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ORIGINAL ARTICLE

Longitudinal associations between bullying and mental health among adolescents in Vietnam

Ha Thi Hai Le · Huong Thanh Nguyen · Marilyn A. Campbell · Michelle L. Gatton · Nam T. Tran · Michael P. Dunne

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Abstract
Objectives This study measured bullying roles across an academic year and examined how change in bullying experiences is associated with symptoms of depression, psychological distress, and suicidal ideation among adolescents in Vietnam.
Methods 1424 students in middle and high schools completed two self-administered questionnaires, six months apart in 2014–2015.
Results Students who were victimised often and those who were classified as highly involved as both victims and bullies at one or both survey times showed significantly higher levels of depression, psychological distress, and suicidal ideation than other students. The mental health of adolescents who were involved in bullying as a victim or bully remained at low levels was generally similar to those not involved in any bullying. However, females who had stable but low level in victimisation or bully–victim status had worse mental health than males with stable-low-level exposure.
Conclusion This is the first longitudinal analysis of bullying among adolescents in Vietnam. Persistent and frequent bullying was strongly linked with poor mental health for males and females. A new observation is that Vietnamese girls appear to be more sensitive to low level but long-term bullying involvement than were boys.

Keywords Bullying · Cyberbullying · Adolescents · Longitudinal study · Mental health · Vietnam

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H. T. H. Le (✉) · H. T. Nguyen
Faculty of Social Sciences and Health Education, Hanoi University of Public Health, Hanoi, Vietnam
e-mail: lhh@huph.edu.vn

H. T. H. Le · M. L. Gatton · M. P. Dunne
Faculty of Health, Queensland University of Technology, Brisbane, Australia

M. A. Campbell
Faculty of Education, Queensland University of Technology, Brisbane, Australia

N. T. Tran
Faculty of Sociology, Academy of Journalism and Communication, Hanoi, Vietnam

N. T. Tran
Institute for Social Science Research, The University of Queensland, Brisbane, Australia

M. P. Dunne
Institute for Community Health Research, Hue University of Medicine and Pharmacy, Hue, Vietnam

Introduction

Bullying is intentional and repeated aggression in which the targets cannot defend themselves (Olweus 2013; Ybarra et al. 2012). Bullying is usually separated into physical, verbal, and social forms, collectively referred to as traditional bullying (Smith et al. 2008). With the emergence of cyberbullying in this century, there has been vigorous debate whether bullying through technology is a separate phenomenon or not. (Dooley et al. 2009). Recently, there seems to be agreement that cyberbullying has all the characteristics of other forms of bullying with intention to hurt, an imbalance of power, and it is usually repetitive (Gladden et al. 2014; Hemphill et al. 2014)

Globally, all forms of bullying are associated with impaired mental health among adolescents (Arseneault

et al. 2010; Campbell et al. 2012). In South-East Asian (SEA) countries, scholars have mainly focused on identifying the prevalence and predictors of bullying among adolescents (Sittichai and Smith 2015). Previous cross-sectional studies show that bullying victimisation is associated with suicidal ideation among Vietnamese school students (Tran et al. 2013), and hopelessness, loneliness, insomnia, and suicidal ideation among Philippine youth (Fleming and Jacobsen 2009). Both traditional and cyber-bullying victimisation are also correlated with suicidal ideation among Singaporean youth (Holt et al. 2013), and bullying perpetration is linked with depression symptoms among Malaysian teenagers (Uba et al. 2010). Little is known, however, about the prospective relationships between bullying involvement and adverse mental health among adolescents in SEA countries (Sittichai and Smith 2015).

Although popular perception suggests that children tend to be either a "bully" or a "victim" and the behaviours are stable over time, research shows a more complex picture. Infrequent involvement in victimisation and/or perpetration tends to be quite stable over time, but frequent, severe bullying tends not to be stable. By following 1180 students from 5th to 9th grades across three time points to examine how students change their bullying involvement, Ryoo et al. (2015) classified four subgroups of children: (1) frequent traditional victim (11.2%); (2) occasional traditional victim (28.9%); (3) occasional cyber and traditional victim (10.3%); and (4) infrequent victim (49.6%). They also found three subgroups of stability in perpetration: (1) frequent perpetrator (5.1%); (2) occasional verbal/relational perpetrator (26.0%); and (3) infrequent perpetrator (68.8%). For many young people, involvement in bullying is fluid. Only a minority of youth report persistent victimisation or bully–victim experiences over time compared to those with unstable involvement (35.2% for unstable pure victim versus 12.6% for stable pure victim; 19.4% for unstable bully–victim versus 2.6% for stable bully–victim) (Lereya et al. 2015). Many young people describe transient experiences of becoming, or ceasing to be victims, perpetrators or bully–victims.

Research in Western societies that has examined bullying involvement over time in relation to mental health has shown that youth who experience any type of victimisation generally have poorer mental health than those who are not victimised. Specifically, adolescents who have experienced sustained victimisation or are both victims and perpetrators tend to report higher levels of suicidal ideation and suicide attempt (Geoffroy et al. 2016) as well as more psychotic experiences and anxiety than those not involved (Lereya et al. 2015). In contrast, those students who perpetrate bullying might not increase their risk of adverse mental health outcomes (Lereya et al. 2015).

Previous studies have shown that more males than females are involved in bullying as both victims and perpetrators (Fleming and Jacobsen 2009; Uba et al. 2010). Females who are bullied may experience more sadness and hopelessness than male victims (Fleming and Jacobsen 2009), while females who experience cyber victimisation appear more likely to have suicidal ideation (Bauman et al. 2013) and depression (Turner et al. 2013) than their male peers. However, there has been little research into gender and the effects of changes in bullying involvement over time.

It is possible that bullying experience and its association with mental health might differ between Western to Asian countries (including South-East Asian) because of cultural differences (Smith 2016). At present, however, there are limited data on which to examine such cultural variation. Few studies with standardised measurement of bullying have been conducted in South-East Asia (Sittichai and Smith 2015), and to date, none in the region have taken a longitudinal perspective. The current study aimed to address this gap by providing evidence of bullying experiences at two points over an academic year, and assess correlations with mental health problems of adolescents in Vietnam. This study is novel, as it is the first in the SEA region to apply a short-term longitudinal design to explore prospective associations between stability or change in bullying involvement and mental health in young people.

Although previous studies have shown relationships between victimisation and perpetration and adverse mental health outcomes regardless of the temporal stability of bullying involvement (Lereya et al. 2015), we examine whether the extent of this association varies with temporal patterns in the intensity of bullying involvement. It was expected that students who experience bullying at low or declining levels will have better mental health than those for whom bullying involvement increases or remains at high levels over time. Therefore, we extend previous research by examining the short-term longitudinal associations between different levels of bullying involvement and mental health problems among Vietnamese students.

Methods

The study was implemented at two public middle schools (grades 6–8) and two public high schools (grades 10–11) in two urban areas of the Red River Delta in the academic year 2014–2015. We employed an identity number-matching technique used in research in Malaysia (Choo et al. 2011) that enables anonymous matching of individuals across surveys. We conducted a baseline survey (Time 1) with 1539 students recruited from 29 classes; 1460 students were followed up six months later (Time 2). The

surveys were conducted during non-teaching sessions, using self-administered questionnaires which took respondents approximately 45 min to complete. About 115 students lost to follow-up at Time 2 were absent due to sickness or change in school (69%), or because we could not match ID numbers between the two surveys (31%).

Data analyses were based on 1424 completed questionnaires (54.9% were females), accounting for 92.5% of the initial sample. The mean age were 14.7 years (SD = 1.9), and females were older (0.5 months) than males ($p < 0.001$). Females reported higher levels of depressive symptoms and psychological distress, and reported more suicidal ideation than males, although the difference was significant only for CES-D depression scores.

The study was approved by the Human Research Ethics Committees of the Queensland University of Technology (Australia) and the Hanoi School of Public Health (Vietnam), and the principals of the four participating schools. Informed consent was obtained from all individual participants included in the study.

Measures

Bullying measures

Traditional and cyber victimisation and perpetration were measured in relation to six behaviours: hitting, robbing, threatening, teasing, excluding, and spreading rumours from the revised Olweus Bully/Victim Questionnaire (Olweus 1996). The scale has been validated among Vietnamese students (Le et al. 2016). A definition adapted from Ybarra et al. (2012) and Langos (2012) was given to students prior to the survey. The definition of bullying is presented as follows. "We consider that a young person is bullied when someone repeatedly and intentionally says or does mean or nasty things to them. The behavioUr happens more than once and occurs between people of different powers or strengths—the bully might be physically stronger, socially more popular, have much more friends or some other type of strength, which makes someone unable to defend him or herself. These things can happen in-person (at school, on the way to, or from school), though technological devices in a direct/private way to only you (as through text message, instant message, phone call, email, etc), or in an indirect/public way that everyone can see or hear (as through website, Facebook, or Youtube)".

For the victimisation scale, students were prompted with the question "How often have you been bullied in any way during the last six months?" then six items were presented. The bullying perpetration measurement was similar with different prompts to ask the students how often they bullied others. We distinguished traditional bullying from cyberbullying via different modes of communication (in-person or cyber) by which students experienced bullying behaviours. Specifically, the first two items (i.e., hitting and robbing) were only used to measure traditional bullying victimisation and traditional bullying perpetration; whilst the four remaining items were used to assess the traditional form, the direct cyber form, and the indirect cyber form. A five-point Likert scale, ranging from 0 = "never", 1 = "a few times during the last six months", 2 = "once or twice a month"; 3 = "once or twice a week", to 4 = "almost every day", was used to measure frequency of behaviour via each mode of communication. The bullying victimisation scale comprises 14 items ($\alpha = 0.86$). The bullying perpetration scale comprised 14 items ($\alpha = 0.84$). Consistent with the definition of bullying, the cut-off point to identify bullying or victimisation behaviours was from "1 = a few times" to more often. The scores ranged from 0 to 56 for both scales of victimisation and perpetration with the higher score indicating a higher level of involvement.

We categorised bullying roles over time by: (1) not involved (include students who were not involved in any form of bullying at both times; these students always have zero scores at both times); (2) victims only (are those who were victimised only at Time 1 or Time 2 or at both times); (3) bullies only (include students only bullied others at Time 1 or Time 2 or both); and (4) bully–victims (consist of those who were bully–victims at Time 1 or Time 2 or both, or changed their roles as victims or perpetrators over time). Subsequently, we measured levels of stability or change in bullying roles by following Turner et al. (2015) classification which compares the mean score of bullying involvement at Time 1 and Time 2. In each group of bullying roles, students were categorised into four levels of bullying involvement: "stable-low"—scores under the mean at Time 1 and Time 2; "declining"—scores above the mean at Time 1 and under at Time 2; "increasing"—scores below the mean at Time 1 and above at Time 2; and "stable-high"—scores above the mean at Time 1 and Time 2 (see Table 1). The not-involved group was treated as reference category for statistical analysis.

Mental health measures

Depressive symptoms were measured by the Centre for Epidemiological Studies-Depression Scale (CES-D) (Radloff 1977). The scale has been validated among school students in Vietnam (Nguyen et al. 2007). It comprises 20 items (e.g., "I felt lonely") using a four-point Likert scale ranging from 0 = 'less than 1 day' to 3 = '5–7 days'. Alpha coefficients for the scale were 0.86 for Time 1 and 0.87 for Time 2.

Psychological distress was assessed by the Kessler Psychological Distress Scale (K-10) (Kessler and Mroczek

Table 1 Descriptive statistics by gender among school adolescents in Vietnam, 2014–2015

Variables[a]	Full sample ($N = 1424$)				Male ($N = 642$)		Female ($N = 782$)		p value[b]
	Mean	SD	Range	Cronbach's alpha	Mean	SD	Mean	SD	
Age	14.7	1.9	12–17	N/A	14.4	1.9	14.9	1.9	<0.001
Depression T1	14.7	9.0	0–54	0.86	14.1	8.8	15.2	9.1	<0.05
Depression T2	15.1	9.6	0–56	0.87	15.3	10.1	14.9	9.2	>0.05
Psychological distress T1	19.4	7.4	10–50	0.87	19.0	7.7	19.7	7.2	>0.05
Psychological distress T2	19.3	8.1	10–50	0.92	19.1	8.5	19.4	7.8	>0.05
Score of bullying involvement at Time 1[c]									
Victims ($n = 324$)	3.5	6.6	0–56	N/A	4.6	8.5	2.5	4.0	<0.01
Bullies ($n = 99$)	1.8	2.0	0–9	N/A	1.8	2.2	1.7	1.9	>0.05
Bully–victims ($n = 313$)	8.5	11.0	0–108	N/A	9.0	11.4	7.9	10.6	>0.05
Score of bullying involvement at Time 2[c]									
Victims (n = 251)	2.1	4.0	0–28	N/A	2.2	3.9	2.1	4.1	>0.05
Bullies ($n = 67$)	0.9	1.6	0–9	N/A	1.2	2.1	0.7	1.2	>0.05
Bully–victims ($n = 221$)	7.9	14.9	0–112	N/A	9.2	18.4	6.5	10.0	>0.05

Variables[d]	N	%	Male		Female		
			N	%	N	%	p value[e]
Gender			642	45.1	782	54.9	N/A
Suicidal ideation (1 = yes) T1	204	14.3	83	12.9	121	15.5	>0.05
Suicidal ideation (1 = yes) T2	183	12.85	78	12.1	105	13.4	>0.05
Stability and changes in bullying involvement across Time 1 and Time 2							
Not-involved	554	38.9	219	34.1	335	42.8	<0.01
Victims only	342	24.0	160	24.9	182	23.3	
Stable-low	199	58.2	113	62.1	86	53.7	
Declining	58	17.0	26	14.3	32	20.0	
Increasing	49	14.3	32	17.6	17	10.6	
Stable-high	36	10.5	11	6.0	25	15.6	
Bullies only[f]	94	6.6	40	6.2	54	6.9	
Stable-low	22	23.4	13	24.1	9	22.5	>0.05
Declining	34	36.2	20	37.0	14	35.0	
Increasing	38	40.4	21	38.9	17	42.5	
Bully–victims	434	30.5	223	34.7	211	27.0	
Stable-low	229	52.8	110	52.1	119	53.4	>0.05
Declining	84	19.3	45	21.3	39	17.5	
Increasing	63	14.5	31	14.7	32	14.3	
Stable-high	58	13.4	25	11.9	33	15.0	

N/A not available, *T1/2* Time 1/Time 2

[a] Measured as continuous variables

[b] p value attained from T test

[c] Not-involved students have zero score of bullying involvement (data not shown)

[d] Measured as categorical variables

[e] p value attained from Pearson Chi-square test

[f] There were only four students bullied others at stable-high level; therefore, these students were combined with ones who bullied peers at "increasing'' level

1994). The scale was employed among Vietnamese school adolescents with excellent psychometric properties in previous studies (Pham 2015; Thai 2010). It includes ten items (e.g., "during the last 30 days, about how often did you feel tired out for no good reason?" using a five-point Likert scale ranging from '1 = none of the time' to '5 = all of the

time'. Alpha coefficients for the scale were 0.87 at Time 1 and 0.92 at Time 2. We scored depressive symptoms and psychological distress on continuous scales with higher scores indicating more symptoms.

Suicidal ideation was measured with three items adapted from the American School Health Association (Association and Kent 1989). The scale has been used among Vietnamese school adolescents and showed high internal consistency (Nguyen 2006; Pham 2015; Thai 2010). Respondents were asked "During the past 6 months, have you ever (1) seriously thought about attempting suicide? (2) made a specific plan about how you would attempt suicide? (3) attempted suicide?". Possible responses were coded as 0 = *no* if students did not experience any of these thoughts or behaviours; and coded 1 = *yes* if they experienced at least one of these thoughts or behaviours.

Covariate measures

Covariate measures included (1) *family, friend, and school social support* measured by the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al. 1988). The scale comprised a 12-item scale measuring family support (e.g., "My family really tries to help me"), friend support (e.g., "My friends really try to help me"), and school support (e.g., "There is a school staff member who is around when I am in need"); using a four-point Likert scale ranging from "1 = strongly disagree" to "4 = strongly agree", (2) w*itness parental violence* was assessed by asking students "How often have you witnessed your parents having: a serious argument with each other?; physically fighting with each other?"; using a four-point Likert scale ranging from "1 = never" to "4 = often", (3) *conflict with siblings* was assessed by single item "How often have you have serious conflict (argument, fighting, etc.) with your siblings?" using a four-point Likert scale ranging from "1 = never" to "4 = often", (4) time spent on online was assessed by a single item "How much time did you spend online each day last week" with optional answers ranging from "0 = never online" to "7 = more than 4 h", (5) *Mental health* variables measured at Time 1. All covariates were treated in continuous variables with higher scores reflecting higher levels of experience.

Data analyses

Data analyses were performed using Stata version 11.2. Preliminary comparisons of student characteristics in the general population and between males and females were made using *t* tests for continuous outcomes and Pearson's Chi square for categorical outcomes. Bivariate associations between predictors, covariates measured at Time 1 and mental health measured at Time 2 were examined. Then, significant associations with p value <0.05 for at least one of the mental health variables were entered in the adjusted models, where multivariate linear regression and multiple binary logistic regression analyses were performed, controlling for covariates at Time 1 which had p value <0.05 with at least one outcome variable, including: age, depression (for model of depression), psychological distress (for model of psychological distress), suicidal ideation (for model of suicidal ideation), self-esteem, average time spending on online, family social support, school social support, friend social support, witness parental violence, and conflict with siblings. Adjusted models were generated for three mental health outcomes for the total sample, and separately for males and females. Coefficient and odds ratio (OR) comparisons were tested to examine the different impacts on mental health indicators across genders.

Missing values for covariates at Time 1 and mental health at both times accounted for less than 10% of the survey data. To increase the statistical power in analyses, we imputed missing values using mean scores (Elliott and Hawthorne 2005). Sensitivity analyses were conducted using multiple imputation with 20 and 50 cycles suggesting that there were no differences between imputing using mean scores and multiple imputation.

Results

Prevalence of bullying roles at Time 1, Time 2, and both times

Figure 1 presents prevalence of bullying roles at Time 1 and Time 2. There was a high degree of overlap between traditional bullying and cyberbullying at both time points. The large majority of students who experienced cyberbullying (about 81% for victims, 75% for bullies, and 100% for bully–victim) did so in conjunction with traditional bullying. Due to the high correlation between traditional and cyberbullying, the categories were collapsed across the modes of bullying for further analysis. Over both times, bullying roles are (1) not involved (38.9% of the sample), (2) victims only (24%), (3) bullies only (6.6%), and (4) bully–victims (40.4%).

Bivariate association between change in bullying involvement and mental health

Table 2 shows that those students involved in bullying as victims or bully–victims had more symptoms of depression and psychological distress, and reported higher odds of suicidal ideation than students not involved in bullying regardless of whether the exposure was stable over time or not. Adolescents who admitted high levels of bullying

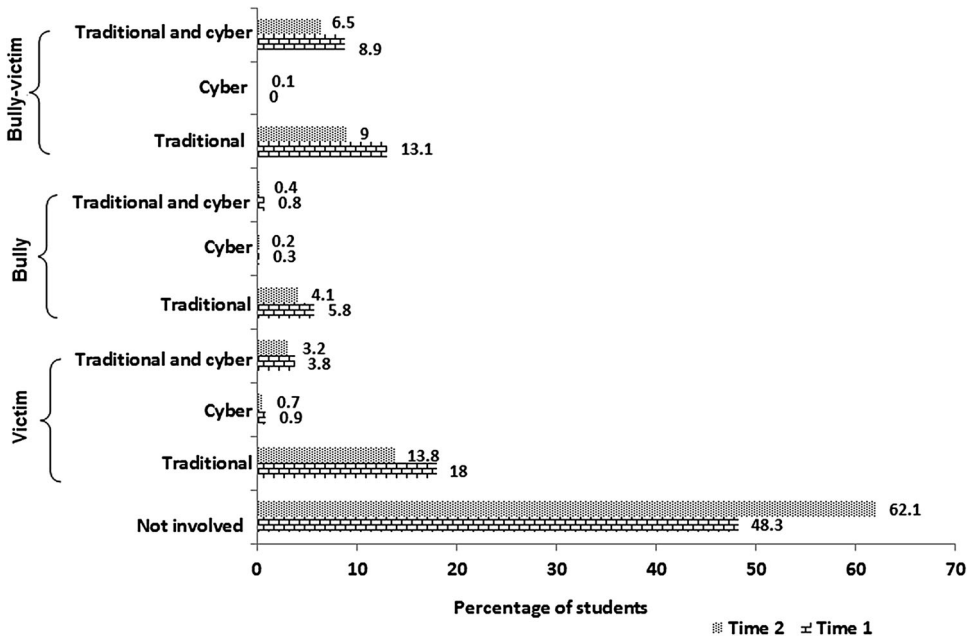

Fig. 1 Prevalence of traditional bullying and cyberbullying roles among 1424 school students in Vietnam, 2014–2015

others at Time 1 or Time 2 (declining or increasing bully-only groups) had significantly higher odds of suicidal ideation. The coefficient comparison test showed no statistical significance across gender in reporting symptoms of depression and psychological distress. The OR comparison test, however, shows a significant difference across gender, with females who experienced stable-low bully–victim status being more likely to report suicidal ideation than males ($p < 0.05$).

Multivariate associations between change in bullying involvement and mental health

Table 3 presents multiple linear regression analyses of levels of stability or change among bullying roles and depressive symptoms. After adjustment for a range of confounders, those with a high level of victimisation at Time 1, Time 2, or both reported significantly higher levels of depression; and those with increasing and stable-high levels in bully–victims were also significantly more likely than those who were not involved to experience depression ($p < 0.05$). Coefficient comparison tests for levels of stability and change in each bullying role showed no significant difference across gender ($p > 0.05$), suggesting no different impacts of bullying involvement on depression between males and females.

The findings regarding K-10 psychological distress at different levels of stability or change in bullying involvement are shown in Table 3. Controlling for potential confounders, adolescents whose victimisation or bully–victim status increased or remained high over time, reported more psychological distress than those who were not involved ($p < 0.05$). Coefficient comparison tests for victimisation, perpetration, and bully–victim status showed no significant differences across genders, except the female stable-low bully–victims, who demonstrated a significantly higher level of psychological distress than their male counterparts ($p < 0.05$).

Table 3 also presents binary logistic regression analyses of levels of stability or change in bullying involvement and suicidal ideation at Time 2. After adjusting for confounders, students involved in declining, increasing, or stable-high levels of victimisation, perpetration, and bully–victim status had higher odds of suicidal ideation than those who were not involved. Significant differences were found among those with declining and stable-high victimisation, increasing perpetration, and increasing and stable-high bully–victim status. There was no significant difference in suicidal ideation between adolescents not involved and those with stable-low involvement ($p > 0.05$). Comparisons of the OR showed few differences between genders, although it is notable that stable-low female victims and stable-low female bully–victims had higher risk of suicidal ideation than their male counterparts ($p < 0.05$).

Discussion

This is the first report from a longitudinal study in Vietnam and South-East Asia to examine the associations between different levels of stability or change in bullying involvement and depressive symptoms, psychological distress, and suicidal ideation among adolescents. It is also one of few studies internationally to use a standardised measurement

Table 2 Bivariate association (linear regression analyses were conducted for depression, psychological distress, while logistic regressions were used for suicidal ideation) between levels of stability or change in bullying involvement over Times 1 and 2 and mental health at Time 2 among adolescents in Vietnam, 2014–2015

Stability and change over time	Depression			Psychological distress			Suicidal ideation		
	Full sample β (95% CI)	Male β (95% CI)	Female β (95% CI)	Full sample β (95% CI)	Male β (95% CI)	Female β (95% CI)	Full sample OR (95% CI)	Male OR (95% CI)	Female OR (95% CI)
Victims only (Ref: Not-involved)									
Stable-low	1.2 (−0.3; 2.7)	0.3 (−2.1; 2.8)	1.8 (−0.01;3.7)*	0.9 (−0.3; 2.2)	0.4 (−1.7; 2.5)	1.4 (−0.2;3.0)†	1.7 (1.0;2.9)†	1.0 (0.4;2.5)	2.4 (1.2;4.9)*
Declining	5.2 (2.7;7.7)***	6.4 (2.7;10.1)***	3.7 (0.2;7.2)*	3.0 (0.9;5.1)**	4.2 (1.0;7.3)**	1.7 (−1.3;4.6)	2.8 (1.3;6.0)**	1.6 (0.5;5.0)	4.7 (1.7;13.1)**
Increasing	3.9 (1.2;6.6)**	2.4 (−2.5;7.3)	4.7 (1.5;7.9)**	2.5 (0.3;4.8)*	2.8 (−1.3; 7.0)	2.4 (−0.3;5.1)†	2.3 (0.9;5.4)†	2.4 (0.6;9.1)	2.2 (0.7;7.0)
Stable-high	9.8 (6.7;12.9)***	9.3 (5.1;13.4)***	10.8 (5.6;16.0)***	6.5 (3.8;9.1)***	5.2 (1.7; 8.6)**	9.7 (5.3;14.2)***	3.8 (1.6;9.1)*	2.8 (0.9;8.3)†	5.9 (1.4;24.0)*
Bullies only (Ref: Not-involved)									
Stable-low	−2.8 (−6.7;1.0)	−3.9 (−10.5;2.7)	−2.1 (−6.7;2.5)	−2.2 (−5.5;1.1)	−3.3 (−8.8;2.3)	−1.4 (−5.5;2.6)	N/A	N/A	N/A
Declining	1.7 (−1.4;4.9)	0.9 (−4.4;6.3)	2.3 (−1.5;6.1)	0.9 (−1.8;3.5)	−0.3 (−4.8;4.2)	1.7 (−1.5;5.0)	2.3 (0.8;6.4)†	−1.9 (0.4;9.0)	2.8 (0.7;10.3)
Increasing	0.07 (−2.9;3.0)	−0.9 (−5.8;4.0)	0.8 (−2.9;4.5)	−0.5 (−3.0;2.1)	−2.1 (−6.2;2.0)	0.9 (−2.3;4.1)	3.6 (1.5;8.4)**	3.4 (1.0;11.6)*	3.7 (1.2;12.0)*
Bully–Victims (Ref: Not-involved)									
Stable-low	2.3 (0.8;3.7)**	1.4 (−0.7;3.6)	3.1 (1.1;5.1)**	1.5 (0.3;2.7)*	0.5 (−1.3;2.3)	2.7 (1.0;4.4)**	2.4 (1.4;3.9)***	1.2 (0.6;2.7)	3.9 (2.0;7.5)***
Declining	4.3 (2.1;6.5)***	4.9 (1.6;8.2)**	3.7 (0.9;6.6)**	2.5 (0.7;4.3)**	3.5 (0.7;6.3)*	1.7 (−0.7;4.1)	3.2 (1.7;6.0)***	1.6 (0.6;4.7)	5.1 (2.2;11.5)***
Increasing	6.1 (3.7–8.6)***	6.4 (2.8;10.0)***	5.8 (2.4;9.2)***	5.5 (3.4;7.6)***	6.4 (3.3;9.4)***	4.7 (1.8;7.5)***	4.6 (2.4;8.9)***	3.7 (1.5;9.5)**	5.5 (2.2;13.8)***
Stable-high	6.0 (3.5;8.6)***	7.4 (3.8;10.9)***	4.1 (0.4;7.9)*	5.8 (3.6;7.9)***	5.8 (2.8;8.8)***	5.8 (2.7;9.0)***	6.6 (3.5;12.5)***	4.8 (2.0;11.8)***	8.9 (3.5;22.5)***

N/A not available due to none of the students bullying others at the sable-low level had suicidal ideation at Time 2

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3 Multivariate analyses between levels of stability or change in bullying involvement over Times 1 and 2 and mental health at Time 2: adjusted models for full sample, male and female adolescents in Vietnam, 2014–2015

Stability or change over time 1 and 2	Depression			Psychological distress			Suicidal ideation		
	Full sample β (95% CI)	Male β (95% CI)	Female β (95% CI)	Full sample β (95% CI)	Male β (95% CI)	Female β (95% CI)	Full sample OR (95% CI)	Male OR (95% CI)	Female OR (95% CI)
Victims only (including 554 not-involved students)									
EMM for ref/not involved	13.8	13.9	13.7	18.4	18.3	18.5	1.0	1.0	1.0
Stable-low	0.1 (−1.2;1.5)	−0.8 (−3.1;1.5)	0.6 (−1.1;2.3)	0.3 (−0.9;1.4)	−0.3 (−2.3;1.5)	0.7 (−0.7;2.1)	1.6 (0.9;2.9)†	0.8 (0.3;2.1)	2.5 (1.2;5.4)*
Declining	2.5 (0.2;4.8)*	3.8 (0.4;7.2)*	0.9 (−2.2;4.1)	0.8 (−1.1;2.8)	1.7 (−1.1;4.6)	−0.7 (−3.4;2.0)	2.5 (1.1;−5.5)*	1.7 (0.5;5.8)	4.1 (1.4;12.0)*
Increasing	3.4 (1.0;5.8)**	3.1 (−1.2;7.6)	3.8 (0.9;6.6)**	2.2 (0.1;4.2)*	3.3 (−0.4;7.0)†	1.7 (−0.7;4.1)	1.9 (0.8;4.8)	1.8 (0.4;7.7)	2.2 (0.7;7.2)
Stable-high	6.6 (3.7;9.4) ***	6.6 (2.8;10.3)***	4.9 (0.03;9.7)*	3.6 (1.2;6.0)**	2.4 (−0.8;5.5)	4.9 (0.8;9.0)*	3.1 (1.2;8.1)*	2.7 (0.8;9.1)	3.3 (0.6;17.3)
Adjusted R^2	0.24	0.26	0.23	0.23	0.25	0.23			
Bullies only (including 554 not-involved students)									
EMM for ref/not involved	13.3	13.3	13.3	18.1	17.8	18.3	1.0	1.0	1.0
Stable-low	−2.7 (−6.2;0.7)	−2.6 (−8.8;3.7)	−3.2 (−7.3;0.9)	−2.5 (−5.4;0.5)	−2.9 (−8.0;2.2)	−2.0 (−5.5;1.6)	N/A	N/A	N/A
Declining	−0.03 (−2.9;2.8)	0.8 (−4.2;5.8)	−0.8 (−4.2;2.6)	−1.2 (−3.6;1.2)	−0.8 (−4.9;3.3)	−1.5 (−4.5;1.5)	2.4 (0.8;7.2)	1.9 (0.3;11.7)	2.4 (0.5;10.7)
Increasing	−0.3 (−3.0;2.4)	−1.3 (−5.9;3.3)	0.5 (−2.7;3.7)	−1.4 (−3.6;0.9)	−3.4 (−7.3;0.4)†	0.2 (−2.6;3.0)	3.2 (1.3;8.1)*	3.0 (0.7;12.8)	3.3 (0.9;12.3)†
Adjusted R^2	0.20	0.16	0.24	0.20	0.18	0.23			
Bully–Victims (including 554 not-involved students)									
EMM for ref/not involved	14.0	14.1	14.1	18.7	18.7	18.8	1.0	1.0	1.0
Stable-low	1.0 (−0.4;2.3)	0.5 (−1.6;2.6)	0.9 (−0.9;2.8)	0.3 (−0.9;1.4)	−0.7 (−2.5;1.0)	1.3 (−0.2;2.8)†	0.9 (−0.4;2.3)	1.0 (0.3;3.3)	2.5 (1.4;5.8)**
Declining	1.7 (−0.3;3.8)†	2.3 (−0.8;5.6)	0.7 (−1.9;3.4)	0.1 (−1.6;1.7)	1.0 (−1.6;3.7)	−1.0 (−3.2;1.2)	1.7 (−0.3;3.8)†	2.8 (0.9;8.3)	3.9 (1.6;9.6)**
Increasing	4.0 (1.7;6.3)***	4.1 (0.7;7.6)	3.2 (0.1;6.3)*	3.3 (1.3;5.2)***	3.5 (0.5;6.4)*	3.1 (0.5;5.7)*	4.0 (1.7;6.3)***	2.8 (0.9;8.3)†	3.6 (1.3;10.1)*
Stable-high	3.8 (1.4;6.2)**	4.9 (1.4;8.4)	0.9 (−2.5;4.4)	3.2 (1.2;5.2)**	2.9 (0.03;5.9)*	3.2 (0.3;6.1)*	3.8 (1.4;6.2)**	3.5 (1.2;9.9)***	6.5 (2.2;19.5)***
Adjusted R^2	0.22	0.18	0.25	0.24	0.20	0.28			

Adjusted models controlled for confounders measured at Time 1 including: age, depression (for model of depression), psychological distress (for model of psychological distress), suicidal ideation (for model of suicidal ideation), self-esteem, average time spending on online, family social support, school social support, friend social support, witness parental violence, and conflict with siblings

EMM estimated marginal mean

† $p < .10$, * $p < .05$, ** $p < .01$ *** $p < .001$

[a] Multinomial linear regression analyses were conducted for depression, psychological distress, while binary logistic regressions were used for suicidal ideation

of both traditional bullying and cyberbullying together to estimate temporal stability or change in involvement as a victim, bully, and bully–victim. We found that the great majority of students who experienced cyberbullying were simultaneously involved in traditional forms of bullying, which supports previous findings that adolescents use cyberbullying as an extension of other acts to bully others (Cross et al. 2015; Olweus 2013).

There is clear evidence that the mental health of adolescents is differentially affected by levels of stability or change in bullying involvement. Supporting past studies (Lereya et al. 2015; Wolke et al. 2013), our findings indicate that students who reported bullying others only are not at risk of depressive symptoms and psychological distress, regardless of their levels of involvement. However, this may not be the case in relation to suicidal ideation. This study in Vietnam revealed that students with declining or increasing perpetration of bullying were more likely to have suicidal ideation than those with stable-low experiences as a bully. This finding is in line with research reporting that bullying others has both cross-sectional (Hinduja and Patchin 2010) and long-term associations with suicidal ideation (Klomek et al. 2013). Interventions focusing on reducing suicidality among young people need to consider perpetration as a potentially significant indicator of self-harm.

Similar to previous research (Geoffroy et al. 2016; Lereya et al. 2015), this study indicates that poor mental health is strongly related to victimisation experiences. The data support the hypothesis that youth mental health problems differ less in relation to whether bullying occurs in traditional or online forms, and is more influenced by the levels of stability or change in any type of victimisation over time. Adolescents' experience of bullying is quite fluid, and the degree of apparent harm is also variable. Although increasing or high levels of any type of victimisation had clear effects on mental health, those with stable-low-level victimisation or bully–victim status did not have more symptoms of depression and psychological distress than those not involved at all. Furthermore, those adolescents for whom victimisation or bully–victim status decreased over time had better mental health than those who had increased levels or remained at a stable-high level over time. This pattern is very similar to recent research into multiple forms of child victimisation in the United States which revealed higher impact of increasing and stable-high poly-victimisation on youth distress over two years compared with no victimisation and stable-low level (Turner et al. 2015).

This study has thrown new light on specific impacts of victimisation. While the effects on suicidal ideation of being a victim or bully–victim at high levels at one-time point or both time points were equivalent for females and males (Turner et al. 2013), the females in Vietnam who experienced being a victim or bully–victim at a stable-low level had significantly higher odds of suicidal ideation than males with similarly low-level bullying experiences. Furthermore, while psychological distress for t bully–victims with stable-low-level involvement did not differ significantly from non-involved students, our findings show a significant difference between genders, with stable-low bully–victim females having more psychological distress than males with stable-low bully–victim experiences. Taken together, the findings regarding suicidality and distress suggest that while the impact over time on mental health of high levels of victimisation and bully–victim status is similar across the two sexes, female victims and bully–victims may be more sensitive than males to chronic but low-level involvement (Campbell et al. 2012).

The study has some limitations. First, the findings are limited to a sample of urban and public school students. Further research should address the bullying involvement of adolescents who are not in high school in rural areas, which may include a significant proportion of young people in low- and middle-income countries. Second, we were not permitted to recruit the final year students in middle school and high school due to their study overload and time constraints which reduced the generalisability of the findings. Finally, like previous research (Lereya et al. 2015), our sample size for the bully-only group was small (6.6%), and thus, we were unable to examine impacts of stable-high perpetration on youth mental health.

In conclusion, this first study of stability and change in bullying involvement among Vietnamese school adolescents extends international research by confirming that bullying (including cyberbullying) impairs, rather than simply correlates with, mental health. That observation by itself is not surprising. However, this study adds the important observation that the intensity of the bullying experience must be considered. Gender may also be important in understanding the impact of low-level involvement, because both suicidal ideation and psychological distress among females were more apparent than among similarly victimised males.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no competing interests.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of

the Human Research Ethics Committees of the Queensland University of Technology (Australia) and the Hanoi School of Public Health (Vietnam) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

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

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