

# The Relationship Between Bullying Victimization and Cyber Aggression Among College Students: The Mediating Effects of Relative Deprivation and Depression

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**Introduction:** Based on the general aggression model, the present study aims to examine the relationship between bullying victimization and cyber aggression as well as the mediating effects of perceived relative deprivation and depression on this relationship.

**Methods:** The present study employed a 3-wave longitudinal method featuring 6-month intervals to investigate 795 Chinese college students (476 female;  $M_{\text{age}} = 19.67$ ). Structural equation modeling was used to evaluate the relationships among bullying victimization, perceived relative deprivation, depression and cyber aggression.

**Results:** The results suggested that bullying victimization positively and significantly predicts cyber aggression in college students and that both perceived relative deprivation and depression play positive mediating roles in this relationship. Moreover, bullying victimization affects cyber aggression via the chain mediating roles of perceived relative deprivation and depression.

**Discussion:** This study offers valuable insight into ways of considering perceived relative deprivation and depression in the context of prevention and intervention strategies to help attenuate cyber aggression among victims of bullying.

**Keywords:** bullying victimization, perceived relative deprivation, depression, cyber aggression, college students

## Introduction

Bullying victimization in a school context is defined as a phenomenon in which an individual is exposed, repeatedly and over time, to negative actions (ie, to actions that inflict injury or discomfort upon another) on the part of one or more other students.<sup>1</sup> Bullying has long been perceived as a widespread phenomenon in schools. Worldwide, approximately 32% of students experience bullying from others;<sup>2</sup> a comparative study of bullying victimization in schools across the US and China found that 22.05% of US students and 21.77% of Chinese students had suffered from bullying.<sup>3</sup> In addition, evidence from a review of the literature indicated that bullying was a prevalent issue for college students, as approximately 30–40% of college students reported being victimized by bullying.<sup>4</sup> Notably, predominant research concerning college students has shown that individuals who experience bullying victimization are vulnerable to a wide range of psychological and behavioral problems, in which context the impact of bullying on aggression is receiving increasing attention from researchers.<sup>5–7</sup>

Compared with populations at other developmental stages, college students, who are mostly emerging adults, are more likely to engage in cyber aggression rather than traditional aggression.<sup>8</sup> Cyber aggression refers to aggressive behavior that takes place via an online platform, such that individuals harm others on purpose and repeatedly by taking advantage of the convenience and anonymity of cyberspace.<sup>9</sup> Compared with traditional aggression, cyber aggression is characterized by features such as anonymity, rapid spread, an unlimited potential audience, a lack of social cues, limited social control and decreased inhibition, all of which contribute to the higher vulnerability to cyber aggression faced by college students.<sup>10,11</sup>

Previous studies have revealed that approximately 59.5% of college students have been victims or perpetrators of cyber aggression, thus indicating the prevalence of cyber aggression in this population.<sup>12,13</sup>

The General Aggression Model (GAM) is a comprehensive framework that explains in detail how personal and situational factors affect the occurrence of aggressive behavior by influencing an individual's present internal state, specifically by altering a person's affect, cognition, and arousal.<sup>14</sup> According to GAM, aggressive cues might function as situational inputs and thus influence aggressive behavioral outcomes by changing an individual's cognitions (eg, perceived relative deprivation), feelings (eg, depression), and arousal levels.

Although multiple empirical studies have supported GAM,<sup>8,15–17</sup> the majority of the extant research has focused on the collective effect of input variables and present internal state variables, and relatively little attention has been given to the way in which input variables influence present internal state variables and the manner in which present internal state variables in turn influence aggressive behavior. In fact, the present internal state of an individual is highly susceptible to influence by input variables.<sup>18,19</sup> Therefore, based on GAM, this study seeks to explore the underlying mechanisms of chain mediation by which situational factors affect aggression among college students via psychological factors by reference to individuals' internal states.

## Bullying Victimization Affects Cyber Aggression

The external factors affecting aggression mainly stem from adverse environmental stressors in the individual's context,<sup>20</sup> particularly the individual's exposure to violence in daily life.<sup>21</sup> GAM proposes that consistent exposure to violent information, such as in the case of bullying victimization, predisposes individuals to activate and reinforce aggressive schemas and automatizes related associations, thus increasing the likelihood of aggression.<sup>22</sup>

According to the frustration-aggression hypothesis,<sup>23</sup> frustration always leads to some form of aggression, and the more lenient the anticipated punishment is, the more likely aggression is to occur. By remaining anonymous online, the perpetrators of cyberbullying face with less anticipated punishment, which encourages the victims of bullying to perpetrate cyberbullying themselves.<sup>5,22</sup> Studies have supported that bullying victimization in school, as a frustrating experience for college students, can easily elicit aggression from victimized individuals.<sup>24,25</sup>

Many studies have found that some victims of school bullying are also perpetrators of cyberbullying.<sup>5,26–28</sup> A meta-analysis of cyberbullying revealed that bullying victimization is significantly and positively associated with cyber aggression.<sup>25,28</sup> Longitudinal studies have also supported the longitudinal predictive effect of bullying victimization on cyber aggression.<sup>29</sup> Taken together, these findings suggest that the experience of bullying victimization in college may have a positive impact on cyber aggression.

While a large body of research has examined the relationship between traditional bullying and cyberbullying and the corresponding mechanisms,<sup>30–32</sup> very little research has investigated the underlying mechanism through which bullying victimization affects cyber aggression. Based on GAM, the cognitive and affective factors of individuals might play a mediating role in the effects of bullying victimization on cyber aggression.

## The Mediating Role of Relative Deprivation

Relative deprivation refers to a subjective experience featuring negative emotions and a perception of being at a disadvantage when compared with others.<sup>33,34</sup> Social comparison is key to the development of relative deprivation.<sup>35</sup> While the victims of bullying may suffer from marginalization in the peer group,<sup>36</sup> which in effect put the victims at a disadvantage in social comparison and produce feelings of unfairness,<sup>37</sup> matching the conditions of relative deprivation.<sup>38</sup> Meanwhile, bullying victimization could have a long-term negative effect on self-esteem,<sup>39</sup> which can render victims of bullying vulnerable to social comparison and elicit more experiences of discrimination, disadvantage and social injustice, thus leading to feelings of relative deprivation.<sup>40</sup> The link between bullying victimization and relative deprivation has also received empirical support regarding college students in China.<sup>41</sup>

Classical relative deprivation theory proposes that high levels of relative deprivation affect an individual's psychological development, leading to behavior such as aggression.<sup>42</sup> The frustration-aggression hypothesis also supported relative deprivation as a source of frustration that creates aggressive inclinations.<sup>23,34</sup> While previous study has supported the predicting role of relative deprivation on offline aggressive behavior,<sup>43</sup> a growing body of research, notably, has put

more emphasis on online deviant behaviors caused by relative deprivation, as Internet use gratifies the subjectively deprived individual's desire to avoid the reality.<sup>44</sup> Studies have demonstrated the positive relationship between relative deprivation and online deviant behavior including online gaming addiction and online flaming.<sup>45,46</sup> Therefore, a similar correlation with cyber aggression can be expected as well. Accordingly, we propose that experiences of bullying victimization are predictive of cyber aggression by increasing feelings of relative deprivation.

## The Mediating Role of Depression

In addition to the cognitive factor of relative deprivation, depression, as a common negative emotion, may also play a mediating role in the effects of bullying victimization on cyber aggression. General strain theory suggests that negative stimuli (eg, bullying victimization) produce negative emotions (eg, depression) in individuals, which in turn lead to the development of aggression.<sup>47</sup> A retrospective study conducted in 2021 revealed that college students who had previously suffered from cyberbullying exhibited higher levels of depressive symptoms.<sup>48</sup> Studies have also supported that cyberbullying victimization significantly and positively predicts depression,<sup>5</sup> even after controlling for traditional bullying victimization.<sup>49</sup>

However, inconsistent findings have been reported by previous studies regarding the effects of depression on aggression. Some research has found that depression does not increase aggression in individuals.<sup>50,51</sup> The reason for this finding may be that a typical symptom of depression is a pronounced sense of tiredness and exhaustion,<sup>52</sup> which causes such individuals to be less able to resort to violence, even when they are aware of potential harms from the outside world. However, other research has reported that depression increases the likelihood of aggression. A review conducted in 2013 supported the claim that depression acts as a risk factor for aggression,<sup>53</sup> evidence has also suggested that depression is related to higher levels of self-directed aggression (eg, nonsuicidal self-injury) in college students.<sup>54</sup> Hence, we propose that the experience of bullying victimization may affect cyber aggression by enhancing the individual's level of depression.

In addition, perceived relative deprivation is also considered to be a factor that can affect depression. Previous research has found that perceived relative deprivation is positively associated with depressive symptoms and might act as a means of enhancement,<sup>55</sup> after controlling for family income, this connection remains among the adolescent population;<sup>56</sup> the greater the perceived relative deprivation of college students is, the higher their risk of depression.<sup>57</sup> Therefore, we propose that experiences of bullying victimization may act as a predictor of cyber aggression via the chain mediation of relative deprivation and depression.

## The Present Study

In summary, based on GAM, the frustration-aggression hypothesis, classic relative deprivation theory and general strain theory, the present study employed longitudinal tracking data to explore the impact of bullying experiences on cyber aggression among college students and to examine the mediating effects of relative deprivation and depression on this relationship.

Specifically, we tested the following hypotheses (H):

(H1) Bullying victimization is positively related to cyber aggression.

(H2) Relative deprivation mediates the relationship between bullying victimization and cyber aggression.

(H3) Depression acts as a mediator in the association between bullying victimization and cyber aggression.

(H4) Bullying victimization indirectly predicts cyber aggression via the chain mediation of relative deprivation and depression.

Since a literature review has revealed mixed findings regarding the relationship between gender and bullying victimization and demonstrated the variability of bullying victimization across ages, we also included gender and age as covariates in the model.<sup>58</sup>

This study contributes to improving our understanding of the effect of bullying victimization experiences on cyber aggression and the underlying mechanisms of this relationship, and it enriches theories related to the development of aggression. In addition, the study has important implications for the prevention of the adverse consequences of bullying and the control of cyber aggression among college students.

## Methods

### Participants and Procedures

We used a longitudinal method to collect data over three waves with six-month intervals; the data concerned college students from five universities located in different parts of mainland China, and the data collection took place in April 2019 (Time 1), October 2019 (Time 2), and April 2020 (Time 3). Specifically, 2445 college students completed a survey concerning bullying victimization at T1, 2150 college students completed a survey pertaining to relative deprivation and depression at T2, and 2181 college students completed a survey focusing on cyber aggression at T3. After removing invalid sample (ie, students who did not complete all the waves of surveys), a total of 795 students who participated in the complete survey were included. 476 of these students (59.9%) were female, and the mean age of the sample was 19.67 (SD = 1.43), with a range of 17–25 years. The purpose of the study was explained, and written informed consent was obtained from all student participants. The study protocol was approved by the Research Ethics Committee of Beijing Normal University, which confirmed that all research processes related to this study were in accordance with the relevant ethical standards.

### Measures

#### Perceived Relative Deprivation

We assessed the perceived relative deprivation of participants by adapting the four-item Relative Deprivation Scale developed by Ma,<sup>59</sup> which showed excellent reliability and validity for use among Chinese populations. Response options for each item were scored on a 6-point Likert-type scale ranging from 1 (strongly disagree) to 6 (strongly agree); higher scores indicated stronger feelings of relative deprivation. A sample item included in the scale is “My life should have been better than it is now given all the work and dedication I have contributed”. In the current study, Cronbach’s alpha for this scale was 0.86.

#### Depression

We evaluated participants’ levels of depressive symptoms by reference to the Center for Epidemiological Study - Depression Scale (CES-D).<sup>60</sup> The Chinese version of this scale, as revised by Chen et al, showed good reliability and construct validity for use among Chinese populations.<sup>61</sup> Each of the 20 items included in the measure was scored on a 4-point Likert-type scale ranging from 0 (never) to 3 (always). Participants with higher total scores were considered to have higher depressive symptoms. In this study, Cronbach’s  $\alpha$  for this scale was 0.92.

#### Cyber Aggression

The Adolescent Cyber Aggression Scale measures the level of individuals’ engagement in reactive aggression online (eg, “I often insult and scold others when playing online games” and “I exclude someone from our network of friends”).<sup>62</sup> The scale showed good reliability and construct validity for use among Chinese populations.<sup>63,64</sup> Participants were asked to rate 15 propositions on a four-point Likert scale, with answers ranging from 1 (never) to 4 (always); higher scores indicated higher levels of engagement in cyber aggression. In this study, the internal consistency of the scale was excellent (Cronbach’s alpha = 0.95).

#### Bullying Victimization

The frequency of participants’ experiences of bullying victimization over the past 6 months was evaluated using a Chinese version of the Delaware Bullying Victimization Scale-Student (DBVS-S).<sup>65,66</sup> This 12-item inventory contains three dimensions indexing the participants’ victimization in terms of verbal, physical, and relational bullying. Sample items include “Some of my classmates have said some mean things to me”, “I have been pushed and shoved by others” and “Some students have told or urged others not to be friends with me”. Each of the items was scored on a 6-point Likert scale, with answers ranging from 1 (never) to 6 (everyday); higher total scores indicated higher levels of exposure to bullying victimization. In the current study, the scores of this scale showed high internal consistency (Cronbach’s alpha = 0.97).

### Statistical Analyses

All analyses in this study were conducted using SPSS Version 22.0 and Amos 17.0. The result of Harman’s single-factor test showed that the variance for both rotated and unrotated first factors was below the threshold of 40%, suggesting that no significant common method bias affected this study.<sup>67</sup> In addition, no missing values were found in the current sample

as participants were required to answer all questions in order to submit the survey on the online questionnaire system that we adopted. It should also be noted that despite the loss of samples due to reasons such as graduation and hinders of teaching arrangement, no significant differences were found on the key variables between participants who participated in all waves of surveys and those who did not.

First, descriptive statistics were collected and correlation analysis was conducted to clarify the preliminary associations among variables. Based on those data, we examined the direct effect of bullying victimization on cyber aggression and the mediating roles played by perceived relative deprivation and depression by developing a structural equation model (SEM) after controlling for age and gender. The bullying victimization latent variable was evaluated in terms of relational bullying, physical bullying and verbal bullying, whereas the cyber aggression latent variable was evaluated in terms of explicit aggression and relational aggression. Finally, 5000-fold bias-corrected bootstrap analyses were performed to test the mediating effects.

## Results

### Descriptive Statistics

Table 1 provides an overview of the descriptive statistics, including the means, standard deviations, and intercorrelations among study variables. The results revealed that gender differences were significant in both bullying victimization and cyber aggression. Specifically, women's vulnerabilities to bullying victimization and cyber aggression are both significantly higher than men. There was also a significant negative association between age and bullying victimization. In addition, all of the psychological variables were found to be significantly and positively correlated with each other.

### Structural Equation Model Analyses

First, we developed a structural equation model that comprised the two observed variables and two latent variables (ie, bullying victimization and cyber aggression). After taking gender and age at T1 as covariates, the direct effect model between bullying victimization at T1 and cyber aggression at T3 fit the data well, exhibiting the following fit indices:  $\chi^2/df = 3.512$ , CFI = 0.993, TLI = 0.988, RMSEA (90% CI) = 0.056 (0.039–0.074). Specifically, the results indicated that bullying victimization was a significantly positive predictor of cyber aggression at T3 ( $\beta = 0.17$ ,  $p < 0.001$ ).

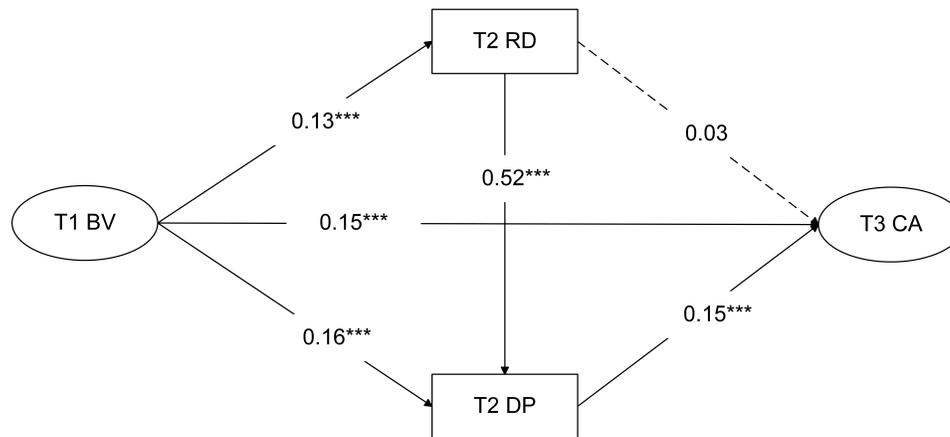
During the second step of the analysis, perceived relative deprivation and depression were included as mediators in the correlation between bullying victimization and cyber aggression to construct a mediation model. The model fit was acceptable:  $\chi^2/df = 2.864$ , CFI = 0.991, TLI = 0.986, RMSEA (90% CI) = 0.048 (0.035–0.062). Compared with the direct effects model, the model fit indices of the mediation model were lower, which was largely due to the increase in the degree of freedom as we added the mediating variables to the model.<sup>68,69</sup> The results showed in detail that bullying victimization significantly and positively predicts perceived relative deprivation at T2, depression at T2 and cyber aggression at T3; perceived relative deprivation has a significantly positive effect on depression at T2; and bullying victimization and depression at T2 each has a significant and positive effect on cyber aggression at T3 (See Figure 1).

**Table 1** Bivariate Correlations and Descriptive Statistics Among Study Variables

Variable	1	2	3	4	5	6
1 Gender	1					
2 Age	-0.013	1				
3 T1 BV	-0.109**	-0.072*	1			
4 T2 RD	-0.008	-0.031	0.132**	1		
5 T2 DP	-0.038	-0.036	0.225**	0.541**	1	
6 T3 CA	-0.153**	-0.028	0.212**	0.133	0.200**	1
M	–	19.67	14.87	7.59	34.66	16.07
SD	–	1.43	6.97	3.52	7.86	3.48

**Notes:** Gender was dummy coded as 1 = male and 2 = female; \* $p < 0.05$ , \*\* $p < 0.01$ .

**Abbreviations:** BV, bullying victimization; RD, relative deprivation; DP, depression; CA, cyber aggression.



**Figure 1** Multiple Mediation Model of the Association Between Bullying Victimization and Cyber Aggression through Relative Deprivation and Depression.

**Note:** \*\*\* $p < 0.001$ .

**Abbreviations:** BV, bullying victimization; RD, relative deprivation; DP, depression; CA, cyber aggression.

Finally, 5000-fold bias-corrected bootstrap analyses were conducted to evaluate the mediating effects of perceived relative deprivation and depression in further detail. The results demonstrated that bullying victimization has an indirect effect on cyber aggression via depression. Additionally, perceived relative deprivation and depression have a chain-mediating effect on the relationship between bullying victimization and cyber aggression.

## Discussion

### Direct Effect of Bullying Victimization on Cyber Aggression

Our study showed that, in line with previous research,<sup>24,25,28,29</sup> bullying victimization has a significant direct effect on cyber aggression, thus supporting the frustration-aggression hypothesis and GAM. Bullying victimization has been perceived as prevalent among college students.<sup>70</sup> However, the unpleasant feelings and negative cognitions produced by bullying victimization can act as a source of frustration and can accumulate, thus enhancing the victim's tendencies toward aggression.<sup>23</sup> College students are recognized as the most frequent and unsupervised Internet users and thus at heightened risk of problematic Internet use (in particular, cyber aggression). Featured with anonymity, cyber aggression is associated with less anticipated punishment, which makes the online platform an attractive and convenient place for college students to perpetrate bullying without fear of retaliation.<sup>5</sup>

### Mediating Roles of Perceived Relative Deprivation and Depression

These results also support our hypotheses that both perceived relative deprivation and depression serve as significant mediators in this context. First, consistent with general strain theory<sup>47</sup> and previous research,<sup>5,48,49</sup> bullying victimization is related to higher levels of depression, which in turn function as stressors and contribute to cyber aggression. However, this finding is inconsistent with the conclusions of the studies by Benarous et al and Yu et al,<sup>50,51</sup> who argued that depression is not correlated with a higher inclination toward aggression. One possible explanation for this discrepancy lies in the different characteristics of the samples used in these studies. Studies that have reported evidence supporting our conclusion have been based on samples of college student populations, while the aforementioned studies reporting contradictory findings have used data drawn from clinical patient populations. Most college students are midway through the process of developing an independent personality, which makes it easier for them to fall into a tendency to exhibit depressive thoughts regarding themselves. Meanwhile, the anonymity of online media makes up for the imbalance of power between victims and perpetrators, which makes the originally disadvantaged individuals easier to exhibit cyber aggression as an outlet for negative emotions due to impulsivity.

Second, bullying victimization indirectly affects cyber aggression by increasing perceived relative deprivation, which is consistent with previous findings.<sup>41</sup> College students suffering from bullying victimization are likely to be marginalized in the

peer group.<sup>36</sup> Given the vital importance of peer relationship for college students, they may predispose to lower self-esteem;<sup>39</sup> on the other hand, they may also feel as if they are at a disadvantage because of this marginalization and to experience injustice during peer comparison; thereby leading to a sense of relative deprivation.<sup>40</sup> To either avoid this negative cognition or turn this perceived disadvantage around, the affected ones may use cyber aggression as a coping strategy.<sup>45</sup>

However, we found that this adverse perception may not directly predict the act of aggression as the path from relative deprivation to cyber aggression did not reach significance in this study. Despite that, we found a chain mediating effect by which perceived relative deprivation affects depression with respect to the relationship between bullying victimization and cyber aggression. This finding is in line with the conclusions of previous studies.<sup>55–57</sup> Perceived relative deprivation induced by bullying victimization may contribute to an increase in negative automatic thoughts toward the self.<sup>55</sup> Faced with pressure from both study and career path decisions, college students who feel relatively deprived are more likely to develop lower expectations regarding the future, thereby contributing to higher levels of depressive symptoms; which in turn externalize as aggressive behavior, ie, in this study, specifically, the act of cyber aggression.

The present study tested and extended the existing theory of GAM. According to GAM, bullying victimization can function as a situational input and influence internal cognitive and affective states; that is, in this study, such victimization produces a sense of relative deprivation and a feeling of depression, and the internal state variables that initially occur in this context can also influence subsequent variable(s) (eg, cognition of relative deprivation can influence depressive affect) and ultimately contribute to the behavioral outcome of aggression.<sup>14</sup> Despite the particular proneness of college students to cyber aggression, relatively few studies have examined its relation with bullying victimization based on GAM.<sup>70</sup> Therefore, the present study extends the GAM theory by applying it to a broader context of aggression (ie, cyber aggression).

## Implications, Strengths, Limitations, and Directions for Future Research

This study uncovered the effect of bullying victimization on cyber aggression and the mechanisms underlying this relationship among college students. Cyber aggression may not only be committed by students who have acted as perpetrators in the context of traditional bullying but also by those who used to be victims, who are likely to adopt the opposite role in cyberbullying contexts.<sup>5</sup> Therefore, it is important to focus on both sides of bullying and to develop targeted intervention strategies to reduce cyber aggression. Most college students are young adults, and their experiences and mental well-being at this stage have an impact not only on their academic performance but also on their future growth. By exploring the relationship between bullying victimization and cyber aggression as well as the mechanism underlying this relationship, this study can provide theoretical support for the prevention of and interventions in school bullying in the future.

The chain mediating effect we found in the study suggests that by reducing the perception of relative deprivation, it is feasible to reduce the depressive symptoms of bullying victims and hence their likelihood of aggression. To prevent cyber aggression among college students with a history of bullying victimization, on the one hand, more attention should be given to their perceptions of relative deprivation, and timely intervention and control measures, such as fostering independent personality and creating a good family atmosphere,<sup>43</sup> should be implemented to lower their levels of perceived relative deprivation; on the other hand, attention should also be given to the mental health of college students with experiences of bullying victimization, and guidance should be provided to mitigate their negative emotions through social support and mindfulness.<sup>71,72</sup>

The present study has several strengths. First, this study enhances our understanding of the relationship between bullying victimization and cyber aggression among college students. Second, this study offers empirical support for utilizing GAM theory as the predominant theoretical lens to explore the development of cyber aggression among college students, and it contributes to existing knowledge concerning the mechanism of GAM by investigating the interactions among situational factors and multiple present internal state variables. Moreover, a longitudinal design featuring three waves was used in this study, thus making the causal association between bullying victimization and cyber aggression and the underlying mechanism of the chain mediation effect of perceived relative deprivation and depression more rigorous and allowing us to draw more reliable conclusions.

Nevertheless, several limitations of this study should be noted. First, all data used in this study were collected via self-report questionnaires, which may lead to a certain degree of social desirability bias. Future research should employ various methods, such as peer nominations and observations, to examine the role played by bullying victimization in cyber aggression

via perceived relative deprivation and depression. Second, this study included only two covariates (ie, gender and age) and omitted other potential variables, such as trauma exposure, personality, and family socioeconomic status. Additional variables should be considered in future studies to enhance the robustness of the conclusions. Finally, this study examined only the outcomes of cyber aggression rather than those of noncyber aggression, but there may be significant differences between these varieties. To extend our findings, future studies should explore the mechanisms underlying the relation between bullying victimization and noncyber aggression in further detail.

## Ethics Approval

Prior to data collection, this study was approved by the ethics committee of the Faculty of Psychology, Beijing Normal University, and it was conducted in accordance with the Declaration of Helsinki.

## Informed Consent

Written informed consent forms were obtained from each participant in this study.

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## Disclosure

The authors declare that they have no conflict of interest.

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