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Relationships between Involvement in School Bullying and Quality of Life in Taiwanese Adolescents

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Abstract This study aimed to examine the associations between involvement in bullying and perceived quality of life (QOL) among adolescents in Taiwan. A total of 5488 students whose grade ranged from 7 to 12 participated in this study. Their experiences of victimization by and perpetration of verbal, relational, and physical bullying (including the snatching of belongings) were assessed through using the Chinese version of the School Bullying Experience Questionnaire. The level of perceived QOL was assessed using the Taiwanese Quality of Life Questionnaire for Adolescents (TQOLA). The associations between involvement in bullying and QOL were examined using multiple regression analysis. After controlling for the effects of sex, age, and depression, victimization by verbal and relationship bullying was negatively associated with QOL on all subscales of the TQOLA except for the Family

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subscale. Victimization by physical bullying and the snatching of belongings was negatively associated with QOL on the Social Relationships and Pain subscales. Perpetration of verbal and relationship bullying was negatively associated with QOL on the Family, Psychological Wellbeing, and Pain subscales, but positively associated with QOL on the Social Relationships subscale. Perpetration of physical bullying and snatching of belongings was negatively associated with QOL on the Residential Environment and Personal Competence subscales, but positively associated with QOL on the Psychological Wellbeing and Pain subscales. The directions of associations between bullying involvement and QOL in adolescents vary according to the types of bullying involvement and the dimensions of QOL. The results may serve as the basis on which mental health and educational professionals can develop comprehensive need-assessment and resource-allocation strategies for adolescents who have been involved in bullying.

Keywords Adolescent · Bullying · Quality of life

Introduction

School bullying is a serious worldwide health problem among school-age children and adolescents. The action of bullying is defined as a type of interpersonal aggression characterized by intentionality, repetition, and an imbalance of power, with abuse of power being a primary distinction between bullying and other forms of aggression (Hymel and Swearer 2015). The form of bullying behaviors can be classified into several different types such as physical harm (e.g., hitting, kicking, pinching, and taking money or belongings), verbal aggression (e.g., name calling, cruel teasing, taunting, and threatening) and relational bullying (e.g., social exclusion, malicious rumor spreading; Wolke et al. 2000). Although physical bullying is often a major concern, social and verbal bullying are the more common forms experienced by students (Hymel and Swearer 2015). An international study on a representative sample of schools in 28 countries of Europe and North America reported that the prevalence of school bullying among students ranged from 6.3% to 41.4%, and that bullying behavior was generally higher among boys than girls (Due et al. 2005). A previous study found that 25.0% and 19.6% of adolescents in Taiwan reported to be bullying victims and perpetrators, respectively (Yen et al. 2014). Bullying victimization was also prevalent among elementary school students (Chen 2015). Many Chinese societies respect collectivism which highly values interpersonal harmony (Chan and Wong 2015). As an intended viciously aggressive behavior, bullying may directly reduce the possibility for the victims to maintain interpersonal harmony in their peer groups and thus may result in adverse impacts on social and psychological wellbeing among victims. Taiwan is one of traditional Chinese societies where collectivism is valued, and school bullying has often been perceived as a collective conduct for the purpose of maintaining group conformity (Chan and Wong 2015). Therefore, social exclusion, as a form of peer victimization, has found to be relatively common in Chinese schools (Chan and Wong 2015) and that maybe different in countries where individualism is stressed. Different culture valued may probable have different impacts on the effects of bullying victimization on social and psychological wellbeing and warrant further study.

Bullying is a distressing experience for youths and often continues over years; it predicts both concurrent and future psychiatric symptoms and disorders, even in adulthood (Kumpulainen 2008). For adolescent bullying victims, there is a consistent, strong, and graded association between increasing exposure to bullying and physical symptoms (e.g., headache, stomach ache, backache, dizziness) and psychological symptoms (e.g., bad temper, feeling nervous, feeling low, difficulties in getting to sleep, morning tiredness, and feelings of isolation, loneliness, helplessness; Due et al. 2005). Moreover, being a perpetrator of bullying is also significantly associated with various mental health problems, such as depression, insomnia, general anxiety, social phobia, inattention, hyperactivity and impulsivity, suicide, and alcohol abuse (Yen et al. 2014).

Although previous studies have commented on the association between involvement in bullying and mental health problems, few studies have examined the relationships of various types of bullying victimization and perpetration with quality of life (QOL) among adolescents. QOL is a multidimensional concept that reflects an individual's subjective satisfaction with psychological, physical, and social well-being (Snoek 2000). A previous study on college students in Taiwan found that those with verbal and relational bullying-victimization experiences, both before and in college, reported significantly lower health-related QOL of social relationships, whereas those with verbal and relational bullying-perpetration experiences in both periods reported significantly higher health-related QOL (Chen and Huang 2015). A study on adolescent students in Chile found that bullying victimization as negatively associated with health-related QOL (Hidalgo-Rasmussen et al. 2015). An Australian study found that adolescent psychosocial health-related QOL was inversely related to frequency of being bullied, while physical health-related QOL was not related (Wilkins-Shurmer et al. 2003).

In spite of previous studies on the relationships between health-related QOL and bullying involvement, the association of various types of bullying victimization and perpetration with multi-dimensional QOL that goes beyond health-related QOL among adolescents warrants further study. According to the Social Ecological Theory (Espelage and Swearer 2010), behaviors and psychological well-beings of adolescents are the results of interaction of the individuals with peers, families, teachers, school, and social environments. Bullying perpetration and victimization are complex socially behavioral interaction between individuals and their peer group. The role of parenting style and sibling relationships contributes to our understanding of the family connection to bullying (Swearer et al. 2006). Maltreatment by parents, including physical, sexual, emotional abuse, and neglect has also been linked to both bullying and victimization in children. It is proposed that maltreatment fosters emotional dysregulation, which is then transferred to interactions with the peer group (Swearer et al. 2006). Rates of child maltreatment, delinquency, violence, aggression, and general externalizing behavior in youth have all been linked to community-level variables which related to residential environment (Swearer et al. 2006). High levels of poverty within a community are most strongly and directly linked to undesirable youth outcomes including aggression and delinquency by influence family cohesion, parenting behavior, social support, and stress (Swearer et al. 2006). Bullying involvement may have complex relationship with psychological, physical, and social well-being among victims and perpetrators. Thus, to examine the association between bullying involvement and QOL may provide a comprehensive understanding toward multi-dimensional wellbeing in adolescents. The results of assessment also serve as a basis on which mental health and educational

professionals can develop comprehensive need-assessment and resource-allocation strategies for adolescents who have been involved in bullying. Moreover, previous research showed that bullying behavior serves different social functions, and bullies differ in their skills, status, and social behavior (Peeters et al. 2010). For example, the popular-socially intelligent bullies may use their skills to gain dominance. Their centrality in the group would enable them to persuade others to ignore the victim and believe their backbiting. In this case, bullying is used to acquire power and influence (Peeters et al. 2010). On the other hand, the social functions of bullying by unpopular-low socially intelligent bullies may be more intuitive or automatic. Perceiving ambiguous cues as hostile may reflectively trigger defending behaviour (Peeters et al. 2010). Different types of bullying victimization could result in independent effects on psychological trauma symptoms (Turner et al. 2011). Another study showed that the risk of mental health problems among adolescents varied with the type of bullying (Yen et al. 2014). The results of previous studies indicate that it needs further study whether there are different relationships between various types of bullying and different domains of QOL in adolescents.

The aim of this study was to examine the associations between involvement in school bullying and perceived QOL among adolescents in Taiwan. As mentioned above, bullying behavior serves different social functions (Peeters et al. 2010) and QOL are the results of complex interaction between individuals and their environments (Snoek 2000), we hypothesized that different types of bullying involvement have various relationships with different domains of QOL in adolescents according to the Social Ecological Theory (Espelage and Swearer 2010). Research has found that sex, age and depression were significantly associated with QOL in adolescents (Fuh et al. 2005). There are many etiologic factors to cause depression such as biological, genetic and psychosocial factors. Bullying perpetration/victimization experience is one of the important psychosocial factors for depression. On the other hand, the effects of verbal and relational bullying-victimization experiences on psychological health-related QOL could be manifested through depression (Chen and Huang 2015). Thus we controlled for the effects of sex, age and depression when examining the association between bullying involvement and QOL in adolescents to reduce the confounding effects of sex, age and depression.

Method

Participants

The subjects in this study were enrolled from the 2009 Project for the Health of Children and Adolescents in Southern Taiwan, for which data were collected from three metropolitan areas and four counties. In 2009, there were 254,130 students in 205 junior high schools and 202,883 students in 143 senior high/vocational schools in this area. Students in Taiwan have to receive compulsory education in elementary school for 6 years (grade 1–6) and junior high school for 3 years (grade 7–9). Then they may decide whether they go to senior high/vocational school for 3 years of education (grade 10–12). Based on the definitions of urban and rural districts in the Taiwan Demographic Fact Book (Ministry of the Interior 2002) and school and grade

characteristics, a cluster random sampling strategy was adopted to ensure that the proportional representation of districts, schools, and grades. The schools and classes which made up with single gender had been excluded. The proportion of urban and rural population is about 3 to 1, and the schools in urban areas have more students than those in the rural areas. The proportion of students in junior high schools and senior high/vocational schools is about 1 to 1. Thus we select 10 schools (5 junior high schools and 5 senior high/vocational schools) from the urban and 9 schools (5 junior high schools and 4 senior high/vocational schools) from the rural areas randomly according to the proportion of school. The classes in these schools were further stratified into 3 levels based on grade in primary, junior high, and senior high/vocational schools, and one-third of classes in each grade were selected randomly. The classes which made up with students with special need of education are excluded.

A total of 6703 high school students were randomly selected according to the ratio of students in each grade. A total of 6445 students (96.2%) agreed to join this study. Each student completed the research questionnaire anonymously under the direction of research assistants in their classrooms during school hours. All students received a gift worth NT$33 (US$1) at the end of the assessment. Those who aged 19 or older were excluded. A total of 5488 students (85.2%) completed the research questionnaires without omission. Among these, 2597 (47.3%) students were boys and 2891 (52.7%) were girls (M_{age}: 14.8 years; *SD*: 1.8 years; range: 11–18 years).

The Institutional Review Board of Kaohsiung Medical University approved this study, allowing the use of passive consent from parents and students. Before conducting the study, we prepared a leaflet explaining the study purpose and procedure. Students brought the leaflet home for their parents or main caretakers, who could telephone the researchers, write in a communications book, or ask their children directly to refuse to join the study. No claim from the parents or main caretakers means that they agreed their children's participation to this study. The students also had the right to refuse to participate in this study by returning blank questionnaires with those from other students. The self-reported questionnaire was anonymous. The researchers guaranteed the participants from disclosure of their responses to the questionnaire.

Instruments

Taiwanese Quality of Life Questionnaire for Adolescents. We used the self-reported TQOLQA to measure the levels of QOL in recent two weeks among participants (Fuh et al. 2005). The 5-point 38-item TQOLQA contains seven domains, including family (7 items, e.g., "Are you satisfied with the help and support you receive from your family?", Cronbach's $\alpha = .88$), residential environment (8 items, e.g., "Do you feel safe and protected in your home?", Cronbach's $\alpha = .88$), personal competence (7 items, e.g., "Can you finish your daily affairs?", Cronbach's $\alpha = .87$), social relationships (5 items, e.g., "Are your friends reliable when you need them?", Cronbach's $\alpha = .80$), physical appearance (4 items, e.g., "Do you feel inferior because of your appearance?", Cronbach's $\alpha = .78$), psychological well-being (4 items, e.g., "Are you upset?", Cronbach's $\alpha = .79$), and pain (3 items, e.g., "Do you worry about pain or discomfort?", Cronbach's $\alpha = .71$). The 5-point 38-item Taiwanese Quality of Life

Questionnaire for Adolescents (TQOLQA) contains 7 domains, including family, residential environment, personal competence, social relationships, physical appearance, psychological well-being, and pain (Fuh et al. 2005). The items on the TQOLQA are rated on a 5-point Likert scale from 1 (*not at all*) to 5 (*very much*). After the raw scores are converted for the reverse questions, higher total scores indicate better QOL over the preceding 2 weeks. Each subscale is then standardized to range from 0 (lowest level of functioning) to 100 (highest level). For example, a higher total score on the subscale of pain indicates that the participants experience less impaired QOL caused by pain. The Cronbach's α coefficient ranges from .77 to .91 for the global scale and seven domains (Fuh et al. 2005). In the present study the Cronbach's α coefficient ranges from .71 to .88 for the seven domains.

Chinese version of the School Bullying Experience Questionnaire. The self-report Chinese version of the School Bullying Experience Questionnaire (C-SBEQ) was employed to evaluate participants' involvement in school bullying in the previous 1 year with 16 items answered on a 4-point Likert scales with a range of 0 (*never*), 1 (*just a little*), 2 (*often*), and 3 (*all the time*; Kim et al. 2001; Yen et al. 2012). This scale was composed of four 4-item subscales for evaluating the severity of victimization by verbal and relational bullying (Items 1–4, including social exclusion, being called mean nicknames, and being spoken ill of, e.g., "Are you left out during recess or lunch time?"), victimization by physical bullying and snatching of belongings (Items 5–8, including being beaten up, being forced to do others' work, and having money, school supplies, or snacks taken away, e.g., "Are you beaten up?"), perpetration of verbal and relational bullying (Items 9–12, e.g., "Do you leave out other students during recess or lunch time?"), perpetration of physical bullying and snatching of belongings (Items 13–16, e.g., "Do you beat up other students?"). A higher total subscale score indicates more severe involvement in school bullying. The results of a previous study examining the psychometrics of the C-SBEQ indicated that the C-SBEQ has good reliability and validity (Yen et al. 2012). In the present study the Cronbach's α coefficient ranges from .68 to .74 for the four subscales.

Mandarin Chinese version of the Center for Epidemiological Studies-Depression Scale. The Mandarin Chinese version of the Center for Epidemiological Studies-Depression Scale (MC-CES-D) employed in this study was a 20-item self-administered questionnaire that adopts a 4-point evaluation scale for assessing the frequency of depressive symptoms in the preceding week (Chien and Cheng 1985; Radloff 1977). After transforming the scores of the four items, the scores of all items on the MC-CES-D were summed up to represent the level of depression. Higher total MC-CES-D scores indicate more severe depression. The Cronbach's α for the MC-CES-D in the present study was .92.

Statistical Analysis

Data analysis was performed using SPSS Version 20.0 (SPSS Inc., Chicago, IL, USA). The associations between bullying involvement and various domains of QOL were examined using forward stepwise multiple regression analysis to control the effects of sex, age, and depression. Change of squared R (ΔR^2) and change of F value (ΔF) were applied to represent the effect size of bullying involvement on QOL. A two-tailed p value of less than .05 was considered statistically significant.

Results

The distribution of sex, mean age, and levels of QOL on the seven domains of the TQOLQA, bullying involvement on the C-SBEQ, and depression on the MC-CES-D are shown in Table 1.

The results of forward stepwise multiple regression analysis examining the associations of bullying involvement, sex, age, and depression with various domains of QOL are shown in Tables 2 and 3. All values of the condition index of the seven multiple regression analysis models were low than 30, indicating that collinearity assumption was not violated. The results indicated that after controlling for the effects of sex, age, and depression, victimization by verbal and relationship bullying was negatively associated with QOL on all subscales of the TQOLA except for the Family subscale. Victimization by physical bullying and snatching of belongings was negatively associated with QOL on the Social Relationships, Physical Appearance, and Pain subscales. Perpetration of verbal and relationship bullying was negatively associated with QOL on the Family, Psychological Wellbeing, and Pain subscales, but positively associated with QOL on the Social Relationships subscale. Perpetration of physical bullying and snatching of belongings was negatively associated with QOL on the Residential Environment and Personal Competence subscales, but positively associated with QOL

Table 1 Demographic characteristics and the levels of depression, quality of life, and bullying involvement ($N = 5488$)

	n (%)	Mean (SD)
Sex		
Girls	2891 (52.7)	
Boys	2597 (47.3)	
Age		14.8 (1.8)
Depression on the MC-CES-D		15.7 (9.8)
QOL on the TQOLQA		
Pain		64.1 (17.1)
Personal competence		56.6 (13.3)
Psychological well-being		64.7 (18.5)
Physical appearance		64.7 (19.3)
Residential environment		62.6 (18.3)
Social relationships		66.0 (18.1)
Family		65.8 (18.7)
Bullying involvement on the C-SBEQ		
Victimization of verbal and relational bullying		2.1 (2.0)
Victimization of physical bullying and belongings snatch		0.7 (1.2)
Perpetration of verbal and relational bullying		2.2 (2.0)
Perpetration of physical bullying and belongings snatch		0.5 (1.1)

C-SBEQ Chinese version of the School Bullying Experience Questionnaire, *MC-CES-D* Mandarin Chinese version of the Center for Epidemiological Studies-Depression Scale, *TQOLQA* Taiwanese Quality of Life Questionnaire for Adolescents

Table 2 The associations of bullying involvement with QOL of family, residential environment, personal competence, and social relationship[a]

	Family				Residential environment				Personal competence				Social relationships			
	Beta	*t*	ΔR^2	ΔF	Beta	*t*	ΔR^2	ΔF	Beta	*t*	ΔR^2	ΔF	Beta	*t*	ΔR^2	ΔF
Victimization of verbal and relational bullying					−.038	−2.852**	.001	8.132**	−.028	−2.192*	.002	15.427*	−.118	−8.195***	.011	72.849***
Victimization of physical bullying and belongings snatch													−.032	−2.305*	.001	5.315*
Perpetration of verbal and relational bullying	−.074	−5.896***	.005	34.758***									.045	3.380**	.001	9.284**
Perpetration of physical bullying and belongings snatch					−.053	−4.217***	.003	21.676***	−.044	−3.586***	.001	4.804***				

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

[a] Controlling for the effects of sex, age, and depression; QOL: quality of life

Table 3 The associations of bullying involvement with QOL of physical appearance, psychological well-being, and pain[a]

	Physical appearance				Psychological well-being				Pain			
	Beta	*t*	ΔR^2	ΔF	Beta	*t*	ΔR^2	ΔF	Beta	*t*	ΔR^2	ΔF
Victimization of verbal and relational bullying	−.098	−7.470***	.009	70.554***	−.075	−6.665***	.006	58.252***	−.057	−3.936***	.005	32.365***
Victimization of physical bullying and belongings snatch	−.026	−2.052*	.001	4.209*					−.055	−3.759***	.002	14.819***
Perpetration of verbal and relational bullying					−.043	−3.764***	.001	7.624**	−.048	−3.395**	.002	11.529**
Perpetration of physical bullying and belongings snatch					.036	3.226**	.001	10.408**	.073	4.934***	.001	7.604**

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

[a] Controlling for the effects of sex, age, and depression; QOL: quality of life

on the Psychological Wellbeing and Pain subscales. The values of ΔR^2 ranged from .001 to .011, indicating that the effect size of bullying involvement on QOL was small.

Discussion

In this study, we found that all types of bullying victimization were weakly but significantly associated with poor QOL in the domains of social relationships and pain. Previous research showed that bullying victimization increases the risk that affected children and adolescents will experience social and emotional maladjustment, as evidenced by low social standing, having few friends, poor relationships with classmates, and experiencing difficulty making friends (Werth et al. 2015). Compared with those who were not involved in bullying, adolescents who were bullied were more likely to report physical symptoms such as headache, stomachache, and backache (Due et al. 2005). Pain may greatly hamper adolescents' subsequent attempts to explore internal and external worlds. Thus, social relationships and pain problems require routine evaluation among adolescents who experience any type of bullying victimization.

Previous studies have shown that both verbal and physical victimization contribute to psychosocial and school maladjustments, such as impaired peer acceptance, impaired athletic or scholastic competence, loneliness, and school avoidance, with no significant differences observed in these maladjustments between victims of verbal and physical bullying (Kochenderfer and Ladd 1996; Smith et al. 2012; Werth et al. 2015). However, the present study shows that victimization by verbal bullying as well as victimization by relational bullying—but not victimization by physical bullying and snatching of belongings—are negatively associated with lower QOL in residential environment, personal competence, physical appearance, and psychological well-being domains. There may be several etiologies accounting for the mixed association between various experiences of bullying victimization and different dimensions of QOL. First, the adolescents in the present study reported more severe victimization by verbal and relational bullying than victimization by physical bullying and snatching of belongings, and thus victimization by verbal and relational bullying may have a consistently and significantly negative association with more dimensions of QOL compared with victimization by physical bullying and snatching of belongings. Second, previous research showed that students are more likely to report bullying when they believe that teachers would respond actively by involving parents or separating the students involved (Hymel and Swearer 2015). Compared with verbal and relational bullying, physical bullying and snatching of belongings are more evident, easier to identify, often considered to be more immoral, and thus teachers usually respond to physical infractions actively as long as the teachers know that such things are happening. By contrast, verbal and relational bullying is more difficult to identify. Students may hesitate and be reluctant to report such verbal and relational bullying, given legitimate fears of negative repercussions or ineffective adult responses (Hymel and Swearer 2015). Delays in reporting may make bullying behaviors persistent and exacerbated, and may further compromise multiple dimensions of QOL for adolescent victims.

The present study finds that the associations between bullying perpetration and QOL varied according to the types of bullying perpetration and the dimensions of QOL. A

previous study found that, compared with those who were not involved in bullying, bullying perpetrators reported more severe depressive symptoms (Nansel et al. 2004). It is reasonable to hypothesize that depression may compromise psychological well-being in youths perpetrating any form of bullying. However, the present study found that perpetration of verbal and relationship bullying was negatively associated with psychological well-being, whereas perpetration of physical bullying and snatching of belongings was positively associated with psychological well-being. It is possible that different statuses of psychological well-being may have various effects on how adolescent bullies choose their methods of bullying. For example, poor psychological well-being may limit the choses that adolescents have. Those who want to bully others may choose perpetration of verbal and relationship but not physical bullying. On the other hand, the action of physical bullying and snatching of belongings may somehow inflate self-esteem, whereas verbal and relationship bullying may have no such effect. Further etiological study is needed regarding the various associations of different forms of bullying perpetration with QOL, particularly psychological well-being.

The present study also found a discrepancy in the direction of association between different forms of bullying perpetration with the pain dimension of QOL. Perpetration of verbal and relationship bullying was negatively associated with pain, whereas perpetration of physical bullying and snatching of belongings was positively associated with pain. The results of previous studies on the association between bullying perpetration and pain were mixed. Some studies have shown that bullying perpetrators were more likely to report pain than those who did not perpetrate bullying (Fekkes et al. 2004; Kaltiala-Heino et al. 2000), whereas other studies have not found a significant association between bullying perpetration and pain symptoms (Gini 2008; Natvig et al. 2001). The results of the present study partially account for the discrepancy in the results of previous studies. Various levels in perception of pain and in anticipatory anxiety toward pain may exert an influence on choices regarding bullying methods. However, further study is needed.

The present study found that all kinds of bullying victimization were negatively associated with QOL of social relationship. Previous studies in Taiwan have found that poor peer social support may compromise the psychological health (Chen and Wei 2013) and aggravate depression (Chen and Wei 2011) among children and adolescents who experienced bullying victimization. Notably, perpetration of verbal and relationship bullying was positively associated with the Social Relationship subscale of QOL but negatively associated with that of Family subscale. Because bullying is an aggressive goal-directed behavior that harms another individual within the context of a power imbalance (Volk et al. 2014), the perpetrators of verbal and relational bullying must be socially intelligent and competent to lead name calling, social exclusion, or rumor spreading in a peer group. Success in perpetration of verbal or relational bullying may reward the perpetrators by enhancing their social status. A study on a representative US students in grades 6 through 10 found that those bullied reported greater difficulty making friends, poorer relationships with classmates, and greater loneliness than the neutrals, whereas persons who bullied others reported greater ease of making friends (Nansel et al. 2001). Although the cross-sectional study design of the present study limited the possibility to make conclusion on the causal relationship between bullying perpetration and social competence, the results of previous and present studies indicated that success in bullying perpetration, especially verbal and relational bullying

perpetration may play an positive role for the self-perceived QOL of social relationships. How the positive relationship between perpetration of verbal and relational bullying develops warrants further study. The superiority of social competence in perpetrators of verbal and relational bullying may hamper teachers' and parents' early detection of bullying, and thus school staff and parents of adolescents should monitor the occurrence of school bullying by gathering information from multiple sources and observe interaction among students carefully. By contrast, based on the negative association between perpetration of verbal and relationship bullying and the family dimension of QOL, it is hypothesized that perpetration of verbal and relationship bullying may be a means for adjusting to negative family relationships. Adolescents who have encountered frustrations in family life may compensate through perpetration of verbal and relationship bullying to dominate their peer relationships. This hypothesis requires further study.

The present study shows that perpetration of physical bullying and snatching of belongings was negatively associated with the residential environment dimension of QOL. Because of the cross-sectional study design, we could not determine the causal relationship between physical bullying perpetration and snatching of belonging and QOL on residential environment. Perpetration of physical bullying and snatching of belongings may evoke victims' aggressive reactions, which may make the perpetrators feel unsafe. On the other hand, adolescents who live in environments in which aggressive behaviors are prevalent may feel unsafe and may be dissatisfied with their residential environments. Concurrently, however, they may accept aggressive behavior as a method for mastering interacting with others. It is also possible that both physical bullying and low QOL on residential environment are the results of criminal activities in the residential areas.

Perpetration of physical bullying and snatching of belongings was also negatively associated with the personal competence dimension of QOL. This result indicates that adolescents who feel a lack of self-competence may have difficulties in managing their social relationships successfully; they may use physical bullying to dominate their interactions with others. These hypotheses require further study for confirmation.

There are two strengths in our study. First, this study applied the TQOLQA to survey the important domains of QOL for adolescents, including the personal (physical and mental), interpersonal (family function, intimate friends, and social networks), and external (income and housing) spheres that Lindstrom proposed (1992). Previous studies have found the significant association between bullying involvement with health-related QOL (Chen and Huang 2015; Hidalgo-Rasmussen et al. 2015; Wilkins-Shurmer et al. 2003). The present study further examined the relationship between bullying involvement and multiple dimensions of QOL that goes beyond health-related QOL. QOL is the result of interaction among multiple systems, including the individuals, family, peers, and living and educational environments. Although the associations between bullying involvement and QOL were significant but weak, the results supported that bullying involvement did have a role for adolescents' QOL. Of the factors that are associated with QOL, bullying involvement is one of the factors that can be prevented and intervened. Based on the results of the present study, we suggest that bullying prevention efforts need to be addressed from a social-ecological perspective. The social-ecological model can serves as an integrated prevention/inter-

prevention framework for bullying in schools as it involves a complex set of interacting factors from multiple contexts (Dresler-Hawke and Whitehead 2009).

The second strength of the present study was that we examined the associations between various types of bullying involvement and QOL in adolescents. Previous research showed that bullying behavior serves different social functions, (Peeters et al. 2010), as well as that different types of bullying victimization could result in independent effects on psychological trauma symptoms (Turner et al. 2011). The present study found that the directions of associations between bullying involvement and QOL in adolescents vary according to the types of bullying involvement and the dimensions of QOL. Based on the results of the present study, we suggest that further study is warrant to explore the underlying etiologies accounting for the various directions of associations between the types of bullying involvement and the dimensions of QOL in adolescents. Mental health and educational professionals should evaluate adolescents' self-reported QOL to early detect bullying victimization and deliver necessary assistance. Moreover, mental health and educational professionals need to keep it in mind that the directions of associations between various types of bullying perpetration and the dimensions of QOL may vary and need to provide assistance based on individual need of perpetrators.

Our study has several limitations. First, the cross-sectional research design limited our ability to make direct associations between different types of bullying involvement and QOL. Moreover, different types of bullying involvement may overlap. Further longitudinal study is warranted to determine the direct consequences of specific types of bullying involvement and their influences on QOL. Second, the data regarding bullying involvement and QOL were provided by adolescents. The problem of shared-method variance results from having a sole information source and requires careful consideration. Third, the experience of bullying involvement and QOL were measured on different time scales. Although the students reported their experiences of bullying involvement over the past year, their responses regarding QOL only reflect their subjective satisfaction for the preceding 2 weeks. Fourth, the bullying experience was surveyed by using the self-reported questionnaire. Thus some components of bullying involvement might not be detected in the present study. For example, "imbalance of power between perpetrators and victims" was not surveyed in the self-reported questionnaire.

Conclusion

The present study shows that victimization by bullying was negatively associated with several dimensions of QOL in adolescents, indicating that mental health and educational professionals should survey QOL levels routinely for adolescents who are being bullied. Furthermore, the directions of associations between bullying perpetration and QOL in adolescents vary according to the types of bullying perpetration and the dimensions of QOL. These results indicate that adolescents may perpetrate bullying according to their various psychological needs, or that bullying perpetration may vary in its influences on various dimensions of QOL. The results of this study may facilitate assessing needs and allocating resources, and could serve as the basis upon which mental health and educational professionals develop comprehensive strategies to improve the QOL of adolescents who are involved in bullying.

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