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Internalizing and externalizing problems in adolescent aggression perpetrators, victims, and perpetrator-victims

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Abstract

The aims of this study were to examine the risks of internalizing and externalizing problems in aggression perpetrators, victims, and perpetrator-victims and their sex differences, and to examine the effects of the level of aggression involvement on internalizing and externalizing problems. Eight thousand eighty-five adolescents in Taiwan completed the questionnaires. The associations of aggression involvement and the level of aggression involvement with internalizing and externalizing problems were examined. Compared with the neutrals, pure aggression perpetrators and perpetrator-victims had higher risks for internalizing and externalizing problems and pure victims had higher risks for internalizing problems and theft. Differences in the risks for internalizing and externalizing problems were found among 3 groups with aggression involvement. Levels of aggression involvement increased the risks for some internalizing and externalizing problems. Sex differences were also found. Internalizing and externalizing problems need to be detected among adolescents involved in aggression, especially among perpetrator-victims, those with high levels of aggression involvements, and females.

1. Introduction

Involvement in aggression is an important issue affecting the health of adolescents internationally. A cross-sectional self-report survey on adolescent students in 35 countries found that aggressive behaviors are prevalent among adolescents, and their associations with injury-related health outcomes are remarkably similar across countries [1]. The latest official report in 2007 indicated that homicide is the seventh and eighth leading cause of death for Taiwanese people aged 1 to 14 and 15 to 24, respectively [2]. However, little is known about adolescent aggression and its associations with mental health outside the United States [3].

The associations of involvement in aggression with internalizing and externalizing problems are an important health issue in adolescents. Traditionally, typical victims would correspond to an internalizing person and would be expected to present with internalizing problems, and the typical perpetrators would fit the externalizing category and present with externalizing problems [4]. However, studies on victims of aggression have revealed that victimization concurrently and prospectively predicts both internalizing [5] and externalizing problems [6]. On the other hand, research has also found that internalizing problems can predict the occurrence of aggression perpetration [7]. The results of these studies have raised the possibility that the difference in internalizing and externalizing problems between aggression perpetrators and victims might not be so definitive.

Except for the relative risks of internalizing and externalizing problems in aggression perpetrators and victims needing further clarification, other issues also need further examination. Firstly, there is a special group of adolescents, named perpetrator-victims, who are involved in both perpetrating aggression to others and being victimized

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by others. Given that perpetrator-victims have dual roles in aggression involvement, one might have predicted that they have a higher risk for internalizing problems than pure perpetrators, as well as to have a higher risk for externalizing problems than the pure victims. However, further studies are needed to examine this hypothesis. Secondly, a previous study found that higher levels of exposure to aggression are associated with worse internalizing symptoms [8]. However, the associations of the level of aggression perpetration with internalizing problems and of the level of victimization with externalizing problems have seldom been examined. Thirdly, 2 previous studies found sex difference in the prediction of aggressive behaviors for suicidality [9,10]; however, few studies have examined sex differences in the associations of aggressive behaviors with other internalizing and externalizing problems. Studying these issues may provide information for developing prevention programs for aggression and associated mental problems in adolescents.

The aims of this study were to (1) examine the risks of internalizing and externalizing problems in aggression perpetrators, victims, and perpetrator-victims by using those noninvolved as a reference; (2) examine the risks of internalizing and externalizing problems in perpetrator-victims compared with perpetrators and victims; (3) examine the effects of the level of aggression perpetration and victimization on internalizing and externalizing problems; and (4) examine the sex effect on the associations of involvement in aggression with internalizing and externalizing problems in a large-scale, representative, nonreferred Taiwanese adolescent population.

2. Methods

The current investigation is based on data from the Project for the Health of Adolescents in Southern Taiwan, which was composed of data collected from 3 metropolitan cities and 4 counties. In 2004, there were 257 873 adolescent students in 209 junior high schools and 202 456 adolescent students in 140 senior high/vocational schools in this area. Based on the definitions of urban and rural districts in the Taiwan Demographic Fact Book [11] and school and grade characteristics, a stratified random sampling strategy was used with the final goal of ensuring that there was proportional representation of districts, schools, and grades. Twelve junior high and 19 senior high/vocational schools were randomly selected from urban districts; likewise, 11 junior high and 10 senior high/vocational schools were randomly selected from rural districts. The classes of these schools were further stratified into 3 levels based on grades in both junior high and senior high/vocational schools. Then, 207 classes that contained a total of 12 210 adolescent students were randomly selected based on the ratio of students in each grade.

Research assistants explained the purpose and procedure of this study to the students in class, emphasizing respect for their privacy, and encouraged them to participate. Written, informed consents were obtained from the adolescents beforehand, and the participants were then invited to complete the research questionnaires anonymously. The protocol was approved by the Institutional Review Board of Kaohsiung Medical University. We also recruited 76 adolescents (40 junior high school students and 36 senior high school students) and their parents into a pilot study to examine the reliability and validity of research instruments.

2.1. Assessment

2.1.1. Aggression

We used the following 3 questions from the Adolescent Aggressive Behaviors Questionnaire [12] to assess the occurrence of aggression in the preceding year: (1) “Have you ever hit or kicked someone on purpose?” (2) “Have you ever grabbed or shoved someone?” and (3) “Have you ever threatened to hurt someone or take their things?” Another 3 questions were used to ask if the participants had been the recipient of those same acts aggression. The response format for these questions was 0 = never, 1 = once, 2 = 2 to 5 times, 3 = 6 to 10 times, 4 = 10 to times, or 5 = more than 50 times. The participants whose answer was not “0” to the first 3 questions were classified as having ever perpetrated aggression to others in the preceding year. The participants whose answer was not “0” to the last 3 questions were classified as having ever been victimized by the perpetrators. The 2-week test-retest reliability (κ) was 0.691 to 0.712 ($P < .001$). The sum of the first and last 3 questions represents the levels of perpetrating aggression and being victimized, respectively.

2.1.2. Suicidality

To assess the occurrence of suicidal attempt and 4 forms of suicidal ideation in the preceding year, we invited participants to complete the questionnaire containing the following questions from the Epidemiological Version of the Kiddie Schedule for Affective Disorders and Schizophrenia [13]: (1) “Has there ever been a period of 2 weeks or longer when you thought a lot about death, including thoughts of your own death, somebody else’s death, or death in general?” (2) “Has there ever been a period of 2 weeks or longer when you had a desire to die?” (3) “Have you ever thought of attempting suicide?” (4) “Have you had a suicidal plan?” and (5) “Have you ever attempted suicide?” Each question elicited a “yes” or “no” answer. The participants who answered “yes” to any of 5 questions were classified to have suicidality. The κ coefficient of agreement (κ) between participants’ self-reported suicidal attempt and their parents’ reports was 0.541 ($P < .001$).

2.1.3. Athens Insomnia Scale

We used the 8-item version of the Athens Insomnia Scale (AIS) to measure participants’ insomnia problems [14]. Each item of the AIS-8 can be rated from 0 to 3, with 0 corresponding to “no problem at all” and 3 “very serious problem.” The Cronbach α in the present study was .669 and

2-week test-retest reliability was .718 ($P < .001$). In a pilot study, total scores of the AIS-8 in 36 adolescents and young college students who had sleep disturbances in the psychiatric clinics were significantly higher than those in the age- and sex-matched controls ($t = -8.194$, $P < .001$). In this study, we classified the adolescents whose total AIS-8 score was higher than the 85th percentile of population as having insomnia.

2.1.4. Depression

We used the 20-item Mandarin-Chinese version [15] of the Center for Epidemiological Studies' Depression Scale (CES-D) [16] to assess the frequency of depressive symptoms in the preceding week. The Cronbach α for the CES-D in the present study was .93. Based on the result of a previous study using the CES-D in a 2-phase survey for depressive disorders among nonreferred adolescents in Taiwan [17], we defined those participants whose total CES-D score was higher than 28 as having significant depression.

2.1.5. Truancy and theft

The occurrences of truancy and criminal behaviors were assessed by the following questions: (1) "Have you ever been absent from school without permission in the preceding year?" and (2) "Have you had any criminal record of theft?" The 2-week test-retest reliability (κ) was 0.703 and 0.746 ($P < .001$), respectively. The κ coefficient of agreement between participants' self-reported criminal record of theft and their parents' report were 0.682 ($P < .001$).

2.1.6. Alcohol consumption

The item of the Questionnaires for Experience in Substance Use was used to inquire dichotomously whether participants had drunk alcohol every week in the preceding year [18]. The 2-week test-retest reliability of the item in this study (κ) was 0.723 ($P < .001$).

2.1.7. Sociodemographic characteristics

Participants' sex, age (<15 vs ≥15 years), and paternal education level (>9 years vs ≦9 years of compulsory fundamental education) were collected. In this study, low paternal education level was used to represent a low socioeconomic status (SES).

2.2. Procedure and statistical analysis

The adolescents were asked to anonymously complete the questionnaire based on the explanations of the research assistants and under their direction. All students received a gift that was worth 33 NT dollars (US $1) at the end of the assessment. Data analysis was performed using SPSS 12.0 statistical software (SPSS, Chicago, Ill). Based on the responses to the questions assessing the experiences of aggression, the participants were classified into 4 groups: pure perpetrators, those who perpetrated aggression to others only; pure victims, those who were victimized of aggression only; perpetrator-victims, those who were involved in perpetrate aggression to others and who also are victims; and neutrals, those who were not involved in aggression.

Risks of internalizing (suicidality, insomnia, and depression) and externalizing problems (truancy, alcohol drinking, and theft) in adolescents with involvement in aggression were examined by 2 levels of comparison. First, by using the neutrals as reference, we examined the association between each internalizing and externalizing problem (dependent variable) and the experience of aggression perpetration, victimization, and perpetration-victimization by using logistic regression analysis models. Because sex [19], age [20], and socioeconomic status [21] are known to correlate with both aggression behaviors and adolescent mental health, we examined the associations by controlling for the effects of these sociodemographic characteristics. Second, we compared the risks of internalizing and externalizing problems in perpetrator-victims with those in perpetrators and in victims. We also examined the effects of the levels of perpetration and victimization on the occurrences of internalizing and externalizing problems by using logistic regression analysis models. Meanwhile, we examined the sex difference in the association of internalizing and externalizing problems with involvement in aggression. Odds ratio (OR) and 95% confidence interval (95% CI) were used to examine the significance.

3. Results

3.1. Sample description

A total of 11 111 (91.0%) adolescents returned their written informed consents. Of them, 8085 (72.8%) participants completed all research questionnaires without omission. Those who had missing data in the questionnaires were more likely to be male ($\chi^2 = 52.113$, $P < .001$) and from junior high schools ($\chi^2 = 92.824$, $P < .001$). Sociodemographic characteristics and internalizing and externalizing problems among aggression perpetrators, victims, perpetrator-victims, and neutrals are shown in Table 1. According to the definitions described above, 1241 (15.3%) participants were classified as pure perpetrators, 293 (3.6%) were pure victims, 506 (6.3%) were perpetrator-victims, and 6045 (74.8%) were neutrals. Significant differences in sex, age, paternal education level, and internalizing and externalizing problems were found among these 4 groups. Thus, we used logistic regression analysis to examine the associations between aggression involvement and internalizing and externalizing problems by controlling for the effects of sex, age, and paternal education.

By using the neutrals as reference, the risks for internalizing and externalizing problems in aggression perpetrators, victims, and perpetrator-victims are shown in Table 2. The results indicated that after controlling for sociodemographic characteristics, both pure perpetrators and perpetrator-victims were more likely to have all internalizing and externalizing problems than the neutrals. Pure victims

Table 1
Sociodemographic characteristics and internalizing and externalizing problems in adolescents with involvement in aggression

	Perpetrators (n = 1241)	Victims (n = 293)	Perpetrator-victims (n = 506)	Neutrals (n = 6045)	χ^2
Male	825 (66.5)	167 (57.0)	381 (75.3)	2473 (40.9)	451.816**
Age ≥15 y	600 (48.3)	139 (47.4)	258 (51.0)	3183 (52.7)	10.024*
Low paternal education	425 (34.2)	115 (39.2)	175 (34.6)	1928 (31.9)	9.661*
Internalizing problems					
Have suicidality	448 (36.1)	137 (46.8)	245 (48.4)	1611 (26.7)	174.442**
Have insomnia	197 (15.9)	59 (20.1)	104 (20.6)	595 (9.8)	98.771**
Significant depression	169 (13.6)	61 (20.8)	111 (21.9)	634 (10.5)	84.668**
Externalizing problems					
Have truancy	350 (28.2)	45 (15.4)	185 (36.6)	782 (12.9)	321.096**
Drink alcohol every week	59 (4.8)	2 (0.7)	35 (6.9)	29 (0.5)	226.396**
Have criminal record of theft	88 (7.1)	14 (4.8)	60 (11.9)	122 (2.0)	192.072**

* $P < .05$.
** $P < .001$.

were also more likely to have all internalizing problems than the neutrals. However, with regard to externalizing problems, only theft, but not truancy and alcohol drinking, was more prevalent in pure victims than in the neutrals.

The risks for internalizing and externalizing problems in perpetrator-victims compared with those in pure perpetrators and in pure victims are also shown in Table 2. Regarding to internalizing problems, whereas perpetrator-victims were more likely to report all 3 internalizing problems than perpetrators, no difference in any internalizing problem was found between perpetrator-victims and victims. Regarding externalizing problems, whereas perpetrator-victims were more likely to report all externalizing problems than victims, perpetrator-victims were more likely to report truancy and theft but not alcohol drinking than perpetrators.

The results of examining the effects of levels of aggression perpetration and victimization on internalizing and externalizing problems are shown in Table 3. Among pure perpetrators, a higher level of aggression perpetration to others increased the risks for both internalizing and externalizing problems. Among pure victims, a higher level of victimization increased the risks for internalizing problems but not externalizing problems. Among perpetrator-victims, both higher levels of aggression perpetration and victimization increased the risks for suicidality, depression, alcohol drinking, and theft. Meanwhile, a higher level of aggression perpetration but not victimization increased the risk for truancy among perpetrator-victims. However, neither the level of aggression perpetration nor victimization was associated with insomnia among perpetrator-victims.

We further examined the sex difference in the association of aggression involvement with internalizing and externalizing problems. The results indicated that female perpetrators (OR, 2.528; 95% CI, 2.059-3.105) had a higher risk for suicidality than male ones (OR, 1.621; 95% CI, 1.348-1.951). Meanwhile, female perpetrator-victims had a higher risk for theft (OR, 2.567; 95% CI, 2.147-3.069) than male ones (OR, 1.509; 95% CI, 1.317-1.730).

4. Discussion

This study found that pure perpetrators had higher risks for all externalizing problems than did the neutrals. As aggression is one of the typical externalizing problems, it is not surprising that aggression perpetration has a high potential to co-occur with other externalizing problems. However, it is noteworthy that pure perpetrators also had higher risks for all internalizing problems than the neutrals, as well as higher levels of aggression perpetration increased

Table 2
Risks of internalizing and externalizing problems in adolescents with involvement in aggression[a]

	Internalizing problems			Externalizing problems		
	Suicide	Insomnia	Depression	Truancy	Alcohol drinking	Theft
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Perpetrators vs neutrals	2.047 (1.786-2.346)	1.929 (1.612-2.308)	1.588 (1.316-1.915)	2.792 (2.401-3.246)	9.626 (6.073-15.257)	3.385 (2.537-4.516)
Victims vs neutrals	3.007 (2.353-3.843)	2.488 (1.842-3.361)	2.527 (1.876-3.405)	1.277 (.918-1.778)	1.407 (.333-5.937)	2.282 (1.292-4.029)
Perpetrator-victims vs neutrals	3.755 (3.093-4.557)	2.710 (2.134-3.441)	2.971 (2.349-3.758)	4.056 (3.307-4.976)	13.692 (8.159-22.976)	5.852 (4.190-8.173)
Perpetrator-victims vs victims	1.249 (.928-1.680)	1.089 (.759-1.563)	1.176 (.823-1.680)	3.175 (2.191-4.602)	9.734 (2.317-40.888)	2.564 (1.403-4.686)
Perpetrator-victims vs perpetrators	1.834 (1.480-2.273)	1.405 (1.077-1.832)	1.872 (1.431-2.448)	1.453 (1.162-1.817)	1.422 (.921-2.196)	1.729 (1.222-2.446)

[a] Controlling for the effects of sex, age, and paternal education level.

Table 3
The effects of levels of aggression and being victimized on the occurrences of internalizing and externalizing problems in adolescent aggression perpetrators, victims, and perpetrator-victims[a]

	Internalizing problems			Externalizing problems		
	Suicide	Insomnia	Depression	Truancy	Alcohol drinking	Theft
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
In perpetrators						
Level of aggression	1.134 (1.058-1.216)	1.220 (1.131-1.316)	1.174 (1.082-1.274)	1.270 (1.179-1.367)	1.404 (1.271-1.550)	1.263 (1.154-1.383)
In victims						
Level of being victimized	1.189 (1.012-1.396)	1.174 (1.016-1.356)	1.247 (1.070-1.452)	.948 (.778-1.155)	.929 (.724-1,214)	1.007 (.752-1.349)
In perpetrator-victims						
Level of aggression	1.157 (1.072-1.248)	1.073 (.995-1.158)	1.121 (1.042-1.205)	1.163 (1.081-1.250)	1.384 (1.256-1.525)	1.254 (1.152-1.364)
Level of being victimized	1.111 (1.024-1.205)	1.082 (.998-1.174)	1.151 (1.062-1.247)	1.045 (.969-1.127)	1.259 (1.147-1.383)	1.199 (1.098-1.309)

[a] Controlling for the effects of sex, age, and paternal education level.

the risks for all internalizing problems. More recently, research has suggested a connection between aggression toward others and suicidality [10]. For example, engaging in a physical fight has been found to increase the risk of suicidal attempt [22], which supports the link between externally and internally directed aggression [23]. The results of this study indicated that the range of mental health problems co-occurring with aggression perpetration is not only restricted to externalizing problems, and thus internalizing problems is also needed to detect and intervene among aggression perpetrators.

Congruent with the results of previous studies [6,8], this study found that pure victims had higher risks for all internalizing problems than the neutrals. One possible explanation for the association is that victimized youths may interpret these negative experiences as critical appraisals of the self, leading to internalized distress [24]. Meanwhile, victims may learn helplessness from the distress caused by victimization of aggression, which may further result in internalizing problems [25]. On the other hand, in this study, only theft but not truancy and alcohol drinking was more prevalent in pure victims than in the neutrals. This result was contrary to that of a study on adolescents referred for mental health treatment [26] *and of* a study on adolescents who had been seriously physically attacked or assaulted [27]. Although one might attribute the discrepancy to the difference in the severity of aggression that victims have experienced, the high levels of aggression victimization still did not raise the risk of truancy, alcohol drinking or theft in this study. However, we could not rule out the possibility that the victims will develop truancy and alcohol drinking in future, and this needs further follow-up studies to determine.

One of the important findings of this study is the vulnerability of perpetrator-victims to internalizing and externalizing problems. This study found that while perpetrator-victims were more likely to report all internalizing problems than pure perpetrators, no difference in any internalizing problem was found between perpetrator-victims and pure victims. This result indicates that regarding internalizing problems, perpetrator-victims are significantly different to pure perpetrators but similar to pure victims. On the other hand, regarding to externalizing problems, perpetrator-victims not only had higher risks for all 3 externalizing problems than pure victims but also had higher risks for truancy and theft than pure perpetrators. This result partially supported the result of a previous study that the aggression perpetrator-victims have the poorest psychological health among adolescents with involvement in aggression and thus they are the most necessary to be identified and targeted in the violence-prevention intervention strategies [28].

This study found that a higher level of aggression perpetration increased the risks for both internalizing and externalizing problems among pure perpetrators. A higher level of aggression perpetration among pure perpetrators may indicate they have more adverse biologically or psychosocially underlying weaknesses that increase the risks of aggression and internalizing and externalizing problems concurrently. On the other hand, a higher level of victimization increased the risks for internalizing problems among pure victims, which was in line with the result of a previous study [8]. However, a higher level of victimization did not increase the risks for externalizing problems among pure victims. The different associations of the level of victimization with internalizing and externalizing problems among pure victims raise the possibility that internalizing and externalizing problems may have different etiologies among pure victims, and this is worthy of further study. Compared with those among pure perpetrators and pure victims, the associations of the levels of aggression involvement with internalizing and externalizing problems were more heterogeneous among perpetrator-victims, which also indicated that perpetrator-victims may be a group of adolescents different from pure perpetrators and pure victims.

Another important finding of this study is the sex difference in the association of aggression involvement with internalizing and externalizing problems. The results of

previous studies on the sex difference in the association between aggression perpetration and suicidality were mixed. Whereas some research found that female perpetrators were more likely to report suicidal ideation or behaviors [9,10], other research had opposite results [29]. In this study, female perpetrators had a higher risk for suicidality than male ones. Meanwhile, female perpetrator-victims had a higher risk for theft than male ones. Given that aggression perpetration is less common in girls than in boys [30-32], it may be the case that aggressive girls represent a troubled, but overlooked, special population [10]. Our results suggest that aggression prevention programs targeted to female adolescents may have the potential to address both self-directed and outwardly directed aggression, with potential benefits to women's mental health. Meanwhile, such programs may need to be sex-specific and that more must be learned about the underlying reasons, circumstances, and consequences of female aggression [10].

4.1. Methodological considerations

This study examined several issues about the associations between aggression involvements and mental health that drew research attention recently, such as comparing the risks for internalizing and externalizing problems in perpetrator-victims with those in pure perpetrators and pure victims, examining the effects of the levels of aggression perpetration and victimization on internalizing and externalizing problems, and examining sex differences in the associations between aggression involvements and internalizing and externalizing problems. Meanwhile, the selection bias was minimized by sampling the participants in a nonreferred representative school-based sample. However, some limitations of this study should be addressed. Firstly, although it is not a main aim of this study to determine the causal relationships between aggression involvements and internalizing and externalizing problems, the cross-sectional research design of this study limited our ability to draw conclusions regarding the causal relationships. Secondly, the data were provided by the adolescents, and some data, such as aggression involvement and externalizing problems, are difficult to validate. Thirdly, this study recruited school population adolescent students as the research population; however, adolescents who have dropped out from school and were the students of night schools who may have different patterns of aggression involvement and mental health status were not recruited into this study. Lastly, the aggression measure in this study included a question inquiring about threatening to take the possessions of another person, which might confound the study's measure of criminal/theft behaviors and the association between aggression and theft.

4.2. Implications

This study found that not only externalizing problems but also internalizing problems need to be detected and acted upon among adolescents perpetrating aggression. Meanwhile, victims of aggression also had higher risks for internalizing problems and theft than those noninvolved in aggression. Mental health professionals and educators especially need to pay attention to perpetrator-victims who had several characteristics of mental health problems different from those of pure perpetrators and pure victims. Those with high levels of aggression perpetration and victimization should be the target of intervention programs for improving their mental health. Such intervention programs for aggression should also take sex differences into consideration.

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References

[1] Pickett W, Craig W, Harel Y, Weizman R, Ratzoni G, Har-Even D, et al. HBSC Violence and Injuries Writing Group. Cross-national study of fighting and weapon carrying as determinants of adolescent injury. Pediatrics 2005;116:e855-63.
[2] Department of Health. Health and National Health Insurance Annual Statistics Information Service. Available from Department of Health, Executive Yuan, R.O.C. (Taiwan) http://www.doh.gov.tw/statistic/index.htm; 2007.
[3] Mattila VM, Parkkari JP, Rimpela AH. Risk factors for violence and violence-related injuries among 14- to 18-year-old Finns. J Adolesc Health 2006;38:617-20.
[4] Kaltiala-Heino R, Rimpelä M, Rantanen P, Rimpelä A. Bullying at school—an indicator of adolescents at risk for mental disorders. J Adolesc 2000;23:61-74.
[5] Lynch M. Consequences of children's exposure to community violence. Clin Child Fam Psychol Rev 2003;6:265-73.
[6] Cooley-Quille MR, Turner SM, Beidel DC. Emotional impact of children's exposure to community violence: a preliminary study. J Am Acad Child Adolesc Psychiatry 1995;34:1362-8.
[7] Swaim RC, Henry KL, Kelly K. Predictors of aggressive behaviors among rural middle school youth. J Prim Prev 2006;27:229-43.
[8] Ozer EJ, McDonald KL. Exposure to violence and mental health among Chinese American urban adolescents. J Adolesc Health 2006;39:73-9.
[9] Juon H, Ensminger ME. Childhood, adolescent, and young adult predictors of suicidal behaviors: a prospective study of African-Americans. J Child Psychol Psychiatry 1997;38:553-63.
[10] O'Donnell L, Stueve A, Wilson-Simmons R. Aggressive behaviors in early adolescence and subsequent suicidality among urban youths. J Adolesc Health 2005;37:517.
[11] Ministry of the Interior. 2001 Taiwan-Fukien demographic fact book, Republic of China. Taipei, Taiwan: Executive Yuan; 2002 [in Chinese].
[12] McConville DW, Cornell DG. Aggressive attitudes predict aggressive behavior in middle school students. J Emot Behav Disord 2003;11:179-87.
[13] Puig-Antich J, Chambers W. The Schedule for affective disorders and schizophrenia for school age children (Kiddie-SADS). New York: New York State Psychiatric Institute; 1978.
[14] Soldatos CR, Dikeos DG, Paparrigopoulos TJ. Athens Insomnia Scale: validation of an instrument based on ICD-10 criteria. J Psychosom Res 2000;48:555-60.
[15] Chien CP, Cheng TA. Depression in Taiwan: epidemiological survey utilizing CES-D. Seishin Shinkeigaku Zasshi 1985;87:335-8.

[16] Radloff LS. The CSE-D scale: a self-report depression scale for research in the general population. Appl Psychol Meas 1977;1: 385-401.
[17] Yang HJ, Soong WT, Kuo PH, Chang HL, Chen WJ. Using the CES-D in a two-phase survey for depressive disorders among non-referred adolescents in Taipei: a stratum-specific likelihood ratio analysis. J Affect Disord 2004;82:419-30.
[18] Yen CF, Yang YH, Ko CH, Yen JY. Substance initiation sequences among Taiwanese adolescents using methamphetamine. Psychiatry Clin Neurosci 2005;59:683-9.
[19] Brady SS, Donenberg GR. Mechanisms linking violence exposure to health risk behavior in adolescence: motivation to cope and sensation seeking. J Am Acad Child Adolesc Psychiatry 2006;45: 673-80.
[20] Vermeiren R, Bogaerts J, Ruchkin V, Deboutte D, Schwab-Stone M. Subtypes of self-esteem and self-concept in adolescent violent and property offenders. J Child Psychol Psychiatry 2004;45:405-11.
[21] Blum RW, Beuhring T, Shew ML, Bearinger LH, Sieving RE, Resnick MD. The effects of race/ethnicity, income, and family structure on adolescent risk behaviors. Am J Public Health 2000;90:1879-84.
[22] Centers for Disease Control and Prevention. Suicide attempts and physical fighting among high school students—US, 2001. MMWR 2004;53:474-6.
[23] Apter A, Gothelf D, Orbach I, Weizman R, Ratzoni G, Har-Even D. Correlation of suicidal and violent behavior in different diagnostic categories in hospitalized adolescent patients. J Am Acad Child Adolesc Psychiatry 1995;34:912-8.
[24] Crick NR, Bigbee MA. Relational and overt forms of peer victimization: a multi-informant approach. J Consult Clin Psychol 1998;66:337-47.
[25] Swearer SM, Grills AE, Haye KM, Cary PT. Internalizing problems in students involved in bullying and victimization: implications for intervention. In: Espelage DL, Swearer SM, editors. Bullying in American schools: a social-ecological perspective on prevention and intervention. Mahwah (NJ): Lawrence Erlbaum Associates; 2004. p. 63-83.
[26] Youngstrom E, Weist MD, Albus KE. Exploring violence exposure, stress, protective factors and behavioral problems among inner-city youth. Am J Community Psychol 2003;32:115-29.
[27] Schilling EA, Aseltine Jr RH, Gore S. Adverse childhood experiences and mental health in young adults: a longitudinal survey. BMC Public Health 2007;7:30.
[28] Stein JA, Dukes RL, Warren JI. Adolescent male bullies, victims, and bully-victims: a comparison of psychosocial and behavioral characteristics. J Pediatr Psychol 2007;2:273-82.
[29] Vannatta RA. Adolescent gender differences in suicide-related behaviors. J Youth Adolesc 1997;26:559-62.
[30] Ellickson PL, McGuigan KA. Early predictors of adolescent violence. Am J Public Health 2000;90:566-72.
[31] Fitzpatrick KM, Boldizar JP. The prevalence and consequences of exposure to violence among African-American youth. J Am Acad Child Adolesc Psychiatry 1993;32:424-30.
[32] Saner H, Ellickson P. Concurrent risk factors for adolescent violence. J Adolesc Health 1996;19:94-103.