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Effects of Cyberbullying and Cybervictimization on Early Adolescents' Mental Health: Differential Mediating Roles of Perceived Peer Relationship Stress

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Abstract

The purpose of this study was to examine the differential mediational roles of perceived peer relationship stress (PPRS) in accounting for the association between cyberbullying (CB) and cybervictimization (CV) and mental health among early adolescents in cross-sectional data and longitudinal data, respectively. A total of 606 early adolescents completed questionnaires as part of a 3-year longitudinal study on three occasions at 1-year intervals. Structural equation modeling revealed that (1) compared to CB, CV showed a stronger relationship with mental health. (2) In contrast to its role in CV, PPRS did not mediate the link between mental health and CB in both cross-sectional and longitudinal models. PPRS mediated the relationship between CV and mental health in both cross-sectional and longitudinal models. Limitations and practical applications of the study were discussed.

Keywords: cyberbullying, cybervictimization, perceived peer relationship stress, mental health, mediating role

Introduction

WORLDWIDE ATTENTION HAS been focused on the potentially serious consequences of the modern phenomena of cyberbullying (CB) and cybervictimization (CV).[1] CB is typically defined as aggression that is intentionally and repeatedly carried out in an electronic context (e.g., e-mail, blogs, instant messages, and text messages) against a person who cannot easily defend himself or herself.[2,3]

Although adverse consequences can be associated with CB and CV at any age, we focused on adolescence in this study because many adolescents are just beginning to develop an online presence, and their online social skills are often not well developed. Adolescence represents the transitional phase in human development when children move into adulthood, which is a particularly sensitive period for healthy development.[4,5] Communicating with friends is very important for early adolescents and continuing a trend in childhood, they spend more time with their peers.[6] The Internet provides a venue for them to communicate at any time.[6] They spend more time on the Internet than children.[7] However, without adult supervision, they are more easily involved in CB.[8] Unfortunately, early adolescents are especially vulnerable to the effects of CV.[9] Furthermore, some research has also shown that CB is particularly prevalent in middle school children,[2] and is most frequent among students in grades 7–8.[10,11] Thus, in this study, we used *early* adolescents as our participants to investigate CB and CV.

CV has been associated with multiple negative psychological outcomes, such as depression, anxiety, and lower life satisfaction.[12–14] Interestingly, negative outcomes associated with CB are not limited to the victims. Much research showed that bullies also report higher levels of anxiety and depression, and lower levels of psychological well-being.[15–17] One meta-analysis[18] also showed that both CB and CV were associated with anxiety, depression, and low life satisfaction. However, because most such studies have been based on cross-sectional methodology, the findings to date are best thought of associations, rather than causal claims.[18] With regard to the available longitudinal research, the results suggest that CB displays less impact on mental health than CV. Much research has shown that CV displays statistically

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significant associations with subsequent anxiety and depressive symptoms.[19] For example, Fahy et al. found that CV, but not perpetration, was a risk factor for mental health problems 1 year later.[20]

Based on the dual-factor model of mental health,[21] mental health has been viewed as a complete state of being, consisting of both the absence of illness or disorder and positive factors, such as well-being.[22–24] To obtain a comprehensive understanding of the relationship between CB and mental health among early adolescents, we adopted negative indicators (i.e., anxiety and depression) and positive indicators (i.e., subjective well-being in school, SWBS) to measure mental health. Consistent with the literature reviewed above, our negative indicators represented common negative outcomes related to CB[25] during adolescence, both of which can contribute to greater psychological problems in adulthood.[26,27] Our positive indicators represented well-being or wellness in the context of one of the most important domains of early adolescent overall well-being, specifically school well-being.[28] ''Wellness is always embedded in an interpersonal, social-familial, or institutional context.[29] However, little is known about the associations between CB and CV and SWBS.

Given the importance of the outcomes, it is critical to explore the psychological mediators that explain the associations between CB and victimization and their particular outcomes. Although some intrapersonal mediators have been identified, such as self-esteem,[30] it is not clear whether external, interpersonal factors, such as perceived peer relationship stress (PPRS), serve as mediators. The experience of being cyberbullied seems like it would result in a significant amount of stress.[31–33] Mixed-effects meta-analysis results have indicated that stress is the strongest correlate of CV.[18] If the stress is not properly dealt with, it will likely lead to anxiety, depression, and other negative emotions.[34] However, thus far, no research has focused on the association between PPRS and CB.

This lack of research attention has occurred despite the fact that peers play an important role in the process of socialization of adolescents.[35,36] Peer relationship stress appears to be one of the most important sources of stress among adolescents.[37,38] Currently, CB is becoming a growing phenomenon that seems to be a common feature of interpersonal relationships during adolescence[39] within a context in which interacting with friends is one of the most important motives for adolescents going online.[40,41] Studies have shown that CB, such as spreading rumors on the Internet, are more likely to happen among school classmates.[42] Bullies may damage cybervictims' reputations and interpersonal relationships by the distribution of online messages.[43,44] Involvement in CB may make students less popular among peers.[45] Both cyberbullies and cybervictims may experience reduced support from peers and yield aversive peer relationships.[46–48] Such decreases in the quality of peer relationships may lead both bullies and victims to feel more stressed when communicating with their classmates or friends. However, because of the anonymity of CB, cyberbullies may feel less stressed than victims.

This study

The purpose of our study was to examine the different mediating roles of PPRS on the effects of CB and CV in early adolescents. First, we examined the mediational roles of PPRS between CB and CV and mental health in a cross-sectional model. However, because of the limitations of cross-sectional research, the results do not shed light on the temporal ordering of the variables.[49] Thus, we collected data on relevant variables to evaluate a three-wave longitudinal model covering a 3-year time span. Specifically, we formulated three hypotheses:

H1: Compared to CB, CV will display a stronger association with adolescents' mental health. Specifically, CB will relate significantly to mental health only in the cross-sectional data, whereas CV will relate significantly to mental health in both the cross-sectional and longitudinal data.

H2: PPRS will mediate the associations between CB and CV and adolescents' mental health in the cross-sectional model and the longitudinal model, respectively.

H3: The size of mediating effect of CV on mental health through PPRS will be stronger than the size of the mediating effect of CB on mental health in both the cross-sectional and longitudinal models.

Methods

Participants

Participants were recruited from four different public middle schools in a city located in northern China. Based on the information obtained from the local education authorities, the selected schools were coeducational, ordinary middle schools, and reasonably representative of such institutions in China. Within each school, four classes were randomly selected to participate in the study. All the schools and classes were comparable in terms of the quality of students, school size, class size, and teachers' teaching abilities.

Students participated in a three-wave longitudinal study, completing questionnaires every 12 months for 3 years. At the baseline assessment (Wave 1), a total of 630 students (330 girls) completed the questionnaires. Because of the missing data on their surveys, the resulting number of valid participants was 623 early adolescents (328 girls) with return rates of 98.89 percent. Participants ranged in age from 12 to 14 years ($M = 12.93$, $SD = 0.60$). At the Wave 2 assessment, because nine students transferred to other schools or for some other reasons, 621 students completed the questionnaires; the resulting number of valid participants was 615 adolescents (98.71 percent of Wave 1 sample), reflecting a return rate of 99.03 percent. At the Wave 3 assessment, 610 students completed the questionnaires. The resulting number of valid participants was 606 adolescents (97.27 percent of Wave 1 sample), reflecting a return rate of 99.34 percent. The final sample included 606 adolescents (323 girls) who completed the measures at Time 1 (T1), Time 2 (T2), and Time 3 (T3). *T*-tests on CB, CV, PPRS, and mental health (anxiety, depression, and SWBS) were conducted to assess bias related to attrition between students who participated on all three occasions versus those students who did not. There were no statistically significant differences in CB ($t = 0.21$, $p > 0.05$), CV ($t = 1.10$, $p > 0.05$), PPRS ($t = 1.86$, $p > 0.05$), SWBS ($t = 0.53$, $p > 0.05$), anxiety ($t = 0.42$, $p > 0.05$), and depression ($t = 1.23$, $p > 0.05$) for the two groups.

Measures

Cyberbullying and cybervictimization. CB and CV were measured using the brief adaptation Electronic Bullying

Table 1. Descriptive Statistics and Correlations for the Main Variables ($N=606$)

	M	SD	1	2	3	4	5	6	7	8	9
1 T1 CV	1.27	0.50									
2 T1 CB	1.17	0.46	0.36***								
3 T1 PPRS	0.75	0.77	0.36***	0.23***							
4 T1 SWBS	6.54	2.34	–0.15**	–0.11***	–0.28***						
5 T1 AN	18.93	14.41	0.29***	0.18***	0.50***	–0.33***					
6 T1 DE	10.11	5.97	0.25***	0.16***	0.40***	–0.52***	0.50***				
7 T2 PPRS	0.69	0.75	0.24***	0.06	0.54***	–0.18***	0.33***	0.29***			
8 T3 SWBS	5.70	2.13	–0.13***	–0.10*	–0.23***	0.39***	–0.26***	–0.36***	–0.28***		
9 T3 DE	11.47	6.27	0.11***	0.05	0.17***	–0.27***	0.23**	0.37***	0.24***	0.55***	
10 T3 AN	18.91	15.20	0.06	0.07	0.22***	–0.15***	0.41***	0.23***	0.30***	–0.37***	0.48***

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

T1, Time 1; T2, Time 2; T3, Time 3; CV, cybervictimization; CB, cyberbullying; PPRS, perceived peer relationship stress; SWBS, subjective well-being in school; DE, depression; AN, anxiety.

Questionnaire (EBQ), which derived from EBQ.[42,50] The EBQ was developed for the purpose of assessing electronic bullying among middle school students. The bullying subscale consists of four items (e.g., ''Have you told lies or spread rumors about someone else on the Internet?''). The victimization subscale consists of four items (e.g., ''Has anyone told lies or spread rumors about you on the Internet?''). Students responded on a five-point Likert scale, ranging from 1 (*it hasn't happened in the past couple of months*) to 5 (*several times a week*). The two subscales were scored separately. Mean scores were calculated, and higher scores reflected higher frequencies of CB. The Cronbach's alphas were 0.80 for bullying subscale and 0.78 for victimization subscale at Time 1.

Perceived peer relationship stress. We adopted a subscale of the Stress Scale for Middle School Students (SSMSS)[38] to measure PPRS. The SSMSS is a self-report questionnaire assessing adolescents' perceptions of stress. The subscale assessing PPRS consists of seven items (e.g., ''I have some quarrels with classmates and friends.''). Participants were asked to respond using a five-point Likert scale, ranging from 0 (*never*) to 4 (*extremely severe*). The score for the PPRS was computed by averaging the responses to the seven items. Total scores were analyzed with higher scores indicating a stronger disposition toward perceiving stress. The Cronbach's alpha coefficient for the PPRS subscale was 0.85 for the sample at Time 1, and 0.86 for the sample at Time 2.

Subjective well-being in school. SWBS was measured using the Brief Adolescents' Subjective Well-Being in School Scale (BASWBSS).[51] The BASWBSS includes a School Satisfaction (SS) subscale (a six-item self-report measure of students' subjective evaluations regarding their school life, e.g., ''I perform well in school.'') and an Affect in School subscale (a two-item self-report measure of students' positive and negative effects in school). The SS subscale items were answered on a six-point Likert scale, ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The Affect in School subscale items were also answered on a six-point Likert scale, ranging from 1 (*never*) to 6 (*always*), requiring participants to assess the frequency of these emotions. The score for the SS subscale was computed by averaging the responses to the six items. The score for the Affect in School subscale was computed by subtracting the NA from the PA score. In this study, the Cronbach's alpha coefficient for the SS subscale was 0.78 for the sample at Time 1 and 0.83 for the sample at Time 3.

Anxiety. Anxiety was measured using the Screen for Child Anxiety Related Emotional Disorders (SCARED),[52] which consists of 41 self-report items (e.g., ''When afraid, I have difficulty breathing.''). The Chinese version was revised by Su.[53] Participants were asked to respond using a three-point Likert scale, ranging from 0 (*never*) to 2 (*often*). Total scores were analyzed with higher scores indicating a stronger disposition toward experiencing anxiety. The Cronbach's alpha coefficient for the SCARED was 0.96 for the sample at Time 1 and 0.96 for the sample at Time 3.

Depression. Depression was measured using the Depression Self-rating Scale for Children (DSRSC),[54] which consists of 18 self-report items (e.g., ''I feel so sad that I can't stand it.''). The Chinese version was revised by Su.[55] Participants were asked to respond using a three-point Likert scale, ranging from 0 (*never*) to 2 (*often*). Total scores were analyzed with higher scores indicating a stronger disposition toward experiencing depression. The Cronbach's alpha coefficient for the DSRSC was 0.84 for the sample at Time 1 and 0.86 for the sample at Time 3.

Procedure

This study was approved by the Human Research Ethics Committee of South China Normal University and the

Table 2. The Confirmatory Factor Analysis Results for All Scales ($N=606$)

Scales	χ^2/df	*CFI*	*TLI*	*RSMEA*
EBQ	1.89	0.99	0.99	0.04
SSMSS	4.83	0.97	0.95	0.08
BASWBSS	4.00	0.98	0.95	0.07
SCARED	2.12	0.91	0.90	0.04
DSRSC	3.72	0.91	0.91	0.07

EBQ, Electronic Bullying Questionnaire; SSMSS, Stress Scale for Middle School Students; BASWBSS, Brief Adolescents' Subjective Well-Being in School Scale; SCARED, Screen for Child Anxiety Related Emotional Disorders; DSRSC, Depression Self-rating Scale for Children.

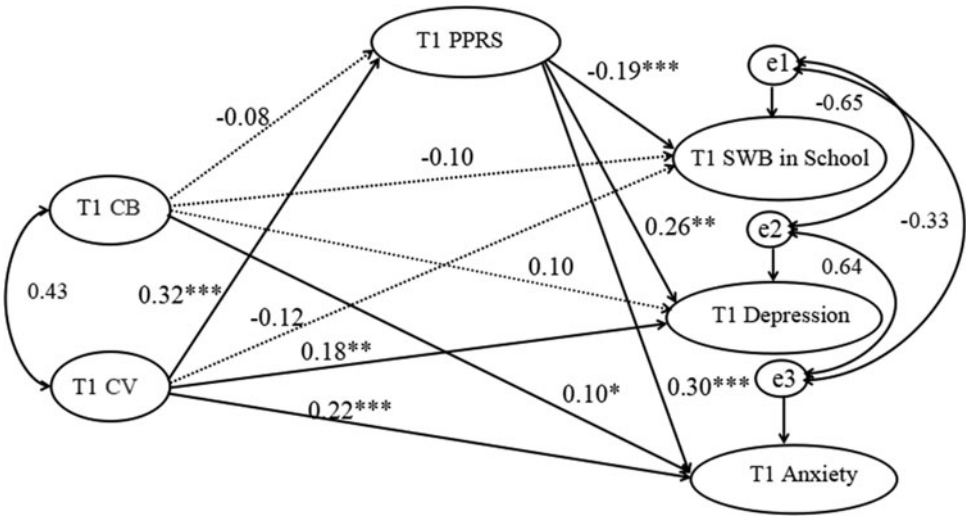

FIG. 1. The Mediation Model in Cross-Sectional Data ($N = 606$). *Solid lines* mean the path coefficients are significant, while *dotted lines* mean the path coefficients are not significant. $^{**}p < 0.01$, $^{***}p < 0.001$. For simplicity, the observed variables are not presented in the figure. T1 CV → T1 SWBS, T1 CB → T1 SWBS, T1 CB → T1 PPRS were statistically nonsignificant ($\beta = -0.12$, $p > 0.05$; $\beta = -0.10$, $p > 0.05$; $\beta = 0.10$, $p > 0.05$; $\beta = -0.08$, $p > 0.05$). CB, cyberbullying; CV, cybervictimization; PPRS, Perceived Peer Relationship Stress; SWB, Subjective Well-Being.

relevant school boards, principals, and teachers. Informed consent was obtained from students and their parents before the data collection. All parents and students agreed to take part in this study, and they were all informed of the confidentiality of their participation. The students could withdraw at any time. If the students were not at school on the testing day, parents were e-mailed to inform them that their students could participate in the study by completing the questionnaires on the Internet at their convenience.

Data analysis

Given our relatively large sample size and small amount of missing data (i.e., 2.72 percent), the missing data were handled using the listwise deletion procedure, which is acceptable when the loss of cases due to missing data is less than five percent.[56] Before examining our hypotheses, correlations were calculated among all variables (Table 1). Then, the measurement model was examined using confirmatory factor analysis (CFA) in Amos 21.0. The model fit was adequate in the cross-sectional model ($\chi^2/df = 2.83$, CFI = 0.93, TLI = 0.92, RMSEA = 0.06) and the longitudinal model ($\chi^2/df = 2.81$, CFI = 0.95, TLI = 0.94, RMSEA = 0.06), respectively, and all standardized factor loadings were significant ($p < 0.001$). Structure Equation Modelling in Amos 21.0 was conducted to examine the mediation model. Given that some of the variables (e.g., CB and CV) were not normally distributed, a bootstrapping approach ($N = 1000$ bootstrap samples) was employed, which does not require distributional assumptions.[57]

Results

Descriptive statistics

Table 1 displayed the descriptive statistics and bivariate correlations. All variables were significantly related to each other, with the exceptions of T1 CB and T2 PPRS ($r = 0.06$, $p > 0.05$), T1 CB and T3 depression ($r = 0.05$, $p > 0.05$), T1 CB and T3 anxiety ($r = 0.07$, $p > 0.05$), and T1 CV and T3 anxiety ($r = 0.06$, $p > 0.05$).

The measurement and structural models

We first tested the factorial structure of the scale by CFA. The findings showed that all the scales exhibited acceptable fit indices (Table 2) with acceptable factor loadings.

The mediational roles of PPRS

In the cross-sectional analyses, the structural model revealed an acceptable fit to the data, $\chi^2/df = 2.86$, CFI = 0.93, TLI = 0.92, RMSEA = 0.07. As is shown in Fig. 1 and Table 3, the mediating role of PPRS on CV and mental health (i.e.,

TABLE 3. BOOTSTRAP ANALYSES OF THE MAGNITUDE AND STATISTICAL SIGNIFICANCE OF INDIRECT EFFECTS

Model pathways	*β standardized indirect effect*	*SE of mean*[a]	*Effect size*	*Total effect*	*95% BC confidence intervals (lower and upper)*
T1 CV—T1 PPRS—T1 SWBS	0.32*(−0.19) = 0.06	0.007	33.63%	0.18	−0.127 to −0.026
T1 CV—T1 PPRS—T1 DE	0.32*0.26 = 0.08	0.004	31.61%	0.26	0.043 to 0.141
T1 CV—T1 PPRS—T1 AN	0.32*0.30 = 0.10	0.004	30.38%	0.32	0.053 to 0.155
T1 CB—T1 PPRS—T1 SWBS	−0.08*(−0.19) = 0.02	0.005			−0.004 to 0.070
T1 CB—T1 PPRS—T1 DE	−0.08*0.26 = −0.02	0.003			−0.076 to 0.007
T1 CB—T1 PPRS—T1 AN	−0.08*0.30 = −0.02	0.003			−0.084 to 0.007

[a]These values are based on unstandardized path coefficients.
*Multiplication of two path coefficients.

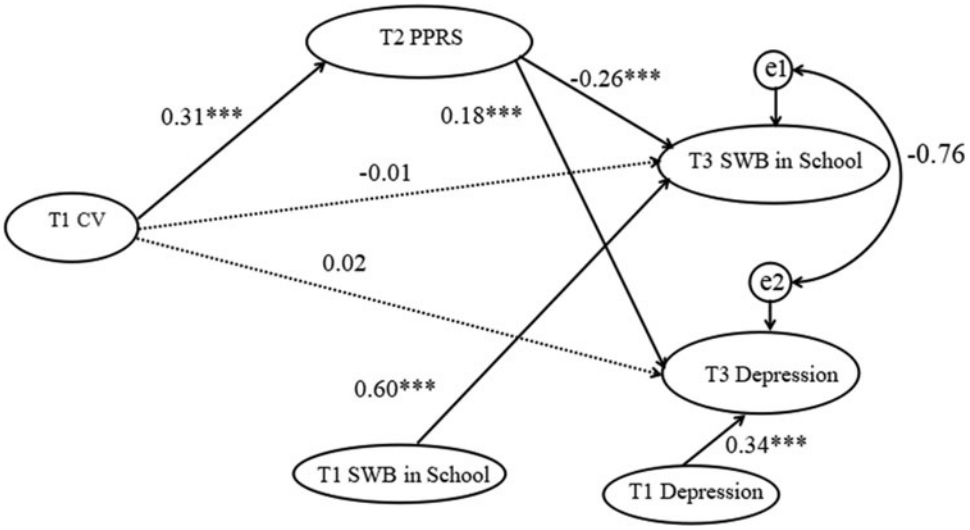

FIG. 2. The Mediation Model in Longitudinal Data ($N = 606$). *Solid lines* mean the path coefficients are significant, while *dotted lines* mean the path coefficients are not significant. $^{***}p < 0.001$, $^{**}p < 0.01$. For simplicity, the observed variables and correlation between T1 CV and T1 mental health indicator are not presented in the figure. T1 CV → T3 SWBS, T1 CV → T3 depression were nonsignificant ($\beta = -0.01$, $p > 0.05$; $\beta = 0.02$, $p > 0.05$).

SWBS, depression, and anxiety) was established; however, the mediating role between CB and mental health (i.e., SWBS, depression, and anxiety) was not established. For the longitudinal analyses, the structural model also revealed an acceptable fit to the data: $\chi^2/df = 2.57$, CFI = 0.95, TLI = 0.94, RMSEA = 0.05. As is shown in Fig. 2 and Table 4, PPRS mediated the relationships between T1 CV → T3 SWBS and T1 CV → T3 depression. As shown in Table 1, T1 CB and T2 PPRS and T1 CV and T3 anxiety were not related significantly, so they were not included in the longitudinal model (Figs. 1 and 2).

Discussion

We investigated the relationships between CB and CV and mental health (i.e., SWBS, anxiety, and depression), and the mediation mechanism of PPRS between them separately, employing both cross-sectional and longitudinal data in early adolescents. Two major findings emerged. First, compared to CB, CV displayed a stronger relationship to mental health. Second, compared to CV, PPRS did not appear to operate as an important link between mental health and CB.

Consistent with hypothesis 1, in cross-sectional data, T1 CB and T1 CV both negatively related to T1 SWBS and positively related to T1 anxiety and T1 depression. In the longitudinal data, T1 CV negatively related to T3 SWBS and positively related to T3 depression, whereas it did not significantly relate to T3 anxiety. T1 CB was not significantly related to T3 anxiety or T3 depression. This finding means that CV exerted a stronger impact than CB on early adolescents' mental health. This finding supports previous cross-sectional findings for adolescents showing that CB and CV were both associated with less satisfaction with life.[50] In longitudinal studies, several researchers have found that CV, even at low levels, may be a risk factor for future mental health problems among adolescents.[1,58] A noteworthy finding in our study was that T1 CV did not relate significantly to T3 anxiety, whereas it did significantly relate to T3 depression. A possible explanation for this difference is that in the long run, CV may lead to increases in symptoms of depression, but not anxiety, which means that students who suffer from CB are more at risk for future depressive disorders. Much research reported that many depressive reactions are preceded by prodromal periods of chronic anxiety.[59,60]

Related to hypotheses 2 and 3, we found that in the cross-sectional data, T1 PPRS mediated the relationships between T1 CV and T1 mental health, but it did not mediate the relationship between T1 CB and T1 mental health. In the longitudinal data, T2 PPRS mediated the relationships after controlling for T1 mental health. More specifically, students with CV experiences were inclined to feel more stress when interacting with their friends or classmates, which in turn reduced their levels of mental health; however, CB experiences did not increase PPRS for bullies when they communicated with their peers. A possible explanation may be that CB might include behaviors that diminish the reputations of the victims, making the victims less popular among peers.[61] Because of the characteristics of rapid dissemination of CB,[8,39] CB can reach a much wider audience than in traditional bullying.[39] Also, cybervictims often do not know who

Table 4. Bootstrap Analyses of the Magnitude and Statistical Significance of Indirect Effects

Model pathways	*β standardized indirect effect*	*SE of mean*[a]	*Effect size*	*Total effect*	*95% BC confidence intervals (lower and upper)*
T1 CV—T2 PPRS—T3 SWBS	0.31*(–0.26) = –0.08	0.005	88.96%	0.09	–0.147 to –0.037
T1 CV—T2 PPRS—T3 DE	0.31*0.18 = 0.06	0.004	73.61%	0.10	0.022 to 0.106

[a]These values are based on unstandardized path coefficients.
*Multiplication of two path coefficients.

is bullying them, which may leave them wondering if each person he or she meets is potentially the bully.[42] Such concerns would likely exacerbate perceived stress among peers, adversely influencing their mental health. Many studies have revealed that perpetration experiences are not always related to feelings of loneliness and lack of social acceptance.[62,63] Bullies can escape the notice of teachers and parents. Even when CB evokes negative reactions from others, cyberbullies might be less affected by them.[64]

Limitations and further research

This study has some important limitations that should be acknowledged. First, it was not possible to control for involvement in traditional forms of bullying. Much research has shown that CB has a greater association with mental health than traditional bullying.[16] Further research should consider CB and traditional bullying simultaneously. Second, this study did not account for Internet access, time online, or online activities, all of which may have an impact on CB. Future research efforts would likely benefit from the incorporation of such information. Third, all data were based on students' self-reports, thus their responses may be affected by social desirability.[13] Future researchers may consider collecting reports from multiple informants (peers, teachers, and parents) or employing a social desirability scale to control for such responding.[65]

Implications

Although this study reflected the above limitations and a need for additional research, the results suggested possible implications related to the links among adolescents' involvement in CB, PPRS, and mental health. Given the long-term negative impact of CV on adolescents' mental health, all adults should pay serious attention to online aggressive behavior of youth,[66] in efforts to ensure healthy peer environments for all youth. First, school professionals and parents should pay attention to the effects of CV and CB on adolescents' mental health, especially the mental health of cybervictims. Second, they should conduct screenings for early detection of anxiety among adolescents[67] and provide early intervention or depression prevention counseling to adolescents who present signs of anxiety after encountering CB. Third, because of the differential mediating roles of PPRS between cybervictimization and CB and mental health, educators and parents should look for different approaches to help adolescents who suffer from CB. Specifically, they may provide victims with empirically validated social skill training interventions to relieve peer relationship stress and enhance the quality of peer relationships.[68]

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