



# School bullying victimization and self-rated health and life satisfaction: The mediating effect of relationships with parents, teachers, and peers



Lei Chai<sup>a</sup>, Jia Xue<sup>b</sup>, Ziqiang Han<sup>c,\*</sup>

<sup>a</sup> Department of Sociology, University of Toronto, 725 Spadina Ave, Toronto, ON M5S 2J4, Canada

<sup>b</sup> Factor-Inwentash Faculty of Social Work & Faculty of Information, University of Toronto, 246 Bloor Street W, Toronto, ON M5S 1V4, Canada

<sup>c</sup> School of Political Science and Public Administration, Shandong University, Qingdao 266237, China

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## ABSTRACT

Using a nationally representative survey of urban areas from China collected in 2016, we examine two research questions: (1) how is school bullying victimization associated with self-rated health and life satisfaction; and (2) how do relationships with parents, teachers, and peers mediate those associations? We find that, among students of higher primary, middle, high, and vocational schools, bullying victims are more likely to report poor self-rated health and life satisfaction, regardless of whether the victims experience traditional bullying or cyberbullying. In addition, both traditional bullying and cyberbullying victims are associated with poor relationships with parents, teachers, and peers, which, in turn, partially mediate the effect of bullying victimization on poor self-rated health and life satisfaction. The present study underscores that the impact of adults and peers might be an important mechanism contributing to the health and well-being disparities by school bullying victimization.

## 1. Introduction

Given its prevalence and adverse consequences, school bullying victimization continues to be the centrality of research in the field of social work (Zhang et al., 2019) and public health (Williford & Zinn, 2018). Prior research has assessed two types of bullying. Traditional bullying (face-to-face) refers to “aggressive behavior that is repetitive and intentional in which a power differential exists between the victims and bullies” (Rettew & Pawlowski, 2016, p.235). It primarily includes three categories of physical (e.g., hitting), verbal (e.g., name-calling), and psychological (e.g., spreading rumors) (Kowalski & Limber, 2007). As a result of increasing accessibility of various forms of social media (Radovic, Gmelin, Stein, & Miller, 2017), cyberbullying has emerged as a phenomenon. Literature defines cyberbullying as bullying behaviors conducted through electronic tools (Waasdorp & Bradshaw, 2015), such as spreading rumors on the Internet (Williams & Guerra, 2007). Prior research has established that the rates of traditional and cyberbullying bullying victimization ranged from 2% to 66% and from 12% to 72%, respectively (Chan & Wong, 2015). Despite an increasing prevalence of bullying victimization in China, surprisingly, relatively little research has examined health and well-being disparities by bullying victimization. The present study seeks to address this gap using a large nationally representative survey of urban areas from China.

### 1.1. School bullying victimization and mental, physical, and behavioral outcomes

Previous research has found detrimental mental health, behavioral, and psychosomatic consequences associated with school bullying victimization, regardless of the types of bullying. For instance, an extensive body of research has revealed that bullying victims are more likely to report distress (Le et al., 2017), anxiety (Moore et al., 2017; Pengpid & Peltzer, 2019), depression (Moore et al., 2017; Murshid, 2017), and loneliness (Moore et al., 2017; Pengpid & Peltzer, 2019). Research has also shown that school bullying victimization is associated with higher rates of suicidal behavior (Moore et al., 2017; Romo & Kelvin, 2016), substance use (Pengpid & Peltzer, 2019), injury (Pengpid & Peltzer, 2019), and aggression (Moore et al., 2017; Romo & Kelvin, 2016). There is also some preliminary evidence that bullying victims are more likely to report headaches, sleep problems, and abdominal pain (Li, Sidibe, Shen, & Hesketh, 2019).

### 1.2. School bullying victimization and self-rated health and life satisfaction

Although previous research has provided valuable empirical evidence, little is known about whether the same deleterious patterns can be observed using two important, yet understudied health and well-being outcomes—self-rated health and life satisfaction. Self-rated

\* Corresponding author.

E-mail addresses: [lei.chai@mail.utoronto.ca](mailto:lei.chai@mail.utoronto.ca) (L. Chai), [jia.xue@utoronto.ca](mailto:jia.xue@utoronto.ca) (J. Xue), [ziqiang.han@sdu.edu.cn](mailto:ziqiang.han@sdu.edu.cn) (Z. Han).

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health is often used to evaluate individuals' global physical health status (Zhang, Padilla, & Kim, 2017), which has been recommended by the World Health Organization (Subramanian, Huijts, & Avendano, 2010). Surprisingly, very few studies have empirically documented self-rated health consequences within the context of school bullying victimization. For instance, Zhang et al. (2019) found that bullying victimization was adversely associated with self-rated health. A similar pattern has also been observed in another study (Chai, Xue, & Han, 2020). Due to prior scarce empirical findings, more investigations are warranted.

Self-rated life satisfaction is a central component of one's subjective well-being (Diener, 1994), which examines children and adolescents' overall quality of life (Pavot & Diener, 1993) or experiences with parents, friends, and school (Saha et al., 2014). Considerable evidence suggests that there are adverse effects of school bullying victimization on life satisfaction. For instance, using a sample of elementary school students from four public schools in a rural school district in the Northeastern United States, Liu et al. (2020) observed that school bullying victimization was negatively associated with life satisfaction. Similarly, using a sample of grades 6–8 students from five public middle schools in a rural school district in the Southeastern United States, Martin and Huebner (2007) found that school bullying victimization was linked to lower levels of life satisfaction. However, most existing evidence is limited to homogenous samples of students, which undermines the generalizability of their findings. Thus, empirical studies are required using more heterogeneous samples.

### 1.3. The stress process model

Although considerable research has suggested the direct adverse associations between bullying victimization and children's and adolescents' health and well-being outcomes, explanations for the linking mechanisms involved in these processes are less clear. We use the concepts of primary stressors, secondary stressors, and stress proliferation embedded in the stress process model (Pearlin & Bierman, 2013) to develop a conceptual framework to examine the mediating processes in the associations between bullying victimization and children's and adolescents' self-rated health and life satisfaction. The association between primary and secondary stressors is defined as "stress proliferation," in the stress process models where one stressor creates additional stressors. We hypothesize that the primary stressor, bullying victimization, is linked to additional stressors, such as poor relationships with parents, teachers, and peers, and part of the associations between bullying victimization and self-rated health and life satisfaction might, therefore, be attributable to those secondary relational stressors. In other words, we argue that bullying victims might experience adverse relationships with parents, teachers, and peers, which, in turn, mediate the associations between the detrimental effect of bullying victimization on self-rated health and life satisfaction.

### 1.4. School bullying victimization and relationships with parents, teachers, and peers

Previous research has often portrayed parents and teachers as protective resources to bullying victims because adults can often provide help and support, which might prevent further victimization (Bjereid, Daneback, & Petzold, 2017). Thus, disclosing victimization to an adult is seen as an effective help-seeking strategy (Dowling & Carey, 2013; Smith et al., 2008) and has been promoted in schools (Black, Weinles, & Washington, 2010). However, some studies have discovered that bullying victims tend not to tell an adult about their victimization experience (Dowling & Carey, 2013; Smith et al., 2008), which is often attributable to a lack of confidence in adults' abilities to help (Cowie, 2000), concern over adults' responses (deLara, 2012), and a sense of shame (deLara, 2012). As a result, children and adolescents who keep bullying victimization experiences away from adults might undermine

their relationships with parents and teachers due to a lack of communication. To our best knowledge, limited studies have formally tested the direct effect of bullying victimization on relationships with parents and teachers. Using the 2013/2014 Swedish Health Behavior in School-aged Children (HBSC) survey, Bjereid et al. (2017) found that bullying victims were associated with unsatisfactory relationships with teachers and parents.

In addition to adverse relationships with adults, relationships with peers might also be fragile among bullying victims (Jantzer, Hoover, & Narloch, 2006). Given that bullies often share the same social network with bullying victims at school (Sticca & Perren, 2013), victims are more likely to report lower levels of friendship quality and trust (Jantzer, Hoover, & Narloch, 2006), reflecting a poor relationship with peers. These ideas and evidence together suggest bullying victimization might undermine children's and adolescents' relationships with parents, teachers, and peers.

### 1.5. Relationships with parents, teachers, and peers and health and well-being

Experiencing poor relationships with parents, teachers, and peers can be stressful, which might contribute to adverse health and well-being consequences. There is a vast literature supporting this claim (Ackard et al., 2006; Chango et al., 2012; Rueger et al., 2016). Using the Add Health survey data, Heard et al. (2008) suggested that poor relationships with parents, teachers, and peers were associated with lower levels of self-rated health of the adolescents. Similar patterns have also been observed for self-rated life satisfaction (Danielsen, Samdal, Hetland, & Wold, 2009; Nickerson & Nagle, 2004; Oberle, Schonert-Reichl, & Zumbo, 2011). Pulling these threads together, we consider the possibility of mediating effects.

### 1.6. Current study

Using a nationally representative survey of urban areas from China collected in 2016, the present study focuses on two research questions: (1) how is school bullying victimization associated with self-rated health and life satisfaction; and (2) how do relationships with parents, teachers, and peers mediate the associations between school bullying victimization and self-rated health and life satisfaction. By relying on previous theoretical and empirical work, we have three hypotheses as follows:

**Hypothesis 1.** School bullying victimization is positively associated with poor self-rated health and life satisfaction.

**Hypothesis 2.** School bullying victimization is positively associated with poor relationships with parents, teachers, and peers.

**Hypothesis 3.** Poor relationships with parents, teachers, and peers partially mediate the detrimental effect of school bullying victimization on poor self-rated health and life satisfaction.

## 2. Method

### 2.1. Participants

We employed a nationally representative survey of urban areas from China collected in 2016. To cover the geographical variations, we selected the following seven provinces: northeast, north, east, south, northwest, southwest, and central part of China. We then selected the capital city of each province (i.e., Shenyang, Beijing, Lanzhou, Guiyang, Nanjing, Guangzhou, and Changsha). Next, we chose the schools based on available connections with local schools. One of each type of pre-college school (i.e., one primary school, one middle school, one high school, and one vocational school) was selected. Within each school, one class of each grade was randomly selected. However, we did not

sample students from Grade one to Grade three because they were not capable of reading and understanding the survey questions. Then we assigned one of our research assistants to help conduct surveys within each selected class. The aforementioned sampling strategies at each stage were chosen for the purpose of best balancing the “representativeness,” reflecting the scientific rationale and the available reality (Lohr, 2009). In total, 3777 questionnaires were distributed to 28 schools (i.e., 4 schools per province multiply by 7 provinces). The response rate was 100%. However, due to missing values, 102 (2.7%) students were excluded from the analyses. The final sample is 3675 (1772 boys and 1903 girls) adolescents.

## 2.2. Measures

**Self-rated health.** We measured self-rated health based on the question: “In general, how do you evaluate your overall health status?” Responses were coded as: “very poor (1),” “poor (2),” “average (3),” “good (4),” and “very good (5).” Previous research has well-documented the validity of the single item of self-rated health (Chai et al., 2020; Zhang et al., 2019). We then recoded responses to a dummy variable (1 = “very poor/poor” and 0 = “average/good/very good”) (Mewes & Giordano, 2017).

**Self-rated life satisfaction.** We measured self-rated life satisfaction based on the question: “In general, how do you evaluate your life satisfaction.” Responses were coded as: “very dissatisfied (1),” “dissatisfied (2),” “average (3),” “satisfied (4),” and “very satisfied (5).” Prior studies have documented the validity of the single item of self-rated life satisfaction (Jovanović & Lazić, 2018). We then recoded responses to a dummy variable (1 = “very dissatisfied/dissatisfied” and 0 = “average/satisfied/very satisfied”) (Lacruz et al., 2016).

**Bullying victimization.** The measurement for bullying victimization was based on 10 items: “In the last academic year, have your classmates or peers done any of the following behaviors to you?” including “called nickname, made fun of, or insulted in a hurtful way (1)” (verbal bullying), “threat you with harm (2)” (verbal bullying), “kick, hit, push, or spit at you (3)” (physical bullying), “deliberately destroy your things (4)” (physical bullying), “spread rumors about your and encourage others to dislike you (5)” (relational bullying), “exclude you from group activities on purpose (6)” (relational bullying), “spread bad news or rumors about you on the internet or social media (7)” (cyberbullying), “purposely post your private information/photos/videos on the internet or social media (8)” (cyberbullying), “threat or insult you by sending a message from phone/WeChat/QQ (9)” (cyberbullying), and “deliberately exclude you from online communication or game (10)” (cyberbullying) (Ba et al., 2019). Traditional bullying refers to the first six behaviors, and cyberbullying refers to the last four behaviors. The responses included the following: “never (1),” “rarely (2),” “sometimes (3),” and “frequently” (4). We first recoded each item as a dummy variable (1 = “rarely/sometimes/frequently” and 0 = “never”). Then, we created victimization variables for traditional bullying and cyberbullying as 1 when at least one item was reported as “rarely/sometimes/frequently” and “0 = none of the bullying items were experienced.”

**Relationship with parents.** We measured relationship with parents by asking if the students agree with the following statements (Han, Fu, Liu, & Guo, 2018): “My parents know most of my friends.” “My parents know where I am when I am not at home.” “My parents and I spend a lot of time together.” “I always chat with my parents.” “My parents compliment me.” And “my parents care about me very much.” Responses were coded as “strongly agree (1),” “agree (2),” “disagree (3),” and “strongly disagree” (4). We averaged items and created an index that ranged from 1 to 4 ( $\alpha = 0.85$ ).

**Relationship with teachers.** We measured relationships with teachers based on the question: “In general, how is your relationship with your teachers?” (Ba et al., 2019) Responses included: “very bad (1),” “bad (2),” “normal (3),” “good (4),” and “very good (5).” We recoded the

**Table 1**

Descriptive statistics of selected variables in the analyses.

	Means/%s
Self-rated health	
Very poor/poor	3.21%
Average/good/very good	96.79%
Self-rated life satisfaction	
Very dissatisfied/dissatisfied	3.13%
Average/satisfied/very satisfied	96.87%
Traditional bullying victimization	
Yes	41.31%
No	58.69%
Cyberbullying victimization	
Yes	17.90%
No	82.10%
Relationship with parents	1.83
Relationship with teachers	
Very bad/bad	4.54%
Normal/good/very good	95.46%
Relationship with peers	
Very bad/bad	2.94%
Normal/good/very good	97.06%
Gender	
Male	48.22%
Female	51.78%
Race/ethnicity	
Han	91.76%
Others	8.24%
Boarding school	
Yes	18.18%
No	81.82%
Grade level	
Primary school	37.77%
Middle school	27.76%
High school	26.91%
Vocational school	7.56%
Living arrangement	
With parents	73.28%
With one parent	9.90%
With other(s)	16.82%
Father's education	
Less than middle school	10.07%
Middle school	31.35%
High school	24.24%
College	11.43%
Bachelor	14.01%
Above Bachelor	8.90%
Mother's education	
Less than middle school	14.34%
Middle school	30.01%
High school	22.29%
College	11.46%
Bachelor	13.55%
Above Bachelor	8.35%
Family's socioeconomic class	
Very low	3.84%
Low	10.99%
Average	54.20%
High	26.39%
Very high	4.57%
Geographic location	
Beijing	16.08%
Lanzhou	12.46%
Guangdong	12.82%
Guiyang	13.66%
Changsha	21.44%
Nanjing	10.56%
Shenyang	12.98%

(continued on next page)

**Table 1** (continued)

	Means/%s
N	3675

Note: Given that relationship with parents was the only continuous variable in our analysis, we report its standard deviation here (SD = 0.65).

responses into a dummy variable (1 = “very bad/bad” and 0 = “normal/ good/very good”).

**Relationship with peers.** We measured relationships with peers based on the question: “In general, how is your relationship with your classmates?” (Ba et al., 2019). Responses included: “very bad (1),” “bad (2),” “normal (3),” “good (4),” and “very good (5).” We recoded the responses into a dummy variable (1 = “very bad/bad” and 0 = “normal/ good/very good”).

The following variables were control variables (Chai et al., 2020; Han, Fu, Liu, & Guo, 2018; Zhang et al., 2019), including (1) *gender* (“male” and “female”), (2) *race/ethnicity* (“Han people” and “other ethnic minority groups”), (3) *boarding school* (“yes, boarding school” and “no, non-boarding school”), (4) *school type* (“primary school,” “middle school,” “high school,” and “vocational school”), (5) *living arrangement* (“living with parents,” “living with one parent,” “others”), (6) *father’s education and mother’s education* (“less than middle school,” “middle school,” “high school,” “college,” “Bachelor,” “above Bachelor”), (7) *family’s socioeconomic status* (“very low,” “low,” “average,” “high,” “very high”), and (8) *geographic location* (“Beijing,” “Lanzhou,” “Guangdong,” “Guiyang,” “Changsha,” “Nanjing,” “Shenyang”). Table 1 reported descriptive statistics of selected variables used in the analyses.

### 2.3. Analytical strategy

We used linear regression to study our continuous measure of relationship with parents. In addition to regression coefficients, we also reported the results as percent changes using the formula  $100 \times (e^b - 1)$  to improve the interpretability of our estimates. We then used logistic regression to fit models for our four dichotomous measures, including the relationship with teachers, relationship with peers, self-rated health, and self-rated life satisfaction. We reported both odds ratio and average marginal effects (AME) in these models: AME provided a discrete change in the outcome (i.e., the predicted probability) with covariate values averaged across the population (Chai & Maroto, 2020).

## 3. Results

### 3.1. School bullying victimization and poor self-rated health and life satisfaction

Table 2 presents logistic regression models predicting the

**Table 2**  
Logistic regression models predicting poor self-rated health and life satisfaction.

	Poor SR Health						Poor SR Life Satisfaction					
	Model 1a		Model 1b		Model 1c		Model 2a		Model 2b		Model 2c	
	OR	AME	OR	AME	OR	AME	OR	AME	OR	AME	OR	AME
Traditional (= 1)	3.136*** (0.709)	0.034			2.238** (0.574)	0.024 0.021	3.275*** (0.765)	0.034			1.926* (0.525)	0.019
Cyberbullying (= 1)			3.003*** (0.606)	0.033	2.031** (0.463)				3.922*** (0.801)	0.039	2.820*** (0.669)	0.029
Intercept	0.012		0.020		0.012		0.013		0.020		0.014	
PseudoR <sup>2</sup>	0.094		0.093		0.103		0.128		0.142		0.147	

Note: All models include full control variables.  
\*\*\*p < .001; \*\*p < .01; \*p < .05.

probability of reporting poor self-rated health and life satisfaction by bullying victimization. Model 1a indicated that compared to non-traditional bullying victims, traditional bullying victims were 3.4 (p < .001) percentage points more likely to report poor self-rated health. Similarly, Model 1b suggested that compared to non-cyberbullying victims, cyberbullying victims were 3.3 (p < .001) percentage points more likely to report self-rated poor health. Similar patterns remained after including both traditional bullying and cyberbullying victimizations into one model, as shown in Model 1c.

We then turned our attention to poor self-rated life satisfaction. Model 2a indicated that compared to non-traditional bullying victims, traditional bullying victims were 3.4 (p < .001) percentage points more likely to report poor self-rated life satisfaction. Similarly, Model 2b suggested that compared to non-cyberbullying victims, cyberbullying victims were 3.9 (p < .001) percentage points more likely to report self-rated poor life satisfaction. We also observed similar patterns when including both traditional bullying and cyberbullying victimizations into one model, as shown in Model 2c. Together, our results supported *hypothesis 1*.

Table 3 presented OLS and logistic regression models predicting poor relationships with parents, teachers, and peers by bullying victimization. Models 1a-1c focused on traditional bullying victimization, suggesting that being traditional bullying victims was 26.1 (p < .001) percent higher in reporting a poor relationship with parents, 4.4 (p < .001) percentage points more likely to report a poor relationship with teachers, and 4.0 (p < .001) percentage points more likely to report a poor relationship with peers compared to non-traditional bullying victims.

Models 2a-2c focused on cyberbullying victimization, suggesting that being cyberbullying victims was 25.7 (p < .001) percent higher in reporting a poor relationship with parents, 4.0 (p < .001) percentage points more likely to report a poor relationship with teachers, and 2.7 (p < .001) percentage points more likely to report a poor relationship with peers compared to non-cyberbullying victims.

After taking into account both traditional bullying and cyberbullying victimizations, as shown in Models 3a-3c, the patterns remained the same; that is, compared with non-traditional victims, traditional bullying victims were 20.1 (p < .001) percent higher in reporting a poor relationship with parents, 3.2 (p < .001) percentage points more likely to report a poor relationship with teachers, and 3.4 (p < .001) points more likely to report a poor relationship with peers. Likewise, compared with non-cyberbullying victims, cyberbullying victims were 13.2 (p < .001) percent higher in reporting a poor relationship with parents, 2.5 (p < .001) percentage points more likely to report a poor relationship with teachers, and 1.3 (p < .05) points more likely to report a poor relationship with peers. Together, the findings supported *hypothesis 2*.

**Table 3**  
OLS and logistic regression predicting poor relationships with parents, teachers, and peers by bullying victimization.

	Model 1a: With parents		Model 1b: With teachers		Model 1c: With peers		Model 2a: With parents		Model 2b: With teachers		Model 2c: With peers		Model 3a: With parents		Model 3b: With teachers		Model 3c: With peers				
	b	e <sup>b</sup> - 1	O.R.	AME	O.R.	AME	O.R.	AME	b	e <sup>b</sup> - 1	O.R.	AME	O.R.	AME	b	e <sup>b</sup> - 1	O.R.	AME	O.R.	AME	
Traditional	0.232*** (0.022)	0.261	2.965*** (0.583)	0.044	4.330*** (1.111)	0.040															
Cyber							0.229*** (0.027)	0.257	2.690*** (0.464)	0.040	2.747*** (0.584)	0.027	0.183*** (0.025)	0.201	2.219*** (0.486)	0.032	3.482*** (0.976)	0.034			
Intercept	1.778		0.054		0.019		1.882		0.092		0.045		0.124*** (0.030)	0.132	1.881*** (0.361)	0.025	1.617* (0.372)	0.013			
R <sup>2</sup>	0.163						0.154						1.779		0.056		0.020				
PseudoR <sup>2</sup>			0.135		0.132				0.133		0.115		0.166		0.143		0.136				

Note: All models include full control variables.

\*\*\*p < .001; \*\*p < .01; \*p < .05.

### 3.2. The mediating effect of relationships with parents, teachers, and peers

Models 1a-2b in Table 4 present the mediating effect of relationships with parents, teachers, and peers in the associations between bullying victimization and poor self-rated health and life satisfaction. To reiterate, both traditional bullying and cyberbullying victims were more likely to report poor self-rated health, as shown in Model 1a. Model 1b showed that poor relationships with parents, teachers, and peers were positively associated with poor self-rated health, respectively; that is, children's and adolescents who reported poor relationships with parents were 0.9 (p < .05) percentage points more likely to report poor self-rated health. Likewise, those who reported poor relationships with teachers were 3.4 (p < .001) percentage points more likely to report poor self-rated health, and those who reported poor relationships with peers were 2.4 (p < .05) percentage points more likely to report poor self-rated health. These relationships partially mediated the association between traditional bullying victimization and poor self-rated health (Sobel tests:  $Z_{parents} = 4.964, p < .001; Z_{teachers} = 2.754, p < .01; Z_{peers} = 2.260, p < .05$  ). Similarly, these relationships also partially mediated the association between cyberbullying and poor self-rated health (Sobel tests:  $Z_{parents} = 3.525, p < .001; Z_{teachers} = 2.878, p < .01; Z_{peers} = 2.424, p < .05$  ).

In addition, as shown in Model 2a, both traditional bullying and cyberbullying victims were more likely to report poor self-rated life satisfaction. Model 2b showed that poor relationships with parents, teachers, and peers were positively associated with poor self-rated life satisfaction, respectively; that is, children's and adolescents who reported poor relationships with parents were 1.8 (p < .001) percentage points more likely to report poor self-rated life satisfaction. Likewise, those who reported poor relationships with teachers were 3.1 (p < .001) percentage points more likely to report poor self-rated life satisfaction, and those who reported poor relationships with peers were 1.9 (p < .10) percentage points more likely to report poor self-rated life satisfaction. These relationships partially mediated the association between traditional bullying victimization and poor self-rated life satisfaction (Sobel tests:  $Z_{parents} = 5.012, p < .001; Z_{teachers} = 2.731, p < .01; Z_{peers} = 2.180, p < .05$  ).

Likewise, these relationships also partially mediated the association between cyberbullying and poor self-rated life satisfaction (Sobel tests:  $Z_{parents} = 3.543, p < .001; Z_{teachers} = 2.852, p < .01; Z_{peers} = 2.326, p < .05$  ). Together, our findings supported hypothesis 3.

## 4. Discussion

Using a nationally representative survey of urban areas from China collected in 2016, the present study focuses on two research questions: (1) how is school bullying victimization associated with self-rated health and life satisfaction; and (2) do relationships with parents, teachers, and peers mediate the associations between school bullying victimization and self-rated health and life satisfaction. Our findings add to the existing literature in the following three ways:

First, extensive research has shown that school bullying victimization is detrimental to children's and adolescents' mental health (Zhang et al., 2019) and behavioral consequences (Pengpid & Peltzer, 2019), but other aspects of health and well-being outcomes have been understudied, such as self-rated health and life satisfaction. Although there is some preliminary evidence that school bullying victimization is negatively associated with self-rated health (Zhang et al., 2019) and life satisfaction (Liu et al., 2020), most existing studies have employed homogenous samples of students that limits the generalizability of their findings. Using a more heterogeneous sample from urban areas in

**Table 4**  
Logistic regression models predicting self-rated health and life satisfaction, mediation by relationships with parents, teachers, and peers.

	Poor SR Health				Poor SR Life Satisfaction			
	Model 1a		Model 1b		Model 2a		Model 2b	
	O.R.	AME	O.R.	AME	O.R.	AME	O.R.	AME
Traditional	2.238** (0.574)	0.024	1.933* (0.507)	0.019	1.926* (0.525)	0.019	1.546 (0.432)	0.011
Cyber	2.031** (0.463)	0.021	1.762* (0.414)	0.016	2.820*** (0.669)	0.029	2.368*** (0.584)	0.023
Parents (= 1)			1.371* (0.203)	0.009			2.015*** (0.293)	0.018
Teachers (= 1)			3.325*** (0.963)	0.034			3.230*** (0.948)	0.031
Peers (= 1)			2.336* (0.800)	0.024			2.032* (0.738)	0.019
Intercept	0.012		0.006		0.014		0.003	
PseudoR <sup>2</sup>	0.103		0.144		0.147		0.210	

Note: All models include full control variables.

\*\*\*p < .001; \*\*p < .01; \*p < .05.

China, we found that school bullying victims were more likely to report both poor self-rated health and life satisfaction, regardless of whether victims experienced traditional bullying or cyberbullying. Our findings provided additional empirical evidence on the association between school bullying victimization and overall health and well-being.

Second, given the adverse effect of school bullying on children's and adolescents' health and well-being, scholars have attempted to find solutions to end bullying (Bjereld, Daneback, & Petzold, 2017). Ample work has underscored the importance of preventing bullying perpetration, suggesting that relationships with parents (Cho, Glassner, & Lee, 2019), teachers (Cho & Lee, 2018) and peers (Spriggs et al., 2007) are contributing factors to bullying behavior. Although these studies have provided valuable empirical evidence, surprisingly, little research has documented the relational consequences among children and adolescents who have already been the bullying victims. According to our best knowledge, there is only one recent study that examines the associations between bullying victimization and relationships with parents and teachers. Using data from the 2013/14 Swedish Health Behavior in School-aged Children (HBSC) survey, Bjereld et al. (2017) found that both traditional bullying and cyberbullying victims reported poorer relationships with parents and teachers. We replicated and confirmed the results observed in their study. Moreover, we extended their study by taking into account relationships with peers. We found that both traditional bullying and cyberbullying victims were more likely to report poor relationships with peers compared to their non-victim counterparts. Together, our study is among the very first that provides empirical evidence on the association between bullying victimization and relationships with parents, teachers, and peers simultaneously.

Third and finally, most existing literature has focused on the direct association between bullying victimization and health and well-being among children and adolescents (Liu et al., 2020; Zhang et al., 2019), little is known about what mechanisms or factors might explain those adverse relationships. By relying on the ideas of the stress process model (Pearlin & Bierman, 2013), we proposed that poor relationships with parents, teachers, and peers might be an important mechanism that accounted for the associations between school bullying victimization and poor self-rated health and life satisfaction. Our results supported this claim: we observed that poor relationships with parents, teachers, and peers partially mediated the associations between traditional and cyberbullying victimization and poor self-rated health, respectively. Similar mediating patterns had also been observed for poor self-rated life satisfaction. Overall, our findings provide some preliminary evidence that the relationships between school bullying victimization and poor self-rated health and life satisfaction are partially

attributable to poor relationships with parents, teachers, and peers.

Despite its contributions, our study included limitations. First, the dataset employed in the present study was cross-sectional, which limited potential causality. Second, due to the dataset limitation, we were unable to examine self-rated mental health consequences among school bullying victims. Third, given that the small cell sizes of children and adolescents who reported poor self-rated health and life satisfaction, we were unable to examine how the associations between school bullying victimization and self-rated health and life satisfaction might further differ for boys and girls.

## 5. Conclusions

School bullying continues to be a significant public health concern (Williford & Zinn, 2018). In addition to focusing on the direct association between school bullying victimization and health and well-being, it is crucial to understand what underlying mechanisms might explain that adverse association. Our findings provide the very first evidence that relationships with parents, teachers, and peers partially explain the association between school bullying victimization and poor self-rated health and life satisfaction. Future studies should explore what other potential factors that we can use to describe the remaining health and well-being disparities by school bullying victimization.

## Declaration of Competing Interest

The authors declare no conflicts of interest associated with this manuscript.

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