends, and teachers were all related to less NSSI. However, both family and friend support at T1 and T2 did not significantly predict NSSI at T2 and T3, indicating no longitudinal direct influence on subsequent NSSI. In contrast, teacher support at T1 and T2 negatively predicted subsequent NSSI at T3. In addition, the results indicated that the increased NSSI at T1 and T2 longitudinally predicted fewer social support from family and teachers at T2 and T3 (Fig. 1).

Then indirect effects of three forms of social support on NSSI were examined across the three time points. Results show that only the indirect effect of family support at T1 on NSSI at T3 via teacher support at T2 was significant ($b = -0.006$, 95% CI [−0.011, −0.001]; Table 2), suggesting that family support at T1 influenced teacher support at T2, which in turn influenced NSSI at T3. Though more friend support at T1 increased teacher support at T2 and more teacher support at T2 decreased NSSI at T3, the indirect effect from friend support at T1 to NSSI at T3 via teacher support at T2 was not significant (Fig. 1; Table 2; $b = -0.004$, 95% CI [−0.009, 0.000]).

Sex Differences

Multiple-group analyses were performed to determine if the stability and cross-lagged paths varied by sex. When the path coefficients were restricted to be equal across sexes, the constrained model did not significantly differ from the unconstrained model, $\Delta\ \chi^2(32) = 32.731$, $p = 0.431$. This suggests that the impact of social support on NSSI does not differ between boys and girls.

Discussion

Teachers, friends, and family are important sources of social support for adolescents. Receiving increased support from these sources may reduce the risk of NSSI behavior. However, significant gaps in the literature exist regarding which source(s) are most meaningful when their influence is examined simultaneously, and whether support sources

Table 1 Descriptive statistics and correlations of study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. T1 Family Support	–													
2. T2 Family Support	0.48***	–												
3. T3 Family Support	0.34***	0.45***	–											
4. T1 Friend Support	0.54***	0.31***	0.26***	–										
5. T2 Friend Support	0.31***	0.61***	0.32***	0.50***	–									
6. T3 Friend Support	0.20***	0.28***	0.74***	0.35***	0.41***	–								
7. T1 Teacher Support	0.46***	0.35***	0.29***	0.53***	0.40***	0.27***	–							
8. T2 Teacher Support	0.36***	0.47***	0.41***	0.38***	0.47***	0.36***	0.55***	–						
9. T3 Teacher Support	0.29***	0.34***	0.46***	0.28***	0.33***	0.41***	0.41***	0.54***	–					
10. T1 NSSI	−0.29***	−0.22***	−0.18***	−0.26***	−0.19***	−0.13***	−0.28***	−0.21***	−;0.19***	–				
11. T2 NSSI	−0.23***	−0.30***	−0.23***	−0.22***	−0.25***	−0.15***	−0.24***	−0.28***	−0.22***	0.58***	–			
12. T3 NSSI	−0.19***	−0.21***	−0.26***	−0.14***	−0.14***	−0.17***	−0.17***	−0.20***	−0.27***	0.43***	0.51***	–		
13. T1 Sex	−0.08***	−0.09***	−0.07***	−0.06***	−0.11***	−0.06**	−0.14***	−0.10***	−0.09***	0.08***	0.11***	0.05**	–	
14. T1 Age	0.09***	0.03	0.01	0.09***	0.06**	0.00	0.07***	0.05**	0.02	−0.00	−0.02	0.01	−0.10***	–
15. T1 Household income	0.06***	0.08***	0.02	0.09***	0.08***	0.03	0.08***	0.06**	0.01	0.01	−0.00	0.01	−0.04*	0.02
M	16.60	17.12	16.67	15.90	16.58	16.90	15.24	15.17	15.08	0.14	0.19	0.16	–	13.27
SD	2.74	3.05	3.83	3.53	3.72	3.90	4.06	4.51	4.88	0.47	0.58	0.61	–	0.73

Sex was dummy coded as 0 = boys, 1 = girls

NSSI non-suicidal self-injury, *T1* Time 1, *T2* Time 2, *T3* Time 3

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

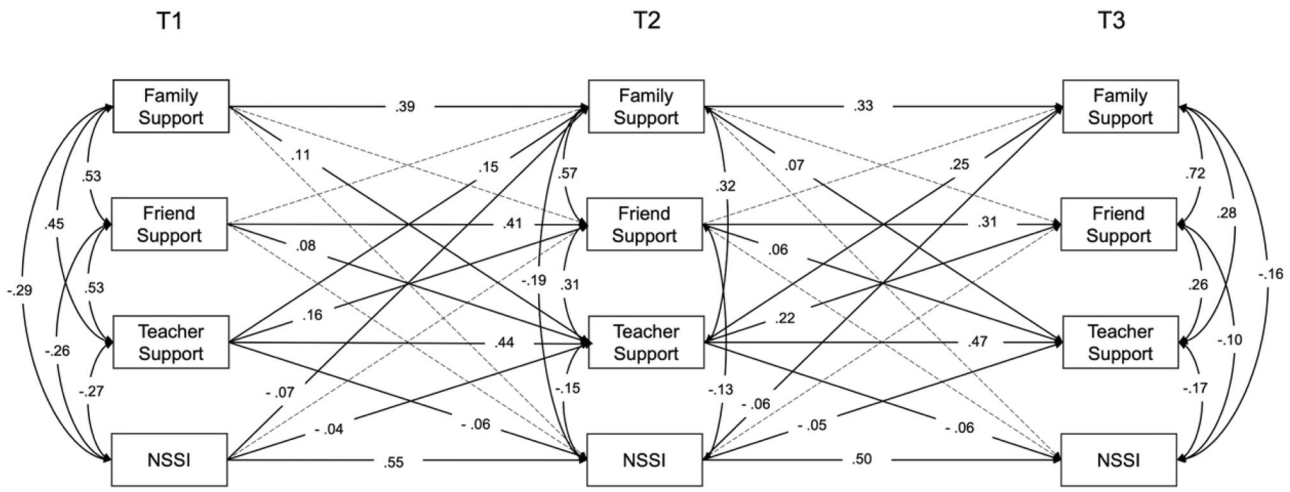

Fig. 1 The CLPM for family support, friend support, teacher support and NSSI. Dotted lines represent nonsignificant paths; solid lines represent significant paths ($p < 0.05$). Only significant standardized coefficients were presented. *NSSI* non-suicidal self-injury, *T1* Time 1, *T2* Time 2, *T3* Time 3

Table 2 Standardized coefficients and 95% Confidence Intervals for indirect effects

Pathways	Indirect effect	95% Confidence interval (CI)	
		Lower	Upper
Family Support (T1) → Friend Support (T2) → NSSI (T3)	0.000	−0.002	0.002
Family Support (T1) → Teacher Support (T2) → NSSI (T3)	−0.006[a]	−0.011	−0.001
Friend Support (T1) → Family Support (T2) → NSSI (T3)	0.000	−0.002	0.003
Friend Support (T1) → Teacher Support (T2) → NSSI (T3)	−0.004	−0.008	0.000
Teacher Support (T1) → Family Support (T2) → NSSI (T3)	−0.009	−0.019	0.001
Teacher Support (T1) → Friend Support (T2) → NSSI (T3)	0.007	−0.002	0.016

NSSI non-suicidal self-injury, *T1* Time 1, *T2* Time 2, *T3* Time 3

[a]95% CI does not include zero

interact to ultimately influence adolescent NSSI. Using a longitudinal design, the current research addresses the gaps in the literature. Results from the current research indicated that when all three sources of social support were combined, only teacher support directly influenced NSSI and mediated the association between family support and NSSI, irrespective of sex. Findings from the present study revealed the necessity of simultaneously exploring the influences of various sources of social support on adolescent NSSI.

This study found that when combining and examining three sources of social support, only teacher support significantly and directly predicted subsequent NSSI at the next time point. For adolescents, teacher support showed a deeper connection with NSSI, which suggests the pivotal role of high social support from teachers in effectively preventing adolescent NSSI. In the context of Chinese culture, which advocates Confucianism, teachers are granted significant authority by the tradition of respecting teachers (Paine, 1995). The role of teachers extends beyond imparting academic education within the classroom, as they may significantly influence students' personal growth (Day et al., 2023; Verschueren & Koomen, 2012). Teachers often serve as mentors, providing guidance and emotional support to students. Their support makes adolescents feel cared for, loved, and trusted, and helps them develop coping mechanisms to counteract the adverse consequences of stressful situations, which provides adolescents with a strong buffer against engaging in NSSI behaviors (Reavis et al., 2010; Veenstra et al., 2014). Moreover, teachers are typically more constructive and instructive when offering support, which may go beyond the emotional companionship and comfort that comes from family and friends (Guo et al., 2022). Consequently, teachers may be approached more often by adolescents for help when they run into problems. In addition, adolescents spend much of their time at school with teachers (Eccles & Roeser, 2003), which gives teachers greater opportunity to observe emotional and behavioral changes in adolescents and to provide timely support (Fayyaz & Hashmi, 2022). Taken together, these factors may contribute to the findings that teacher support was more influential compared to other kinds of support, in reducing adolescent NSSI.

Besides the direct impact that various sources of social support have on adolescent NSSI, prior study demonstrates that different sources of social support are interactive (Lyell et al., 2020). This study supported these previous findings in that family support indirectly influenced NSSI through support from teachers (Woolley et al., 2009). The findings revealed the intersections between the microsystems of teachers and families, reinforcing the mesosystem influences proposed in Bronfenbrenner's ecological theory (2005). The observation that teacher support is influenced by family support aligns with the convergence hypothesis of perceived support across different sources. This hypothesis posits that one positive relationship could promote another, creating a perception of consistently high or low support across social partners (Pallini et al., 2014). Specifically, feeling supported by family—likely because of positive parenting—may enhance youth' ability to feel supported by teachers outside the home, aiding their integration into the broader society beyond the home environment (Chan et al., 2022). Moreover, the capitalization perspective (Gable et al., 2018; Gable & Bedrov, 2022) also supports findings in that teacher support bolsters the benefits of family support, thereby enhancing positive affect, subjective well-being, and self-esteem (Choi et al., 2019; Peters et al., 2018). This enhanced support system can help buffer stress and reduce the likelihood of self-injury. Although an interaction between teacher and family support was observed in the current study, no such interaction with friend support was observed. The lack of a significant indirect effect of friend support on NSSI behaviors might relate to the increased complexity of the models simultaneously examining all three sources of social support, potentially obscuring the role of friends support. Generally, the current study suggests that the connection between support from both teachers and families is critical for adolescent NSSI. The findings highlight the central role of teacher support among the three sources of social support. The joint effects of social support from teachers and family significantly benefit students NSSI behaviors. In other words, adolescents are less likely to engage in NSSI behaviors if they have the support of teachers and their families.

It is noteworthy that this study not only found that social support significantly affects NSSI but also that NSSI significantly impacts subsequent social support. Specifically, increased NSSI at T1 predicted fewer family and teacher support at T2, and increased NSSI at T2 predicted fewer family and teacher support at T3. Given that NSSI is highly stigmatized, adolescents who engage in this behavior may meet fear, avoidance, rejection, and even isolation from others, which could decrease their perceived social support (Simone & Hamza, 2020). Additionally, the stigmatizing and unpleasant experiences can cause adolescents to hide their NSSI and reduce their social engagement, increasing their feelings of isolation and further decreasing their perceived social support (Simone & Hamza, 2020; Yang et al., 2023). Finally, engaging in NSSI may also provide feelings of relief, thereby reducing the willingness to seek help and ultimately limiting the social support sought and received (Salvador et al., 2023). Thus, while findings from the present study suggest that social support is effective in reducing NSSI behaviors among adolescents, those with a propensity for high self-injury may struggle with accessing quality social support or may not actively seek support. These conundrums necessitate identifying proactive prevention and intervention measures that do not solely rely on adolescents' willingness to seek help and addressing the stigma and negative reactions associated with NSSI. It may be beneficial to investigate approaches that integrate community, school, and family-based programs to address NSSI more holistically and to foster environments where adolescents feel safe to disclose their struggles without fear of stigma or misunderstanding.

The current findings have important implications for understanding and proposing interventions for preventing NSSI in adolescents. The current study extends previous research indicating that teacher support plays the vital role in preventing NSSI and act as the hub in the social support network that impact NSSI. Practically, this study suggests that teachers should be informed about the importance of supportive behaviors toward adolescents, such as showing care, warmth, respect, a responsive and helpful attitude, and being available. These behaviors are crucial in reducing adolescents' NSSI (Yeung & Leadbeater, 2010). By acting in a supportive manner toward youth, teachers may send a message of availability and willingness to help (Yeung & Leadbeater, 2010). Further, this study emphasizes the importance of the connections between teacher and family support. Increasing teacher support is a promising way to reduce adolescent NSSI while justifying home-school collaboration. For instance, establishing robust communication channels such as digital platforms or regular meetings for parents and teachers where they can discuss concerns, share observations, and collaborate may be an effective way to support at-risk adolescents (Marcu et al., 2019). Additionally, providing specialized training sessions for both teachers and parents on how to recognize signs of self-injury and how to respond effectively is also warranted (Glennon et al., 2020). Notably, home-school collaboration should be conducted under the guidance of school mental health professionals to prevent potential harm to students. Expert involvement could ensure that the collaboration supports the students effectively and avoids any negative impacts from improper handling (Ekart & Perše, 2023).

Several limitations should be noted. First, self-report measures were the only ones used in this study. Future

studies may improve the design by employing multi-informant and observational paradigms with consistent reliability and greater ecological validity to evaluate social support and NSSI levels. Second, this study used a dataset with three-time points to investigate developmental pathways, which restricted the use of random-intercept cross-lagged panel model (RI-CLPM) analyses to examine how within-person relationships between NSSI and three sources of social support play out (Orth et al., 2021). Future study could include longer time frames, with four or more data points to enable RI-CLPM analyses and provide a more comprehensive understanding of the longitudinal relationships between various sources of support and NSSI throughout development (e.g., Orth et al., 2021). Finally, the data used in this study was collected solely from three middle schools in China's north, which restricts the generalizability of results to other ages and regional groups. Future studies should use a representative national sample to yield more generalizable conclusions.

Conclusion

Despite evidence that family, friend, and teacher support can prevent adolescent NSSI, it is unclear which source is perceived as most supportive and how these sources interact to influence NSSI. The current study addressed this issue by employing a cross-lagged panel model to investigate the direct effects of three sources of social support on NSSI and the interconnected effects of family, friend, and teacher support on adolescent NSSI. The results indicated that teacher support was most predictive of NSSI compared to family and friend support and mediated the relations between family support and NSSI. The findings suggest that teacher support acts as the hub in the social support network and plays a pivotal role in reducing NSSI behaviors. The findings also emphasize the importance of the connections between teacher and family support.

Data sharing and declaration

The datasets generated or analyzed during the current study are not publicly available but are available from the corresponding author on reasonable request.

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Authors' contributions Q.Z. conceived of the study performed the statistical analysis, participated in the research design, data curation, and interpretation of the data results, and drafted the manuscript; Y.L. participated in the research design, and the interpretation of the data results, and commented on the manuscript; Y.G. participated in the research design, and commented on the manuscript; X.L. acquired the research funding, administrated and supervised the project, participated in the interpretation of the data, reviewed and edited the manuscript. All authors have read and agreed to the published version of the manuscript.

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Compliance with ethical standards

Conflict of interest The authors declare no competing interests.

Ethical approval Ethical approval was obtained from the Institutional Review Board and Ethics Committee of Human Participant Protection, Faculty of Psychology at Beijing Normal University. The procedures used in this study adhered to the tenets of the Declaration of Helsinki.

Informed consent Participants and their primary caregivers gave written informed consent for the assessment.

References

Becker, T. E. (2005). Potential problems in the statistical control of variables in organizational research: A qualitative analysis with recommendations. *Organizational Research Methods*, *8*(3), 274–289. https://doi.org/10.1177/1094428105278021.

Bokhorst, C. L., Sumter, S. R., & Westenberg, P. M. (2010). Social support from parents, friends, classmates, and teachers in children and adolescents aged 9 to 18 years: Who is perceived as most supportive? *Social development*, *19*(2), 417–426. https://doi.org/10.1111/j.1467-9507.2009.00540.x.

Bollen, K. A. (1989). A new incremental fit index for general structural equation models. *Sociological Methods & Research*, *17*(3), 303–316. https://doi.org/10.1177/0049124189017003004.

Bronfenbrenner, U. (Ed.). (2005). *Making human beings human: Bioecological perspectives on human development*. Sage.

Burke, T. A., Hamilton, J. L., Abramson, L. Y., & Alloy, L. B. (2015). Non-suicidal self-injury prospectively predicts interpersonal stressful life events and depressive symptoms among adolescent girls. *Psychiatry Research*, *228*(3), 416–424. https://doi.org/10.1016/j.psychres.2015.06.021.

Chan, M. K., Sharkey, J. D., Nylund-Gibson, K., Dowdy, E., & Furlong, M. J. (2022). Social support profiles associations with adolescents' psychological and academic functioning. *Journal of School Psychology*, *91*, 160–177. https://doi.org/10.1016/j.jsp.2022.01.006.

Chen, C., Chen, Y., & Song, Y. (2023). Reciprocal relationship between interpersonal communication and depressive symptoms and the mediating role of resilience across two years: Three-wave cross-lagged panel model. *Journal of Affective Disorders*, *334*, 358–369. https://doi.org/10.1016/j.jad.2023.04.121.

Choi, H., Oishi, S., Shin, J., & Suh, E. M. (2019). Do happy events love company? Cultural variations in sharing positive events with others. *Personality and Social Psychology Bulletin*, *45*(4), 528–540. https://doi.org/10.1177/0146167218789071.

Colarossi, L. G. (2001). Adolescent gender differences in social support: Structure, function, and provider type. *Social Work Research*, *25*(4), 233–241. https://doi.org/10.1093/swr/25.4.233.

Colarossi, L. G., & Eccles, J. S. (2003). Differential effects of support providers on adolescents' mental health. *Social Work Research*, *27*(1), 19–30. https://doi.org/10.1093/swr/27.1.19.

Costa, R. P. D. O., Peixoto, A. L. R. P., Lucas, C. C. A., Falcão, D. N., Farias, J. T. D. S., Viana, L. F. P., & Trindade-Filho, E. M. (2021). Profile of non-suicidal self-injury in adolescents: interface with impulsiveness and loneliness. *Jornal de Pediatria*, *97*, 184–190.

Chavkin, N. F., Gonzalez, J., & Rader, R. (2000). A home-school program in a Texas-Mexico border school: Voices from parents, students, and school staff. *School Community Journal*, *10*(2), 127–137.

Gillies, D., Christou, M. A., Dixon, A. C., Featherston, O. J., Rapti, I., Garcia-Anguita, A., … & Christou, P. A. (2018). Prevalence and characteristics of self-harm in adolescents: Meta-analyses of community-based studies 1990–2015. *Journal of the American Academy of Child & Adolescent Psychiatry*, 57(10), 733-741.

Cumsille, P. E., & Epstein, N. (1994). Family cohesion, family adaptability, social support, and adolescent depressive symptoms in outpatient clinic families. *Journal of Family Psychology*, *8*(2), 202–214. https://doi.org/10.1037/0893-3200.8.2.202.

Curtis, A. C. (2015). Defining adolescence. *Journal of Adolescent and Family Health*, *7*(2), 2.

Daukantaitė, D., Lundh, L. G., Wångby-Lundh, M., Claréus, B., Bjärehed, J., Zhou, Y., & Liljedahl, S. I. (2020). What happens to young adults who have engaged in self-injurious behavior as adolescents? A 10-year follow-up. *European Child & Adolescent Psychiatry*, *30*, 475–492. https://doi.org/10.1007/s00787-020-01533-4.

Day, C. W., Simpson, A., Li, Q., Bi, Y., & He, F. (2023). Teacher professionalism: Chinese teachers' perspectives. *Journal of Professional Capital and Community*, *8*(2), 65–89. https://doi.org/10.1108/JPCC-01-2022-0004.

Eccles, J. S., & Roeser, R. W. (2003). Schools as developmental contexts. In G. R. Adams & M. D. Berzonsky (Eds.), *Blackwell handbook of adolescence* (pp. 129–148). Blackwell Publishers, Ltd. https://doi.org/10.1002/9780470756607.

Ekart, Ž. G., & Perše, T. V. (2023). Active involvement in home-school collaboration and its impact on student motivation-the Slovenian experience. *TEM Journal*, *12*, 1.

Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling*, *8*(3), 430–457. https://doi.org/10.1207/S15328007SEM0803_5.

Esposito, C., Affuso, G., Amodeo, A. L., Dragone, M., & Bacchini, D. (2021). Bullying victimization: investigating the unique contribution of homophobic bias on adolescent non-suicidal self-injury and the buffering role of school support. *School Mental Health*, *13*, 420–435. https://doi.org/10.1007/s12310-021-09434-w.

Fayyaz, H. N., & Hashmi, K. (2022). Adolescence and academic well-being: Parents, teachers, and students' perceptions. *Journal of Education and Educational Development*, *9*(1), 27–47. https://doi.org/10.22555/joeed.v9i1.475.

Gable, S. L., Reis, H. T., Impett, E. A., & Asher, E. R. (2018). What do you do when things go right? The intrapersonal and interpersonal benefits of sharing positive events. In H. Reis (Ed.), *Relationships, well-being and behaviour* (pp. 144–182). Routledge. https://doi.org/10.4324/9780203732496

Gable, S. L., & Bedrov, A. (2022). Social isolation and social support in good times and bad times. *Current Opinion in Psychology*, *44*, 89–93. https://doi.org/10.1016/j.copsyc.2021.08.027.

Gao, Y., Liu, J., Liu, X., Wang, Y., & Qiu, S. (2024). Dimensions of family stress and repetitive nonsuicidal self-injury in adolescence: Examining the interactive effects of impulsivity and emotion dysregulation. *Child Abuse & Neglect*, *152*, 106804. https://doi.org/10.1016/j.chiabu.2024.106804.

Glennon, S. D., Viola, S. B., & Blakely, A. O. (2020). Increasing school personnel's self-efficacy, knowledge, and response regarding nonsuicidal self-injury in youth. *Psychology in the Schools*, *57*(1), 135–151. https://doi.org/10.1002/pits.22300.

Gong, Y. (1994). Overview of research on the relationship between social support and health. *Advances in Psychological Science*, *2*, 34–39.

Gratz, K. L. (2001). Measurement of deliberate self-harm: Preliminary data on the Deliberate Self-Harm Inventory. *Journal of Psychopathology and Behavioral Assessment*, *23*, 253–263. https://doi.org/10.1023/A:1012779403943.

Guo, X., Zhang, Y., Chen, Y., & Zhang, L. (2022). School victimization and self-esteem: Reciprocal relationships and the moderating roles of peer support and teacher support. *Aggressive Behavior*, *48*(2), 187–196. https://doi.org/10.1002/ab.22009.

Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods*, *20*(1), 102–116. https://doi.org/10.1037/a0038889.

Hamza, C. A., Stewart, S. L., & Willoughby, T. (2012). Examining the link between nonsuicidal self-injury and suicidal behavior: A review of the literature and an integrated model. *Clinical Psychology Review*, *32*(6), 482–495. https://doi.org/10.1016/j.cpr.2012.05.003.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, *76*(4), 408–420. https://doi.org/10.1080/03637750903310360.

Hellfeldt, K., López-Romero, L., & Andershed, H. (2020). Cyberbullying and psychological well-being in young adolescence: the potential protective mediation effects of social support from family, friends, and teachers. *International Journal of Environmental Research and Public Health*, *17*(1), 45. https://doi.org/10.3390/ijerph17010045.

Helsen, M., Vollebergh, W., & Meeus, W. (2000). Social support from parents and friends and emotional problems in adolescence. *Journal of Youth and Adolescence*, *29*(3), 319–335. https://doi.org/10.1023/a:1005147708827.

Jacobson, C. M., & Gould, M. (2007). The epidemiology and phenomenology of non-suicidal self-injurious behavior among adolescents: A critical review of the literature. *Archives of Suicide Research*, *11*(2), 129–147. https://doi.org/10.1080/13811110701247602.

Jaworska, N., & MacQueen, G. (2015). Adolescence as a unique developmental period. *Journal of Psychiatry & Neuroscience*, *40*(5), 291. https://doi.org/10.1503/jpn.150268.

Kellerman, J. K., Millner, A. J., Joyce, V. W., Nash, C. C., Buonopane, R., Nock, M. K., & Kleiman, E. M. (2022). Social support and nonsuicidal self-injury among adolescent psychiatric inpatients. *Research on Child and Adolescent Psychopathology*, *50*(10), 1351–1361. https://doi.org/10.1007/s10802-022-00931-3.

Little, R. J., & Rubin, D. B. (1989). The analysis of social science data with missing values. *Sociological Methods & Research*, *18*(2-3), 292–326. https://doi.org/10.1177/0049124189018002004.

Liu, K., Yang, X., & Xin, M. (2021). Impact of violent experiences and social support on R-NSSI behavior among middle school students in China. *International Journal of Environmental Research and Public Health*, *18*(7), 3347. https://doi.org/10.3390/IJERPH18073347.

Liu, R. T. (2023). The epidemiology of non-suicidal self-injury: lifetime prevalence, sociodemographic and clinical correlates, and treatment use in a nationally representative sample of adults in England. *Psychological Medicine*, *53*(1), 274–282. https://doi.org/10.1017/S003329172100146X.

Lundh, L. G., Karim, J., & Quilisch, E. (2007). Deliberate self-harm in 15-year-old adolescents: A pilot study with a modified version of the Deliberate Self-Harm Inventory. *Scandinavian Journal of Psychology*, *48*(1), 33–41. https://doi.org/10.1111/j.1467-9450.2007.00567.x.

Lyell, K. M., Coyle, S., Malecki, C. K., & Santuzzi, A. M. (2020). Parent and peer social support compensation and internalizing problems in adolescence. *Journal of School Psychology*, *83*, 25–49. https://doi.org/10.1016/j.jsp.2020.08.003.

Marcu, G, Spiller, A, Arevalo Garay, J, Connell, J. E., & Pina, L. R. 2019). Breakdowns in home-school collaboration for behavioral intervention. *Proceedings of the 2019 CHI conference on human factors in computing systems*. (pp. 1–12). ACM. https://doi.org/10.1145/3290605.3300891.

Marini, Z. A., Dane, A. V., Bosacki, S. L., & Cura, Y. (2006). Direct and indirect bully-victims: Differential psychosocial risk factors associated with adolescents involved in bullying and victimization. *Aggressive Behavior*, *32*(6), 551–569. https://doi.org/10.1002/ab.20155.

Madjar, N., Shabat, S. B., Elia, R., Fellner, N., Rehavi, M., Rubin, S., Segal, N., & Shoval, G. (2017). Non-suicidal self-injury within the school context: Multilevel analysis of teachers' support and peer climate. *European Psychiatry*, *41*(1), 95–101. https://doi.org/10.1016/j.eurpsy.2016.11.003.

Madjar, N., Daka, D., Zalsman, G., & Shoval, G. (2021). Depression symptoms as a mediator between social support, non-suicidal self-injury, and suicidal ideation among Arab adolescents in Israel. *School Psychology International*, *42*(4), 358–378. https://doi.org/10.1177/0143034321998741.

Masten, A. S., Roisman, G. I., Long, J. D., Burt, K. B., Obradović, J., Riley, J. R., & Tellegen, A. (2005). Developmental cascades: linking academic achievement and externalizing and internalizing symptoms over 20 years. *Developmental Psychology*, *41*(5), 733. https://doi.org/10.1037/0012-1649.41.5.733.

Mogens, N. C., Bo, M., Diane, D., & Katrine, S. V. (2015). Non-suicidal self-injury—does social support make a difference? An epidemiological investigation of a Danish national sample. *Child Abuse & Neglect*, *44*, 106–116. https://doi.org/10.1016/j.chiabu.2014.10.023.

Muthén, L. K., & Muthén, B. O. (2016). *Mplus user's guide* (8th ed.). Muthén & Muthén.

Nock, M. K. (Ed.). (2009). *Understanding nonsuicidal self-injury: Origins, assessment, and treatment*. American Psychological Association. https://doi.org/10.1037/11875-000.

Orth, U., Clark, D. A., Donnellan, M. B., & Robins, R. W. (2021). Testing prospective effects in longitudinal research: Comparing seven competing cross-lagged models. *Journal of Personality and Social Psychology*, *120*, 1013–1034. https://doi.org/10.1037/pspp0000358.

Paine, L. (1995). Teacher education in search of a metaphor: Defining the relationship between teachers, teaching, and the state in China. In M. B. Ginburg & B. Lindsay (Eds.), *The Political Dimension in Teacher Education: Comparative Perspectives on Policy Formation, Socialisation and Society* (pp. 76–98). Falmer Press. https://doi.org/10.4324/9781315043135.

Pallini, S., Baiocco, R., Schneider, B. H., Madigan, S., & Atkinson, L. (2014). Early child–parent attachment and peer relations: A meta-analysis of recent research. *Journal of Family Psychology*, *28*(1), 118–123. https://doi.org/10.1037/a0035736.

Peters, B. J., Reis, H. T., & Gable, S. L. (2018). Making the good even better: A review and theoretical model of interpersonal capitalization. *Social and Personality Psychology Compass*, *12*(7), e12407. https://doi.org/10.1111/spc3.12407.

Pössel, P., Burton, S. M., Cauley, B., Sawyer, M. G., Spence, S. H., & Sheffield, J. (2018). Associations between social support from family, friends, and teachers and depressive symptoms in adolescents. *Journal of Youth and Adolescence*, *47*, 398–412. https://doi.org/10.1007/S10964-017-0712-6.

Quach, J. L., Nguyen, C. D., Williams, K. E., & Sciberras, E. (2018). Bidirectional associations between child sleep problems and internalizing and externalizing difficulties from preschool to early adolescence. *JAMA Pediatrics*, *172*(2), e174363. https://doi.org/10.1001/jamapediatrics.2017.4363.

Reavis, R. D., Keane, S. P., & Calkins, S. D. (2010). Trajectories of peer victimization: The role of multiple relationships. *Merrill-Palmer Quarterly*, *56*(3), 303–332. https://doi.org/10.1353/mpq.0.0055.

Richman, J. M., Bowen, G. L., & Woolley, M. E. (2004). School failure: An eco-interactional developmental perspective. In M. W. Fraser (Ed.), Risk and resilience in childhood: An ecological perspective. (2nd ed., pp. 133–160). NASW Press.

Rigby, K. (2000). Effects of peer victimization in schools and perceived social support on adolescent well-being. *Journal of Adolescence*, *23*(1), 57–68. https://doi.org/10.1006/jado.1999.0289.

Rivera-Mosquera, E., Phillips, J. C., Castelino, P., Martin, J. K., & Mowry Dobran, E. S. (2007). Design and implementation of a grassroots precollege program for Latino youth. *The Counseling Psychologist*, *35*(6), 821–839. https://doi.org/10.1177/0011000007304593.

Rosenfeld, L. B., Richman, J. M., & Bowen, G. L. (2000). Social support networks and school outcomes: The centrality of the teacher. *Child and Adolescent Social Work Journal*, *17*, 205–226. https://doi.org/10.1023/A:1007535930286.

Salvador, V. F., Gouveia-Pereira, M., Simões, B., & Duarte, E. (2023). Young adults who self-harm: barriers to and facilitators of seeking help. *Psychiatry Research*, *327*, 115390. https://doi.org/10.1016/j.psychres.2023.115390.

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, *66*(4), 507–514. https://doi.org/10.1007/BF02296192.

Simone, A. C., & Hamza, C. A. (2020). Examining the disclosure of nonsuicidal self-injury to informal and formal sources: A review of the literature. *Clinical Psychology Review*, *82*, 101907. https://doi.org/10.1016/j.cpr.2020.101907.

Sornberger, M. J., Heath, N. L., Toste, J. R., & Mclouth, R. (2012). Nonsuicidal self-injury and gender: Patterns of prevalence, methods, and locations among adolescents. *Suicide and Life-Threatening Behavior*, *42*(3), 266–278. https://doi.org/10.1111/j.1943-278X.2012.0088.x.

Tang, J., Yang, W., Ahmed, N. I., Ma, Y., Liu, H. Y., Wang, J. J., Wang, P. X., Du, Y. K., & Yu, Y. Z. (2016). Stressful life events as a predictor for nonsuicidal self-injury in Southern Chinese adolescence: A cross-sectional study. *Medicine*, *95*(9), e2637. https://doi.org/10.1097/MD.0000000000002637.

Vaux, A. (1985). Variations in social support associated with gender, ethnicity, and age. *Journal of Social Issues*, *41*(1), 89–110. https://doi.org/10.1111/j.1540-4560.1985.tb01118.x.

Veenstra, R., Lindenberg, S., Huitsing, G., Sainio, M., & Salmivalli, C. (2014). The role of teachers in bullying: The relation between antibullying attitudes, efficacy, and efforts to reduce bullying. *Journal of Educational Psychology*, *106*(4), 1135–1143. https://doi.org/10.1037/a0036110.

Verschueren, K., & Koomen, H. M. (2012). Teacher–child relationships from an attachment perspective. *Attachment & Human Development*, *14*(3), 205–211. https://doi.org/10.1080/14616734.2012.672260.

Wang, Y. J., Li, X., Ng, C. H., Xu, D. W., Hu, S., & Yuan, T. F. (2022). Risk factors for non-suicidal self-injury (NSSI) in adolescents: A meta-analysis. *eClinicalMedicine*, *46*, 101350. https://doi.org/10.1016/j.eclinm.2022.101350.

Wenz-Gross, M., Siperstein, G. N., Untch, A. S., & Widaman, K. F. (1997). Stress, social support, and adjustment of adolescents in middle school. *The Journal of Early Adolescence*, *17*(2), 129–151. https://doi.org/10.1177/0272431697017002002.

Woolley, M. E., Kol, K. L., & Bowen, G. L. (2009). The social context of school success for Latino middle school students: Direct and indirect influences of teachers, family, and friends. *The Journal of*

Early Adolescence, *29*(1), 43–70. https://doi.org/10.1177/0272431608324478.

Wu, C. Y., Stewart, R., Huang, H. C., Prince, M., & Liu, S. I. (2011). The impact of quality and quantity of social support on help-seeking behavior prior to deliberate self-harm. *General Hospital Psychiatry*, *33*(1), 37–44. https://doi.org/10.1016/j.genhosppsych.2010.10.006.

Xia, T. S., Liu, J., Gu, H. L., & Dong, S. L. (2016). The effects of interparental conflicts on adolescents' aggressive behavior: A moderated mediation model. *Psychological Development and Education*, *32*(4), 503–512. https://doi.org/10.16187/j.cnki.issn1001-4918.2016.04.15.

Xin, M., Yang, X., Liu, K., Naz Boke, B., & Bastien, L. (2020). Impact of negative life events and social support on nonsuicidal self-injury among Chinese middle school students. *American Journal of Men's Health*, *14*(4), 1557988320937124. https://doi.org/10.1177/1557988320937124.

Yang, Q., Xie, R., Li, J., Zhang, R., Ding, W., & Li, W. (2023). The mutual relationship between self-compassion, perceived social support, and adolescent NSSI: A three-wave longitudinal study. *Mindfulness*, *14*(8), 1940–1950. https://doi.org/10.1007/s12671-023-02169-6.

Yeung, R., & Leadbeater, B. (2010). Adults make a difference: the protective effects of parent and teacher emotional support on emotional and behavioral problems of peer-victimized adolescents. *Journal of Community Psychology*, *38*(1), 80–98. https://doi.org/10.1002/jcop.20353.

Zhang, H., Miller-Cotto, D., & Jordan, N. C. (2023). Estimating the co-development of executive functions and math achievement throughout the elementary grades using a cross-lagged panel model with fixed effects. *Contemporary Educational Psychology*, *72*, 102126. https://doi.org/10.1016/j.cedpsych.2022.102126.

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, *52*(1), 30–41. https://doi.org/10.1207/s15327752jpa5201_2.

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