

# School Bullying Victimization and Emotional Problems in Relation to Sexual Orientation Among High School Students in China: A Cross-Sectional Study

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## Research article

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## Abstract

**Background** School bullying has become a global concern for the public as well as a fierce battlefield for educational psychologists. And sexual minority youth (SMY) may experience minority stress, a chronic form of stress engendered by negative social experiences such as stigmatization, that is known to impact adversely mental health and well-being. Under the specific cultural background of China, few scholars associate sexual orientation with campus bullying, as well as depression and anxiety symptoms. But in fact, China's sexual minority adolescences face no less difficulties than any sexual minority in the world.

**Methods** From April to July 2018, a cross-sectional survey was conducted among senior high school students in Hunan Province, China. A total of 3934 subjects were investigated by multi-stage cluster random sampling. Traditional bullying victimization was surveyed via the suffering subscale of Chinese version of Olweus Bully/Victim Questionnaire (OBVQ). Cyber school bullying was surveyed via a question. The Chinese version of the 9-item Patient Health Questionnaire (PHQ-9) and the Chinese version of the 7-item Generalized Anxiety Disorder Scale (GAD-7) were used to screen depression and anxiety symptoms of participants. Logistic regression model was used to analyze the relationship between sexual orientation and types of bullying victimization, depression and anxiety symptoms.

**Results** Bisexuality accounted for the highest proportion of victims of traditional bullying only and cyber bullying only, at 10.2% and 4.8%, respectively. Homosexuality accounts for the highest proportion of combined bullying, at 18.2%. Homosexuality (OR: 5.833; 95% CI: 3.045 to 11.176), bisexuality (OR: 2.831; 95% CI: 1.354 to 5.923) and uncertainty of sexual orientation (OR: 2.206; 95% CI: 1.435 to 3.392) were significantly associated with combined bullying. The bisexual group has the highest rate of depression (40.1%) and anxiety (38.1%) symptoms. Compared to heterosexual group, bisexual group has the highest risk of depression (OR: 2.349; 95% CI: 1.664 to 3.316) and anxiety (OR: 3.049; 95% CI: 2.150 to 4.324) symptoms.

**Conclusions:** Homosexuals are at the greatest risk of becoming victims of double bullying (traditional bullying and cyberbullying) and bisexuals are at the greatest risk of depression and anxiety symptoms.

## Background

Bullying is characterized as a specific kind of aggressive behavior that is unprovoked and intended to harm or disturb. The behavior occurs repeatedly over time and there is an imbalance of power, with a more powerful person attacking a less powerful one[1]. And bullying that takes place electronically, such as through social media, chatrooms, SMS/text messages, and instant messaging, is commonly known as "cyberbullying"[2]. So bullying is divided into traditional bullying and cyber bullying. School bullying has become a global concern for the public as well as a fierce battlefield for educational psychologists[3]. In fact, School bullying is an oppressive mode of interpersonal conflict that rattles the bodies and beings of young people. While no youth is exempt from being bullied, some populations tend to be more vulnerable and at greater risk than others[2]. For instance, the recent study from America demonstrated that in 2015 a "higher percentage of self-identified gay, lesbian, or bisexual students than of self-identified heterosexual students reported that they had been bullied on school property during the previous 12 months"[4]. And previous studies have shown that sexual-minority youth (SMY), namely lesbian, gay, bisexual and questioning youth, are repeatedly victims of cyberbullying[5]. They are targeted because of a nonconforming sexual orientation to societal traditional expectations over sexuality and gender. Bullying based on sexual-minority status sends the message that non-exclusive heterosexuality is unwelcome and undervalued[6]. In this context, SMY may experience minority stress, a chronic form of stress engendered by negative social experiences such as stigmatization, that is known to impact adversely mental health and well-being[7].

A person's sexual orientation has also been shown to be independently associated with mental health status, suggesting that lesbian, gay, and bisexual people may face unique factors associated with being members of a sexual minority[8]. For example, in one community-based study of adult lesbians and heterosexual women, non-heterosexual orientation was an independent predictor of depressive stress (a composite measure of depression indicators)[9]. SMY are particularly vulnerable to adverse health outcomes in a variety of physical and mental health domains[10-15]. For example, sexual minority youth are more likely than their heterosexual peers to experience suicidal thinking or attempt suicide[14]. They are more likely than their heterosexual peers to be threatened or injured at school[10,11,15], skip school because of feeling unsafe[15], be violently attacked requiring medical treatment and witness violence[16], and experience sexual and physical abuse[17-18].

Although more and more people realize that bullying is a public health problem, and studies related to sexual orientation and violence are accumulating, there are few studies on the relationship between sexual orientation and the types of bullying victimization, depression, anxiety symptoms among high school students in China. Due to the lack of correct sex education and the bondage of Chinese traditional educational concepts, many sexual minority youth groups are under great psychological pressure in school. And there is a lack of East Asian samples in the relevant papers on this subject[6-9], so this study aims to explore whether China's sexual minority adolescents are different from the conclusions drawn by western countries on bullying and emotional issues, so as to provide some help for pediatric psychologists and school bullying protection laws and regulations in China.

## Methods

### Research design and sample

This study was a cross-sectional survey, conducted from April to July, 2018. The participants were recruited from Hunan Province, China by a multi-stage cluster sampling. First, the prefecture-level cities in Hunan Province are stratified according to their geographical location (eastern Hunan, southern Hunan, western Hunan and northern Hunan), and one prefecture-level city (Zhuzhou City, Yongzhou City, Shaoyang City and Changsha City) is randomly selected in each area. Then 4 senior high schools (2 in urban areas and 2 in rural areas) are randomly selected in each prefecture-level city as sample schools, and a total of 16 high schools are selected for investigation. Finally, according to the proportion of students in the school, five classes were randomly selected from the

selected schools, and all the students in the selected classes were selected as the subjects of the survey. Due to the heavy academic tasks of the students in the third grade of senior high school, the acceptance of this survey is low, so only the students in the first and second grades of senior high school are selected as the objects of this study. Before the field investigation, we requested permissions from the principals of each school. Once the permissions were granted, investigators conducted the research in each class with the help of the headteachers. A total of 4050 questionnaires were distributed and 3934 valid questionnaires were collected, with an effective response rate of 97.1%.

All participants signed informed consent forms, and the purpose of the study as well as the questionnaire sections were explained to them by investigators. The students were assured of the anonymity and confidentiality of the information provided in the self-reported questionnaires, and the respondents were free to discontinue their participation at any time of the study. The study received the approval from the ethical committee of Xiangya School of Public Health, Central South University. (XYGW-2017-056).

## **Data collection and measurements**

### **General characteristic**

Potential confounding factors were selected based on the literature with regard to the association between bullying victimization, emotional problems and sexual orientation[19-20], which included gender, grade, the type of school (public high schools, or private high schools), school location(rural or urban), family type (single-parent family, Remarriage / foster family, or Complete family), parental education (lower than a bachelor's degree ,or a bachelor's degree and above) and whether the respondent comes from one-child family (yes or no). Besides, parental abuse were considered as confounding variables in this study according to prior work [21]. Parental abuse were measured by asking participants "how often your parents hit or abused you". The frequency coded on a 5-point scale in the last half year, ranging from 1 to 5 (1= never happened, 2 = only once or twice, 3 = two or three times a month, 4 = about once a week, 5 = several times a week). Those who chose options 2, 3, 4 and 5 were defined as being abused by their parents, and those who chose option 1 were defined as not abused by their parents.

### **Bullying victimization**

Traditional bullying victimization was surveyed via the suffering subscale of Chinese version of Olweus Bully/Victim Questionnaire (OBVQ). The reliability of the subscale is good, and the Cronbach's  $\alpha$  coefficient is 0.80[22]. Second, bullying victimization was assessed by asking that have you ever been bullied by peers in the last 6 months using the following 6 items: (1) Having been hit, kicked, pushed or shoved; (2) Having belongings been taken or damaged; (3) Having been called nasty name; (4) Having been made fun of; (5) Having been kept out of things on purpose, excluded from the group or completely ignored; (6) They told lies or spread rumors about you and/or tried to make others dislike you. The frequency was coded on a 5-point scale ranging from 1 to 5 (1= never happened, 2 = only once or twice, 3 = two or three times a month, 4 = about once a week, 5 = several times a week). Students were considered to be involved in traditionally bullying victimization if the frequency of bullying behavior mentioned above happened more than two or three times a month [23].

Cyber school bullying was surveyed via the question, "In the past six months, have any students ridiculed, abused, threatened you or maliciously spread your privacy on the Internet through electronic products such as text messages, e-mails and chat platforms?". " Students who answered " yes " were classified as victims of cyber bullying.

For the analysis, the participants were placed into categories based on their responses to traditional and cyber bullying victimization: 1) no form of bullying, 2) traditional bullying only, 3) cyber bullying only 4) a combination of traditional and cyber bullying.

### **Depression symptoms**

The Chinese version of the 9-item Patient Health Questionnaire (PHQ-9) was used to screen depression of participants [24]. The PHQ-9 has 9 questions with a score ranging from 0 to 3 for each item, and total score ranging from 0 to 27. A higher score indicates that the participant has more depressive symptoms. A total score of 10 or more is considered to meet the criterion of screening for depressive symptoms (1 = Yes, 0 = No)[25, 26]. The prior study showed good reliability of the Chinese version of PHQ-9 in children and adolescents population[27]. In the present study, the Cronbach's  $\alpha$  of PHQ-9 was 0.88.

### **Anxiety symptoms**

The Chinese version of the 7-item Generalized Anxiety Disorder Scale (GAD-7) was used to assess anxiety disorders of children[28]. The GAD-7 has 7 questions with a score ranging from 0 to 3 for each item. Therefore, total score of GAD-7 ranges from 0 to 21[29]. A total score  $\geq 10$  of the GAD-7 is considered to meet the criterion of screening for anxiety disorder (1 = Yes, 0 = No)[29, 30]. The Chinese version of GAD-7 had good reliability among Chinese population according to early findings[31]. In this study, the alpha Cronbach for GAD-7 was 0.93.

### **Sexual orientation**

First, participants were provided with a definition of sexual orientation[32]. Then, sexual orientation was measured using a single item on a 4-point scale. Participants were asked to circle a number which best describes their sexual orientation, the responses included: 0 = Heterosexual, 1 = Lesbian/gay, 2 = Bisexual, and 3 =Questioning[33]. Sexual minority included adolescents who self-identified as lesbian/gay, bisexual, or questioning about their sexual orientation (LGBQ).

### **Statistical analysis**

EpiData 3.1 and SPSS 19.0 software were used for data entry and statistical analysis. Prevalence of participants involved in different types of bullying victimization, depression and anxiety symptoms were summarized by descriptive statistics [n (%)]. The  $\chi^2$  test and multinomial logistic regressions were conducted to examine the associations between sexual orientation and traditional, cyber and combined bullying. The  $\chi^2$  test and multivariate binary logistic regression were conducted to examine the associations between sexual orientation and depression and anxiety symptoms. The crude odds ratio (COR), adjusted odds ratio (AOR) and 95% confidence intervals (95% CI) were estimated. The gender and grade of the respondent, the type of school, whether the school was rural or urban, parental education, whether the respondent comes from one-child family, whether the respondent was beaten by a parent or guardian were included as covariates in the logistic regression. P values of less than 0.05 were considered statistically significant.

## Results

Of the 3934 adolescents, 492 (12.5%) students reported being victimized by traditional bullying and 272 (6.9%) students were victims of cyber bullying. Of those, 349 (8.9%) students were victims of traditional bullying only, 129 (3.3%) students were victims of cyber bullying only and 143 (3.6%) students were victims of combined bullying (Table 1). Moreover, 992 (25.2%) and 747 (19.0%) children met a threshold score of screening for depression and anxiety symptoms respectively (Table 1).

Chi-square analysis shows that there were statistically significant differences between sexual orientation, gender, education level of parents, whether they were beaten by parents or guardians and bullying victimization ( $P < 0.05$ ) (Table 2). And according to Table 3, there were statistically significant differences between sexual orientation, family type, education level of parents, whether they were beaten by parents or guardians and bullying victimization ( $P < 0.05$ ).

### The associations between sexual orientation and types of bullying victimization.

Bisexuality accounted for the highest proportion of victims of traditional bullying only and cyber bullying only, at 10.2% and 4.8%, respectively. Homosexuality accounts for the highest proportion of combined bullying, at 18.2% (Table 2).

These six variables were adjusted as confounding variables (Gender, Grade, the type of school, whether the school was rural or urban, parental education, whether the respondent comes from one-child family, whether the respondent was beaten by a parent or guardian). After adjustment, results of logistic regression analyses indicated that homosexuality (OR: 5.833; 95% CI: 3.045 to 11.176), bisexuality (OR: 2.831; 95% CI: 1.354 to 5.923) and uncertainty of sexual orientation (OR: 2.206; 95% CI: 1.435 to 3.392) were significantly associated with combined bullying (Table 4).

### The associations between sexual orientation and depression and anxiety symptoms.

The bisexual group has the highest rate of depression symptoms (40.1%), followed by the uncertain sexual orientation group (38.2%), the homosexual group (36.4%) and the heterosexual group (21.7%). And the bisexual group also has the highest rate of anxiety symptoms (38.1%), followed by the homosexual group (32.5%), the uncertain sexual orientation group (28.3%), and the heterosexual group (15.9%) (Table 3).

The logistic binary regression analyses indicated that the homosexual group, the bisexual group and the uncertain sexual orientation group have a higher risk of depression and anxiety symptoms than the heterosexual group. Compared to the heterosexual group, the bisexual group has the highest risk of depression symptoms (OR: 2.349; 95% CI: 1.664 to 3.316), followed by the uncertain sexual orientation group (OR: 2.177; 95% CI: 1.805 to 2.625) and the homosexual group (OR: 1.906; 95% CI: 1.183 to 3.071); at the same time, the bisexual group has the highest risk of anxiety symptoms (OR: 3.049; 95% CI: 2.150 to 4.324), followed by the homosexual group (OR: 2.344; 95% CI: 1.435 to 3.829) and the uncertain sexual orientation group (OR: 1.991; 95% CI: 1.625 to 2.438) (Table 5).

## Discussion

This is the first time controlled the relevant factors of individual, school and family, and tentatively analyze which kind of sexual orientation of Chinese young children is the most serious when they are bullied by only one kind of bullying (traditional bullying or cyber bullying) or combined bullying. And this study also explores the differences between Chinese sexual minority adolescents and heterosexual adolescents who more likely to have depression and anxiety symptoms. Two key findings emerge from this study regarding the association between sexual orientation and school bullying victimization, emotional problems via a large and random sample in a non-western country. Firstly, being a victim of both traditional and cyber bullying had the strongest association with sexual orientation, even after controlling potential confounding variables including individual characteristics, family characteristics, and school characteristics. Homosexual, bisexual and uncertain sexual orientation adolescents had a higher risk of combined bullying than heterosexual adolescents. Among them, homosexual adolescents are likely to have the highest risk of becoming victims of combined bullying. Secondly, compared with heterosexual adolescents, bisexual adolescents have the highest risk of depression and anxiety among non-heterosexual adolescents.

Confirmed our hypothesis, the results point in the same direction as other studies that have shown that the LGBT collective is more vulnerable to bullying and cyberbullying [34-41]. In traditional bullying, some research has revealed data ranging from 51% to 58% of victimization in people with non-normative sexual orientation/identity [42]. In cyberbullying, cybervictimization rates between 10% and 71% have been reported in LGBTs [34, 43]. The discrepancies between studies are due to the different ages of the samples and the different behaviors measured. We found that 3.3% of the students in the current sample were victims of cyber bullying only. The finding was lower than a study in Shantou, China [44], where 5.5% of the research object were victims of cyber bullying only. This may be because middle schools in eastern and central China have different regulations for students to bring mobile phones to school. Besides, our study results indicate that there is no statistical difference between the situation of sexual minority adolescents who suffer only one kind of bullying (traditional bullying or cyber bullying) and heterosexual adolescents.

At the same time, our study results indicate that the second highest risk group of depression and anxiety symptoms, after bisexual adolescents, were homosexual adolescents, followed by uncertain sexual orientation adolescents. The findings are consistent with international studies reporting poorer mental

health outcomes such as depression, anxiety disorders, and suicide, among lesbian, gay, and bisexual people [45-51]. One of the first mental health community surveys analyzing bisexuals as a group separate from gays/lesbians and heterosexuals was published in 2002 [52]. The results of this research, which was conducted in Australia, demonstrated that the bisexual group scored the highest on measures of anxiety, depression, and negative affect. The reasons for higher risks of mental health disorders among GLB people are multifactorial and include health disparities linked to prejudice, discrimination and social stigma as chronic stressors [53-55]. Meyer's minority stress model suggests that members of a minority group, such as a sexual minority, are at higher risk of mental illness because of the unique chronic stressors they encounter as a result of their disadvantaged position in society [54]. The mental health of sexual minority adolescents in China has not been the subject of much study. Since depression and anxiety are such potentially disabling chronic diseases, it is important to identify groups at greatest risk and particular risk factors [56].

The study provides data on the prevalence of being bullied traditionally/cyberbullied and also analyzes the emotional problems among sexual minority adolescents in central China. Both aggressive behavior towards sexual diversity and the internalized discrimination that characterizes LGBTs can be considered as the result of a society that is educated by a hetero-normative system. Despite the potential contribution to the literature of sexual minority adolescents, there are several limitations of this study. This is a cross-sectional study, and it is impossible to infer the causal relationship between sexual orientation and campus bullying and depression and anxiety. In addition, although the study was enhanced by the use of a large number of population-based survey samples, the sample size of LGB respondents undermined our ability to conduct additional stratified analysis (for example, separate effects on gay, lesbian and bisexual puberty).

Finally, we hope to provide some suggestions to school psychologists or parents on intervention measures that can effectively reduce school bullying and better promote children's health, that is, we should focus on vulnerable groups and reduce the stigmatization of sexual minority adolescents, although this is not easy for China, which is deeply influenced by traditional culture.

## Conclusions

This study reported that the positive rate of high school students suffering from campus bullying in Hunan Province was 12.2%, the positive rate of depressive symptoms was 25.2%, and the positive rate of anxiety symptoms was 19.0%. Among senior high school students, sexual orientation is strongly related to the types of bullying victimization and emotional problems. These findings indicate that homosexuals are at the greatest risk of becoming victims of double bullying (traditional bullying and cyberbullying) and bisexuals are at the greatest risk of depression and anxiety symptoms. The two types of teenagers face more pressure than heterosexual teenagers. Although anti-bullying activities are being carried out in developed areas of eastern China, few projects contain specific strategies to reduce stereotypes and prejudices, which are necessary to address stigma-based bullying. Future intervention recommendations should include such strategies to address the problem of bullying stigmatized groups. Finally, we emphasize that reducing LGBT stigmatization and bullying/cyberbullying interventions should be multidirectional. Family education plays a key role in embracing diversity. Schools are the context for anti-bullying activities that focus on vulnerable groups and promote tolerance for diversity.

## Declarations

### Ethics approval and consent to participate

The study has been approved by the Ethics Committee of Xiangya School of Public Health, Central South University (XYGW-2017-056). Written informed consent was obtained from all participants before administering any study procedures.

### Consent for publication

Not applicable.

### Availability of data and material

Data is currently not available online. But can be made available to any interested person(s) contacting the corresponding author via email.

### Competing interests

The authors declare that they have no competing interests.

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### Authors' contributions

Conceptualization, MY; Methodology, MY; Investigation, MY, FW, QL, ZY and XL; Resources, XL; Data Curation, MY and FW; Writing – Original Draft Preparation, MY; Writing – Review & Editing, XL. All authors have read and approved the final manuscript.

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## Tables

**Table 1**

The prevalence of bullying victimization, depression and anxiety symptoms. (N = 3934).

	n (%)
Bullying victimization	
Traditional bullying only	349 (8.9)
Cyber bullying only	129 (3.3)
Combined bullying	143 (3.6)
Neither	3313 (84.2)
Depression symptoms	
Yes	992(25.2)
No	2942(74.8)
Anxiety symptoms	
Yes	747(19.0)
No	3187(81.0)

**Table 2**

Distribution of three types of bullying victimization with different demographic characteristics.

Variables	Total(n=3934)		Bullying victimization		χ <sup>2</sup> value		p value	
	Traditional bullying only	Cyber bullying only	Combined bullying	Neither				
Sexual orientation							<b>66.822</b>	<b>0.000</b>
Homosexual	77 (2.0)		5(6.5)	1(1.3)	14(18.2)	57(74.0)		
Bisexual	147 (3.7)		15(10.2)	7(4.8)	9(6.1)	116(78.9)		
Uncertain	607 (15.4)		56(9.2)	28(4.6)	32(5.3)	491(80.9)		
Heterosexual	3103 (78.9)		273(8.8)	93(3.0)	88(2.8)	2649(85.4)		
Gender							<b>105.854</b>	<b>0.000</b>
Boys	1725(43.8)		222(12.9)	53(3.1)	99(5.7)	1351(78.3)		
Girls	2209(56.2)		127(5.7)	76(3.4)	44(2.0)	1962(88.8)		
Grade							1.645	0.649
Grade ten	2593(65.9)		240(9.3)	82(3.2)	94(3.6)	2177(84.0)		
Grade eleven	1341(34.1)		109(8.1)	47(3.5)	49(3.7)	1136(84.7)		
School type							1.573	0.666
Public high schools	3332(84.7)		291(8.7)	109(3.3)	117(3.5)	2815(84.5)		
Private high schools	602(15.3)		58(9.6)	20(3.3)	26(4.3)	498(82.7)		
School location							4.988	0.173
Rural area	1419(36.1)		139(9.8)	39(2.7)	46(3.2)	1195(84.2)		
Urban area	2515(63.9)		210(8.3)	90(3.6)	97(3.9)	2118(84.2)		
Family type							12.209	0.057
Single-parent family	220(5.6)		25(11.4)	8(3.6)	7(3.2)	180(81.8)		
Remarriage / foster family	203(5.2)		24(11.8)	12(5.9)	11(5.4)	156(76.8)		
Complete family	3511(89.2)		300(8.5)	109(3.1)	123(3.6)	2977(84.8)		
Parental education							<b>8.198</b>	<b>0.042</b>
< Bachelor's degree	3429(87.2)		295(8.6)	107(3.1)	118(3.4)	2909(84.8)		
≥ Bachelor's degree	505(12.8)		54(10.7)	22(4.4)	25(5.0)	404(80.0)		
One-child family							1.163	0.762
Yes	1177(29.5)		107(9.1)	34(2.9)	40(3.4)	996(84.6)		
No	2757(70.5)		242(8.8)	95(3.4)	103(3.7)	2317(84.0)		
Parental abuse							<b>74.181</b>	<b>0.000</b>
Yes	541(13.8)		64(11.8)	39(7.2)	42(7.8)	396(73.2)		
No	3393(86.2)		285(8.4)	90(2.7)	101(3.0)	2917(86.0)		

Data are presented as n (%).

Characters in bold means statistical significance p<0.05.

**Table 3**

Distribution of depression and anxiety symptoms with different demographic characteristics.

Variables	Total(n=3934)	Depression symptoms	$\chi^2$ value	p value	Anxiety symptoms	$\chi^2$ value	p value
	no	yes	no				
Sexual orientation				<b>97.339</b>	<b>0.000</b>		<b>97.452</b> <b>0.000</b>
Homosexual	77 (2.0)	28(36.4)	49(63.6)			25(32.5)	52(67.5)
Bisexual	147 (3.7)	59(40.1)	88(59.9)			56(38.1)	91(61.9)
Uncertain	607 (15.4)	232(38.2)	375(61.8)			172(28.3)	435(71.7)
Heterosexual	3103 (78.9)	673(21.7)	2430(78.3)			494(15.9)	2609(84.1)
Gender				2.89	0.089		1.057 0.304
Boys	1725(43.8)	412(23.9)	1313(76.1)			315(18.3)	1410(81.7)
Girls	2209(56.2)	580(26.3)	1629(73.7)			432(19.6)	1777(80.4)
Grade				1.912	0.167		0.014 0.907
Grade ten	2593(65.9)	636(24.5)	1957(75.5)			491(18.9)	2102(81.1)
Grade eleven	1341(34.1)	356(26.5)	985(73.5)			256(19.1)	1085(80.9)
School type				0.539	0.463		1.197 0.274
Public high schools	3332(84.7)	833(25.0)	2499(75.0)			623(18.7)	2709(81.3)
Private high schools	602(15.3)	159(26.4)	443(73.6)			124(20.6)	478(79.4)
School location				0.028	0.867		0.149 0.7
Rural area	1419(36.1)	360(25.4)	1059(74.6)			274(19.3)	1145(80.7)
Urban area	2515(63.9)	632(25.1)	1883(74.9)			473(18.8)	2042(81.2)
Family type				<b>20.066</b>	<b>0.000</b>		<b>8.093</b> <b>0.017</b>
Single-parent family	220(5.6)	78(35.5)	142(64.5)			53(24.1)	167(75.9)
Remarriage / foster family	203(5.2)	66(32.5)	137(67.5)			49(24.1)	154(75.9)
Complete family	3511(89.2)	848(24.2)	2663(75.8)			645(18.4)	2866(81.6)
Parental education				<b>6.743</b>	<b>0.009</b>		<b>9.311</b> <b>0.002</b>
< Bachelor's degree	3429(87.2)	841(24.5)	2588(75.5)			626(18.3)	2803(81.7)
≥ Bachelor's degree	505(12.8)	151(29.9)	354(70.1)			121(24.0)	384(76.0)
One-child family				2.891	0.089		2.416 0.12
Yes	1177(29.5)	318(27.0)	859(73.0)			241(20.5)	936(79.5)
No	2757(70.5)	674(24.4)	2083(75.6)			506(18.4)	2251(81.6)
Parental abuse				<b>17.805</b>	<b>0.000</b>		<b>21.489</b> <b>0.000</b>
Yes	541(13.8)	176(32.5)	365(67.5)			142(26.2)	399(73.8)
No	3393(86.2)	816(24.0)	2577(76.0)			605(17.8)	2788(82.2)

Data are presented as n (%).

Characters in bold means statistical significance  $p \leq 0.05$ .

**Table 4**

The associations between sexual orientation and types of bullying victimization.

Variables	Bullying victimization					
	Traditional bullying only	Cyber bullying only	Combined bullying			
COR*(95% CI)	AOR** (95% CI)	COR* (95% CI)	AOR** (95% CI)	COR*(95% CI)	AOR** (95% CI)	
Sexual orientation						
Homosexual	0.851(0.338~2.141)	0.736(0.290~1.866)	0.500(0.068~3.648)	0.395(0.054~2.900)	<b>7.394(3.969~13.772)</b>	<b>5.833(3.045~11.176)</b>
Bisexual	1.255(0.722~2.179)	1.535(0.872~2.703)	1.719(0.780~3.789)	1.426(0.634~3.204)	<b>2.336(1.147~4.754)</b>	<b>2.831(1.354~5.923)</b>
Uncertain	1.107(0.817~1.499)	1.254(0.918~1.713)	<b>1.624(1.053~2.505)</b>	1.459(0.935~2.277)	<b>1.962(1.294~2.974)</b>	<b>2.206(1.435~3.392)</b>
Heterosexual	1.00		1.00		1.00	

Abbreviations: COR, crude odds ratio; AOR, adjusted odds ratio.

\* Multivariate logistic regression model.

\*\*Some characteristics were adjusted (gender, grade, the type of school, school location, Family type, parental education, whether the respondent comes from one-child family, parental abuse)

Characters in bold indicate statistical significance,  $p \leq 0.05$ .

**Table 5**

The associations between sexual orientation and depression and anxiety symptoms.

Variables	Depression symptoms		Anxiety symptoms	
	COR** (95% CI)	AOR** (95% CI)	COR** (95% CI)	AOR** (95% CI)
Sexual orientation				
Homosexual	<b>2.063(1.287~3.308)</b>	<b>1.906(1.183~3.071)</b>	<b>2.599(1.561~4.131)</b>	<b>2.344(1.435~3.829)</b>
Bisexual	<b>2.421(1.722~3.403)</b>	<b>2.349(1.664~3.316)</b>	<b>3.250(2.298~4.596)</b>	<b>3.049(2.150~4.324)</b>
Uncertain	<b>2.234(1.857~2.687)</b>	<b>2.177(1.805~2.625)</b>	<b>2.088(1.708~2.553)</b>	<b>1.991(1.625~2.438)</b>
Heterosexual	1.00		1.00	

Abbreviations: COR, crude odds ratio; AOR, adjusted odds ratio.

\* Multivariate binary logistic regression model.

\*\*Some characteristics were adjusted (gender, grade, the type of school, school location, Family type, parental education, whether the respondent comes from one-child family, parental abuse)

Characters in bold indicate statistical significance,  $p \leq 0.05$ .