



Bullying and Depression among Vietnamese Adolescents: Parallel Mediation Through Stress and Anxiety

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Accepted: 18 July 2025

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Abstract

Previous research has primarily focused on the effect of being bullied on mental health; however, little attention has been given to the impact of bullying others on adolescents' mental health. This study aims to investigate the mediating roles of stress and anxiety in the relationship between bullying (both being bullied and bullying others) and depression among Vietnamese adolescents. The sample consisted of 714 adolescents (46.6% male and 53.4% female). The Cyberbullying and Victimization Questionnaire and the Depression Anxiety Stress Scales were administered. The results indicated that stress ($B=0.166$, $SE=0.030$, $CI=[0.112; 0.229]$) and anxiety ($B=0.128$, $SE=0.022$, $CI=[0.088; 0.173]$) fully mediated the relationship between being bullied and depression. Similarly, stress ($B=0.172$, $SE=0.039$, $CI=[0.102; 0.258]$) and anxiety ($B=0.121$, $SE=0.028$, $CI=[0.071; 0.182]$) fully mediated the relationship between bullying others and depression. In both models, the direct effects of being bullied and bullying others on depression were not statistically significant after accounting for the mediators. These findings have important implications for educators and psychological counselors.

Keywords Adolescents · Anxiety · Bullying · Depression · Stress

Introduction

Bullying is acknowledged as a global issue and raises public worries about adolescents' safety (Shahrour et al., 2020). Bullying is an aggressive, intentional, and repetitive behavior in which there is a power imbalance between the bully and the victim (Rettew & Pawlowski, 2016). There are two main forms of bullying: traditional bullying and cyberbullying. While traditional bullying typically involves direct interactions and can result in physical harm or verbal aggression (Shetgiri, 2013), cyberbullying takes place in the digital world, making it easier for perpetrators to hide their identities and extend the reach of their harmful actions (Nocentini et al., 2010). Adolescents are increasingly spending more time online and staying connected with one another through digital technologies (Odgers & Jensen, 2020), which can

exacerbate the negative impacts of bullying by amplifying the frequency and reach of such behavior, often making it more difficult to address. Statistics from recent studies have shown that the proportion of adolescents participating in bullying as perpetrators ranged from 21.26% (Silva et al., 2020) to 52.1% (An et al., 2019) and as victims ranged from 7.0% (Shahrour et al., 2020) to 11.59% (Li et al., 2023). Whether as perpetrators or victims, adolescents involved in bullying often experience mental health problems such as stress, anxiety, and depression.

Stress, anxiety, and depression are significant mental health issues that profoundly affect adolescents' psychological development (Hoang & Nguyen, 2025). The strong association between being bullied or bullying and mental health has been demonstrated in the literature. Previous research has shown that victims of bullying can experience anxiety, depression (Balluerka et al., 2023; Pimentel et al., 2020), and stress (Kampoli et al., 2017; Pimentel et al., 2020). According to Kampoli et al. (2017), the frequency of bullying is a key predictor of stress in victims. Additionally, bullying lowers victims' self-esteem, increases social anxiety, and thereby contributes to anxiety and depression (Balluerka et al., 2023; Mei et al., 2021). Being bullied is also perceived as social exclusion, which reduces perceived

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social support and leads to psychological distress (Ho & Nguyen, 2023).

Not only bullying victims but also perpetrators are significantly associated with mental health problems such as stress (Kampoli et al., 2017), anxiety, and depression (Bitar et al., 2023). Studies on adolescents have found that higher levels of bullying behavior are linked to increased stress, particularly in school environments where adult intervention is likely (Kampoli et al., 2017). This suggests that frequent perpetrators may perceive a lack of social support due to adult efforts to curb their behavior, which in turn may lead to stress. In addition, research among Lebanese adolescents has shown that the perpetration of bullying is positively associated with anxiety and depression (Bitar et al., 2023; Gong et al., 2022). Explaining the link between perpetrators of bullying and mental health problems, previous studies have shown that perpetrators may have poor social skills (Savage & Tokunaga, 2017) and low levels of empathy (Ang & Goh, 2010). More importantly, when bullying others, the perpetrator not only lowers the victim's self-esteem but also lowers their self-esteem as well (Rinehart et al., 2020). Meanwhile, lack of social skills, low self-esteem, and low empathy in perpetrators can increase their anxiety and depression (Bitar et al., 2023; Calandri et al., 2019; Gambin & Sharp, 2018).

There is also a well-documented interrelationship between stress, anxiety, and depression (Havnen et al., 2020; Ho, 2023b). According to Liu and Alloy (2010), stress symptoms play a significant role in the onset, relapse, and aggravation of depressive symptoms. Many studies have confirmed the positive association between stress and depression (Havnen et al., 2020; Ho, 2023b; Rabadi et al., 2017; Valikhani et al., 2020). When individuals experience stress, they may suffer increased anxiety, resort to maladaptive coping strategies, perceive lower social support, and experience sleep disturbances, all of which can contribute to depression (Evans et al., 2015; Havnen et al., 2020; Ho, 2023b; Lee et al., 2022; Talwar et al., 2017). Furthermore, anxiety itself can exacerbate depressive symptoms (Havnen et al., 2020; Ho, 2023a, 2023b), especially in those with poor sleep quality (Ho, 2023b), heightened emotional attention, and low emotional clarity (Yildirim et al., 2023). Individuals who rely on avoidant coping, experience poor sleep, or have limited social support are particularly vulnerable to developing depression after anxiety (Jacobson et al., 2017; Jacobson & Newman, 2014; Li et al., 2018).

To better understand these psychological mechanisms, this study is guided by the Transactional Model of Stress and Coping developed by Lazarus and Folkman (1984). This model posits that psychological outcomes, such as depression, are shaped by an individual's cognitive appraisal of stressors and the coping strategies employed. In the context

of bullying, adolescents may perceive involvement—as victims or perpetrators—as a source of stress, which triggers anxiety and eventually depression. Therefore, stress and anxiety are conceptualized as parallel mediators that reflect adolescents' emotional and cognitive reactions to bullying. This theoretical framework provides a robust basis for understanding the pathway from bullying to depression in youth.

Although many studies have explored the impact of bullying victimization on mental health and its underlying mechanisms, relatively little attention has been given to the link between bullying perpetration and mental health. More importantly, in Vietnam, no studies to date have examined the relationship between bullying (both victimization and perpetration) and mental health outcomes. This study was conducted to address these identified gaps in the literature.

Purpose and Hypothesis of the Study

This study aims to achieve two main objectives: first, to investigate the mediating roles of stress and anxiety in the relationship between being bullied (victimization) and depression among Vietnamese adolescents; and second, to examine the mediating roles of stress and anxiety in the association between bullying others (perpetration) and depression among Vietnamese adolescents. Based on findings from previous studies, we propose the following hypotheses:

H1: Being bullied would positively correlate with depression.

H2: Stress and anxiety would parallelly mediate the effect of being bullied on depression.

H3: Bullying others would positively correlate with depression.

H4: Stress and anxiety would parallelly mediate the effect of bullying others on depression.

Methods

Samples

This study was conducted with approval from a university of education in Central Vietnam (No. 69/QĐ-DHSP). Participation was voluntary, and informed consent was obtained from parents or legal guardians, with written assent obtained from the adolescents. All participants were informed about the purpose of the study, the procedures involved, and their rights, including the right to withdraw at any time without penalty.

The study utilized a cross-sectional research design. A convenience sampling method was employed to recruit

participants from various schools. Data were collected at the end of the second semester of the 2022–2023 academic years. Adolescents completed paper-based questionnaires in classrooms under the supervision of trained researchers. The total number of questionnaires collected was 767, and after data screening, 714 were deemed valid, resulting in a valid response rate of 93.1%.

Measures

Bullying/Victimization Questionnaire

The Cyberbullying and Victimization Questionnaire was developed by Campfield (2008). The scale includes 54 items that assess adolescents' engagement in bullying behaviors such as traditional bullying victimization, traditional bullying perpetrator, cyberbullying victimization, and cyberbullying perpetrator. Each item requires participants to answer three questions, such as (Question 1) yes or no; (Question 2) how many times (1 = 1–2 times per year; 2 = 1 time per week; 3 = several times per week; 4 = almost every day and 5 = every day); and (Question 3) level of bother (0 = none, 1 = some, and 3 = very much) (Campfield, 2008). The scale has been adapted and used in Vietnam (Trần, 2018). The Vietnamese version of the scale has only 43 items left, divided into 2 subscales: the 20-item bullying perpetrator subscale (including cyberbullying perpetrators and traditional bullying perpetrators) and the 23-item bullying victimization subscale (including cyberbullying victimization and traditional bullying victimization) (Trần, 2018). In a sample of Vietnamese adolescents, the scale had good reliability and validity (Trần, 2018). In this study, we only evaluate the level of being bullied and the level of bullying others among adolescents. The level of being bullied or bullying others used data from the first two questions of the scale (Question 1 and 2). In particular, the answer “no” to question 1 is considered a 0 point, equivalent to never being bullied or bullying others. The score of frequency of being bullied or bullying others is calculated as the average of all items in the bully victimization or bully perpetrator subscale. Thus, scores on the bullying victimization and bullying perpetrator subscale range from 0 to 5, with higher scores indicating a higher level of being bullied and bullying others. According to this study, when assessing the level of being bullied and bullying others, the scale had high reliability coefficients (bullying perpetrator subscale $\alpha = 0.794$, bullying victimization subscale: $\alpha = 0.883$).

Depression Anxiety Stress Scales – Short Form (DASS 21)

DASS 21 was used to evaluate adolescents' mental health problems. It was developed by Lovibond and Lovibond

(1995) and then used in many studies in Vietnam (Le et al., 2020; Nguyen et al., 2013; Tran et al., 2019). DASS 21 includes three subscales; each scale includes seven items on a 4-point Likert scale from never (0 points) to almost always (3 points). Sample items for each subscale are “I felt downhearted and blue” (depression subscale), “I felt I was close to panic” (anxiety subscale), and “I felt that I was using a lot of nervous energy” (stress subscale). The score of each subscale is equal to the total item score multiplied by 2. Therefore, the highest score on each subscale is 42, and the lowest score is 0. Higher scores indicate higher levels of stress, anxiety, and depression. According to this study, the scale had high reliability coefficients (depression: $\alpha = 0.845$; anxiety: $\alpha = 0.816$; stress: $\alpha = 0.807$).

Data Analysis

This study used SPSS 20 and PROCESS macro 4.2 for statistical processing. In SPSS software, we tested the reliability of the scales, performed descriptive statistics, and conducted correlation analysis for variables. PROCESS macro software was used for mediation analysis. In the mediation models, being bullied or bullying was entered as the X variable, depression as the Y variable, and stress and anxiety as the M variables. The parallel and full mediation effects are considered significant (1) when each indirect path (e.g., through stress and through anxiety) independently shows a significant effect, indicated by confidence intervals that do not contain zero, and (2) when the direct effect from the independent variable (being bullied or bullying others) to depression is not significant, indicated by confidence intervals that do not contain zero (Hayes, 2018).

Findings

Characteristics of the Study Sample

The final sample included 714 participants. The demographic characteristics of the sample are presented in Table 1. As shown in Tables 1 and 46.6% were male students, and 53.4% were female students. By grade level, there are 42.2% of 10th grade students, 31.2% of 11th grade students, and 26.6% of 12th grade students. By school name, there are 48.2% of students at Nguyen Binh Khiem High School, 13.6% of students at Chau Thanh High School, 6.3% of students at Cao Ba Quat High School, 7.4% of students at Le Hong Phong High School, 13.4% of students at Gia Hoi High School, 4.3% of students at Xuan Dinh High School, and 6.7% of students at HNUE High School for Gifted Students. Participants ranged in age from 15 to 18 years old, with a mean age of 16.73 years ($SD = 0.878$).

| | | | |
|---------------------|--------------------------------------|-------------------|------|
| Grade level | Female | 381 | 53.4 |
| | Grade 10 | 301 | 42.2 |
| | Grade 11 | 223 | 31.2 |
| | Grade 12 | 190 | 26.6 |
| School name | Nguyen Binh Khiem High School | 344 | 48.2 |
| | Chau Thanh High School | 97 | 13.6 |
| | Cao Ba Quat High School | 45 | 6.3 |
| | Le Hong Phong High School | 53 | 7.4 |
| | Gia Hoi High School | 96 | 13.4 |
| | Xuan Dinh High School | 31 | 4.3 |
| | HNUE High School for Gifted Students | 48 | 6.7 |
| Age (Mean \pm SD) | | 16.73 \pm 0.878 | |

Table 2 Correlation between variables

| Variables | Being bullied | Bullying others | Stress | Anxiety |
|-----------------|---------------|-----------------|---------|---------|
| Being bullied | 1 | | | |
| Bullying others | 0.709** | 1 | | |
| Stress | 0.243** | 0.168** | 1 | |
| Anxiety | 0.239** | 0.149** | 0.805** | 1 |
| Depression | 0.218** | 0.163** | 0.792** | 0.772** |

Note: **: $p < 0.01$

Preliminary Analysis

Table 2 presents the results of the correlation analysis between variables. As shown in Table 2, being bullied was positively correlated with stress ($r=0.243$, $p<0.01$), anxiety ($r=0.239$, $p<0.01$), and depression ($r=0.218$, $p<0.01$). Bullying others was positively correlated with stress ($r=0.168$, $p<0.01$), anxiety ($r=0.149$, $p<0.01$), and depression ($r=0.163$, $p<0.01$). Stress and anxiety were positively correlated with depression ($r=0.792$, $p<0.01$ and $r=0.772$, $p<0.01$, respectively). Although stress and anxiety were strongly correlated with depression, the correlation coefficients remained below the recommended thresholds of 0.80 (Rönkkö & Cho, 2022) or 0.90 (Posner & Kouzes, 1988) for establishing discriminant validity. This indicates that while the constructs are related, they are sufficiently distinct.

Testing Mediating Role of Stress and Anxiety in the Association between Being Bullied and Depression

As shown in Table 3; Fig. 1, being bullied positively predicted stress ($B=0.326$, $SE=0.049$, $CI=[0.230; 0.423]$) and anxiety ($B=0.321$, $SE=0.049$; $CI=[0.224; 0.417]$). Stress and anxiety positively predicted depression ($B=0.508$; $SE=0.038$; $CI=[0.433; 0.583]$) and $B=0.401$, $SE=0.038$, $CI=[0.326; 0.475]$, respectively). The total indirect effect was significant ($B=0.294$, $SE=0.041$, $CI=[0.216; 0.376]$). The indirect impact of being bullied on depression through stress ($B=0.166$; $SE=0.030$, $CI=[0.112; 0.229]$), as well as the indirect impact of being bullied on depression through anxiety ($B=0.128$; $SE=0.022$, $CI=[0.088; 0.173]$), was significant. In addition, the direct effect of being bullied on depression was not significant ($B=0.013$, $SE=0.031$; $CI=[-0.048; 0.075]$). Thus, stress and anxiety fully mediated the association between being bullied and depression in adolescents.

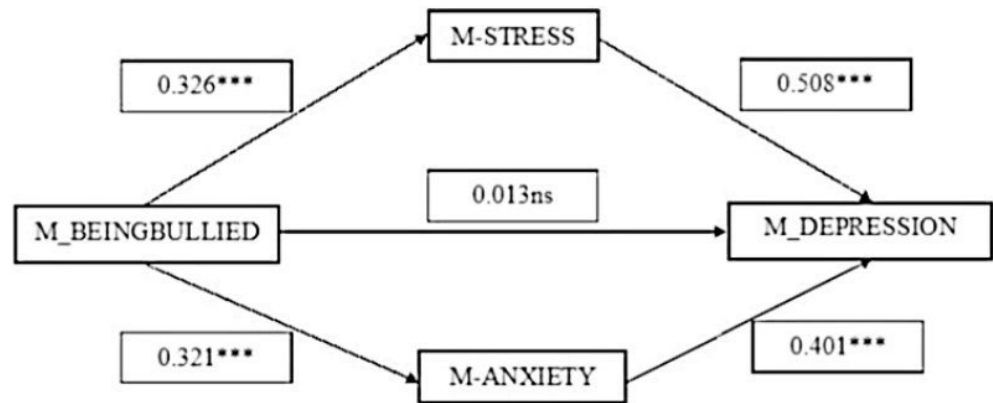
Testing Mediating Role of Stress and Anxiety in the Association between Bullying Others and Depression

As shown in Table 4; Fig. 2, bullying others positively predicted stress ($B=0.340$, $SE=0.075$, $CI=[0.192; 0.488]$)

Table 3 The direct and indirect effects of being bullied on depression

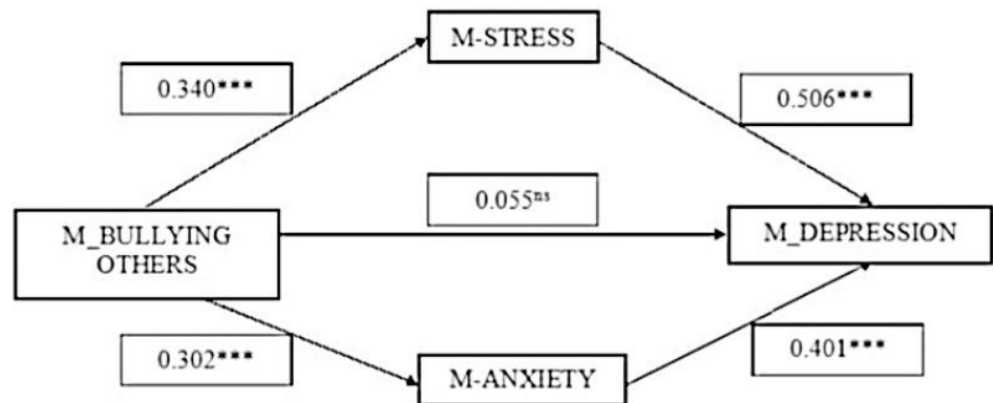
| The effects | B | SE | Lower 95%CI | Upper 95%CI |
|--------------------------------------------------------------|---------------------|-------|-------------|-------------|
| Being bullied \rightarrow stress | 0.326*** | 0.049 | 0.230 | 0.423 |
| Being bullied \rightarrow anxiety | 0.321*** | 0.049 | 0.224 | 0.417 |
| Stress \rightarrow depression | 0.508*** | 0.038 | 0.433 | 0.583 |
| Anxiety \rightarrow depression | 0.401*** | 0.038 | 0.326 | 0.475 |
| Being bullied \rightarrow depression | 0.013 ^{ns} | 0.031 | -0.048 | 0.075 |
| Being bullied \rightarrow stress \rightarrow depression | 0.166 | 0.030 | 0.112 | 0.229 |
| Being bullied \rightarrow anxiety \rightarrow depression | 0.128 | 0.022 | 0.088 | 0.173 |
| Total indirect effect | 0.294 | 0.041 | 0.216 | 0.376 |

Note: ***: $p < 0.001$; ns: not significant

Fig. 1 Stress and anxiety as mediators in the association between being bullied and depression**Table 4** The direct and indirect effects of bullying others on depression

| The effects | B | SE | Lower 95% CI | Upper 95% CI |
|----------------------------------------|---------------------|-------|--------------|--------------|
| Bullying others → stress | 0.340*** | 0.075 | 0.192 | 0.488 |
| Bullying others → anxiety | 0.302*** | 0.076 | 0.154 | 0.451 |
| Stress → depression | 0.506*** | 0.038 | 0.431 | 0.581 |
| Anxiety → depression | 0.401*** | 0.038 | 0.326 | 0.475 |
| Bullying others → depression | 0.055 ^{ns} | 0.046 | -0.036 | 0.146 |
| Bullying others → stress → depression | 0.172 | 0.039 | 0.102 | 0.258 |
| Bullying others → anxiety → depression | 0.121 | 0.028 | 0.071 | 0.182 |
| Total indirect effect | 0.293 | 0.055 | 0.193 | 0.410 |

Note: ***: $p < 0.001$, ns: not significant

Fig. 2 Stress and anxiety as mediators in the bullying others-depression relationship

and anxiety ($B=0.302$, $SE=0.07$; $CI=[0.154; 0.45]$). Stress and anxiety positively predicted depression ($B=0.506$; $SE=0.038$; $CI=[0.431; 0.581]$) and $B=0.401$, $SE=0.038$, $CI=[0.326; 0.475]$, respectively). The total indirect effect was significant ($B=0.293$, $SE=0.055$, $CI=[0.193; 0.410]$). The indirect impact of bullying others on depression through stress ($B=0.172$; $SE=0.039$, $CI=[0.102; 0.258]$), as well as the indirect impact of bullying others on depression through anxiety ($B=0.121$; $SE=0.028$, $CI=[0.071; 0.182]$), was significant. In addition, the direct effect of bullying others on depression was not significant ($B=0.055$, $SE=0.046$; $CI=[-0.036; 0.146]$). Thus, stress and anxiety fully mediated the association between bullying others and depression in adolescents.

Discussion

Among Vietnamese adolescents, the present study aimed to investigate the association between bullying (as victim and perpetrator) and mental health and the mediating mechanism in the above association. The findings of this study showed that there is a strong and positive association between bullying and mental health among adolescents.

Previous studies indicated that being bullied can increase depression symptoms (Balluerka et al., 2023; Pimentel et al., 2020). Not only adolescents who are bullied but also adolescents who bully others are at risk of depression (Bitar et al., 2023). Inconsistent with previous studies and hypotheses 1 and 3, this study found that being bullied and bullying others did not directly increase depressive symptoms in

Vietnamese adolescents. This result implies that there may be mediating factors in being bullied-depression and bullying others-depression relationships.

Our mediation analysis showed that stress and anxiety fully mediate the effect of being bullied on depression among adolescents, which is consistent with hypothesis 2. This means that stress and anxiety are two important mechanisms in the development of depression among adolescents after they are bullied. Similar to previous studies, this study found that adolescents who are bullied are likely to experience symptoms of stress (Kampoli et al., 2017; Pimentel et al., 2020) and anxiety (Balluerka et al., 2023; Pimentel et al., 2020). Symptoms of stress (Havnen et al., 2020; Ho, 2023b; Liu & Alloy, 2010; Rabadi et al., 2017; Valikhani et al., 2020) and anxiety (Havnen et al., 2020; Ho, 2023a, 2023b), in turn, increase an adolescent's risk of depression (Havnen et al., 2020; Ho, 2023a, 2023b; Rabadi et al., 2017; Valikhani et al., 2020). For adolescents, friendship relationships, position, and role in the group of friends are very important because positive friendships give them a sense of confidence, belonging, and support. Being bullied means being excluded from groups; it damages self-esteem (Balluerka et al., 2023), reduces social support (Ho et al., 2020), and increases loneliness (Edery, 2016; Li et al., 2021) among victims, which in turn leads to stress (Juth et al., 2008; Pilcher & Bryant, 2016; Satici, 2020) and anxiety (Hards et al., 2022; Sowislo & Orth, 2013; Zhang et al., 2021) among victims. After experiencing stress and anxiety, if individuals do not have effective coping strategies (Evans et al., 2015; Jacobson & Newman, 2014), lack social support (Jacobson et al., 2017; Talwar et al., 2017), or have sleep problems (Ho, 2023b; Li et al., 2018), they are at risk of depression.

Consistent with hypothesis 4, we found that stress and anxiety fully mediate the effect of bullying others on depression among adolescents. Therefore, stress and anxiety are two important mechanisms in the bullying others-depression association. This finding is similar to a few previous studies that found that adolescents who bullied others showed signs of stress (Kampoli et al., 2017) and anxiety (Bitar et al., 2023). Bullying others is prohibited in Vietnamese schools. When adolescents bully others, they may fear that adults or teachers will intervene (punish, criticize) to reduce their behavior, which makes the perpetrator feel that they have low levels of social support (K. Holt & L. Espelage, 2007) and low levels of self-esteem (Rinehart et al., 2020), which in turn leads to stress (Juth et al., 2008; Pilcher & Bryant, 2016; Satici, 2020) and anxiety (Hards et al., 2022; Sowislo & Orth, 2013; Zhang et al., 2021) among perpetrators. In addition, stress and anxiety are found to be associated with an increase in depression (Havnen et al., 2020; Ho, 2023a, 2023b; Rabadi et al., 2017; Valikhani et al., 2020).

There were several strengths in this study. This study is an initial attempt to investigate the parallel mediating roles of stress and anxiety in explaining the relationship between being bullied and depression, as well as between bullying others and depression, in a sample of Vietnamese adolescents. Previous studies have primarily focused on the relationship between being bullied (as a victim) and mental health problems (Balluerka et al., 2023; Kampoli et al., 2017; Pimentel et al., 2020), with little attention paid to the association between bullying others (as a perpetrator) and mental health outcomes (Bitar et al., 2023; Kampoli et al., 2017). To the best of our knowledge, this is the first study to simultaneously examine the parallel mediating roles of stress and anxiety in both relationships. Therefore, our study makes an important theoretical contribution by establishing the link between bullying others and mental health problems and by identifying the psychological mechanisms—stress and anxiety—that help explain this link.

More importantly, the results indicated that stress and anxiety fully mediated the relationship between bullying involvement and depression for both victims and perpetrators. This suggests that stress and anxiety are crucial emotional experiences that precede the onset of depressive symptoms among adolescents engaged in bullying, regardless of their role. Consequently, intervention programs aimed at preventing adolescent depression should not only target those who are bullied but also those who bully others. Regarding intervention content, programs should include strategies to reduce stress and anxiety levels. For example, increasing social support, enhancing resilience, improving self-esteem, promoting adaptive coping strategies, and building social skills may be particularly beneficial for both groups.

These findings also have important practical implications for educators and psychological counsellors. For educators, implementing school-wide prevention programs that foster a safe and inclusive environment, support emotional well-being, and promote healthy peer interactions may help reduce bullying behaviors and their psychological impact. Psychological counsellors should consider screening not only for depressive symptoms but also for underlying stress and anxiety among students involved in bullying, including perpetrators, who are often overlooked in mental health assessments. Interventions such as cognitive-behavioral therapy (CBT), mindfulness-based stress reduction, and group counseling focused on emotion regulation and interpersonal skills may be especially helpful. Importantly, the recognition that perpetrators may also be at psychological risk calls for a shift in how support services are designed, moving toward a more comprehensive approach that addresses the needs of all adolescents affected by bullying dynamics.

Our study has several limitations. First, the cross-sectional design precludes the ability to draw causal inferences between bullying involvement (both as a victim and a perpetrator) and mental health outcomes. Future longitudinal studies are needed to establish the temporal and causal relationships among these variables. Second, all measures were based on self-report instruments, which may be subject to recall bias and social desirability bias. To enhance the validity and reliability of findings, future research should incorporate multi-informant approaches or objective assessment tools. Third, the study did not control for other potentially influential factors on adolescents' mental health, such as family dynamics, peer relationships, academic stress, or socioeconomic conditions. These broader contextual variables may significantly shape psychological outcomes and should be taken into account in future investigations to develop a more comprehensive understanding of the links between bullying and adolescent depression.

In conclusion, this study highlights the dual role of stress and anxiety as parallel mediators in the link between bullying involvement (either as victim or perpetrator) and depression among adolescents. These findings provide both theoretical and practical implications for identifying and supporting at-risk youth. Future research and interventions should address these psychological pathways to effectively reduce depression and improve adolescent mental health.

Funding The authors thank The Ministry of Education and Training, Vietnam, for supporting and funding this projects (Code B2024-DHII-01).

Data Availability Research data are not shared.

Declarations

Ethics Approval and Consent to Participate All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee.

Competing Interests The author declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Informed Consent Informed consent was obtained from all individual participants included in this study.

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