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Self-Reported and Parent-Reported School Bullying in Adolescents with High Functioning Autism Spectrum Disorder: The Roles of Autistic Social Impairment, Attention-Deficit/Hyperactivity and Oppositional Defiant Disorder Symptoms

Wen-Jiun Chou (Department of Child and Adolescent Psychiatry, Chang Gung Memorial Hospital, Kaohsiung Medical Center, Kaohsiung, & College of Medicine, Chang Gung University, Taoyuan, Taiwan)
Ray C. Hsiao (Department of Psychiatry and Behavioral Sciences, University of Washington School of Medicine, & Department of Psychiatry, Children's Hospital and Regional Medical Center, Seattle, WA)
Hsing-Chang Ni (Department of Child and Adolescent Psychiatry, Chang Gung Memorial Hospital, Linkou Medical Center & College of Medicine, Chang Gung University, Taoyuan, Taiwan)
Hsin-Yi Liang (Department of Child and Adolescent Psychiatry, Chang Gung Memorial Hospital, Linkou Medical Center & College of Medicine, Chang Gung University, Taoyuan, Taiwan)
Chiao-Fan Lin (Department of Child and Adolescent Psychiatry, Chang Gung Memorial Hospital, Linkou Medical Center, Taoyuan, Taiwan)
Hsiang-Lin Chan (Department of Child and Adolescent Psychiatry, Chang Gung Memorial Hospital, Linkou Medical Center, Taoyuan, Taiwan)
Yi-Hsuan Hsieh (Department of Child and Adolescent Psychiatry, Chang Gung Memorial Hospital, Linkou Medical Center, Taoyuan, Taiwan)
Liang-Jen Wang (Department of Child and Adolescent Psychiatry, Chang Gung Memorial Hospital, Kaohsiung Medical Center, Kaohsiung, & College of Medicine, Chang Gung University, Taoyuan, Taiwan)
Min-Ching Li (Department of Child and Adolescent Psychiatry, Chang Gung Memorial Hospital, Kaohsiung Medical Center, Kaohsiung, Taiwan)
Huei-Fan Hu (Department of Psychiatry, Tainan Municipal Hospital, Tainan, Taiwan)*
Cheng-Fang Yen (Department of Psychiatry, Kaohsiung Medical University Hospital, & Department of Psychiatry, School of Medicine, and Graduate Institute of Medicine, College of Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan)*

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Corresponding author

Cheng-Fang Yen, M.D., Ph.D

Department of Psychiatry, Kaohsiung Medical University Hospital

No. 100, Tzyou 1st Rd, Kaohsiung 807, Taiwan

E-mail: chfaye@cc.kmu.edu.tw

Tel: 886-7-3121101 ext. 6816

Fax: 886-7-3134761

Huei-Fan Hu, M.D.

Department of Psychiatry, Tainan Municipal Hospital (Managed by Show Chwan medical Care Corporation),

670 Chongde Road, East District, Tainan 701, Taiwan

E-mail: cych07205@gmail.com

Tel: +886-6-2609926886

Fax: +886-6-2606351

Abstract

The aim of this study was to examine the prevalence of self-reported and parent-reported bullying victimization, perpetration, and victimization-perpetration and the associations of autistic social impairment and attention-deficit/hyperactivity disorder (ADHD) and oppositional defiant disorder (ODD) symptoms with bullying involvement in adolescents with high functioning autism spectrum disorder (ASD). A total of 219 adolescents with high functioning ASD participated in this study. The associations of sociodemographic characteristics, parent-reported autistic social impairment on the Chinese Social Responsiveness Scale, and parent-reported ADHD and ODD symptoms on the Short form of the Swanson, Nolan, and Pelham Version IV Scale (SNAP-IV)-Chinese version with self-reported and parent-reported bullying victimization, perpetration, and victimization-perpetration evaluated using the Chinese version of the School Bullying Experience Questionnaire were examined using logistic regression analysis. The agreement between self-reported and parent-reported bullying involvement was low. Compared with bullying involvement experiences reported by adolescents themselves, parents reported higher rates of pure bullying victimization (23.7% vs. 17.8%) and victimization-perpetration (28.8% vs. 9.1%) but a lower rate of pure bullying perpetration (5.9% vs. 9.1%). Deficit in socio-communication increases the risk of being pure victims and victim-perpetrators. Parent-reported victim-perpetrators had more severe ODD symptoms than did parent-reported pure victims. The agreement between self-reported and parent-reported bullying involvement of adolescents with high functioning ASD was low. Deficit in socio-communication and ODD symptoms were significantly associated with a high risk of bullying involvement in adolescents with high functioning ASD.

Key words: Bullying, autism spectrum disorder, attention-deficit/hyperactivity disorder, oppositional defiant disorder, social impairment.

1. Introduction

Children and adolescents with autism spectrum disorder (ASD) have been identified as the group vulnerable to school bullying. A recent study found that 19.2% of children with ASD were often victims, versus 4.6% for community children; 10.3% were often involved in teasing others, compared to 2.1% for the community control children [1]. A systematic literature search on children and adolescents with ASD found that the pooled prevalence estimate for school bullying perpetration, victimization and both was 10%, 44%, and 16%, respectively [2]. Bullying victimization was significantly associated with higher risks of depression [3], anxiety [4], suicide [5], poor quality of life [6], and poor educational outcomes [7] in children and adolescents with ASD. The results of previous studies indicated that bullying involvement in children and adolescents with ASD warrants mental health and educational professionals' attention. Determining the risk factors of involving in school bullying is the essential step to develop programs of prevention, early detection and effective intervention for children and adolescents with ASD.

The risk factors of bullying involvement for children and adolescents with ASD most often examined in previous studies included poor socio-communicative skills and comorbid attention-deficit/hyperactivity disorder (ADHD) and oppositional defiant disorder (ODD). Research has found that poor socio-communicative skills were correlated to peer victimization in children and adolescents with ASD [8-10]. Moreover, compared with those with ASD but no ADHD, children and adolescents with ASD and ADHD had increased odds of being bullying victims [10,11] and perpetrators [10,12]. Comorbid ODD also increased the potential to bullying others [11,12]. A recent study even found that the significant association between ASD and being perpetrators or victim-perpetrators disappeared after controlling for comorbid hyperactivity, attention problems, aggression and conduct problem, while risk for being bullied in ASD continued to be significantly elevated [1]. The results of the studies described above indicated that poor socio-communicative skills and comorbid ADHD and ODD have a determining role in bullying involvement among

children and adolescents with ASD.

Several important concerns regarding the roles of poor socio-communicative skills and comorbid ADHD and ODD symptoms in the risk of bullying involvement among adolescents with ASD warrant further study. First, the results of previous studies on the ability of adolescents with ASD to recognize bullying involvement are mixed. Some studies have found that adolescents with ASD may misinterpret bullying situations as non-bullying [13,14], other studies have found that adolescents with ASD demonstrate similar levels of ability to identify bullying situations [15,16]. Multiple sources of reports such as from parents, teachers and peers are considered important on identifying bullying involvement among adolescents with ASD. However, whether the rates and related factors of bullying involvement in adolescents with ASD are different between self-report and parent-report warrant further study.

Second, although the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) characterizes ASD in two behavioral domains, including difficulties in social communication and social interaction, and unusually restricted, repetitive behaviors and interests [17], ASD has the “spectrum" nature and is composed of subgroups with various symptom severity, cognition, and biological mechanisms [18]. For example, the social responsiveness scale (SRS), an instrument for assessing autistic traits of the individuals with ASD, is composed of various dimensions of autistic social impairment [19,20]. It warrants further study to examine whether various dimensions of autistic social impairment have various relationships with bullying involvement experiences in and adolescents with ASD.

Third, research has revealed that bullying victim-perpetrators, defined as people who bully others but are also bullied themselves, are a distinct group and the most troubled amongst all children and adolescents involved in peer bullying [21,22]. Children with ASD identified as bullying victim-perpetrators were more likely to have ADHD, ODD, or conduct disorder [11]. However, whether there are differences in autistic social impairment, ADHD and ODD symptoms

between adolescent victim-perpetrators, pure victims and pure perpetrators with ASD warrants further study.

A higher risk of bullying victimization and a lower risk of bullying perpetration were found in children with ASD and without intellectual disability (ID) but not in those with ASD and with ID [1]. Children with a high level of autistic traits were the most likely to involve in bullying [23]. Moreover, children with ASD in full inclusion classrooms were more likely to be victimized than those who spend the majority of their time in special education settings [23]. Therefore, the present study examined the roles of autistic social impairment and comorbid ADHD and ODD symptoms in self-reported and parent-reported bullying involvement in a group of adolescents with high functioning ASD, defined as having full-scale intelligence quotient determined using the Chinese version of the Wechsler Intelligence Scale for Children, fourth edition [24] >80, having verbal communication ability, and currently studying in inclusive classroom but not being pulled out to special education room. We hypothesized that there are differences in the rates and risk factors between self-reported and parent-reported school bullying involvement. Given that communication problems [8], fewer friendships [14], stereotyped behavior and interests [25], and aggressive behaviors [26] have been found to account for the high risk of bullying victimization in adolescents with ASD, we hypothesize that various dimensions of autistic social impairment have various relationships with bullying involvement experiences in adolescents with high functioning ASD. Moreover, given that research on general population found that victim-perpetrators are the most troubled amongst all children and adolescents involved in peer bullying [21,22], we hypothesized that adolescent victim-perpetrators with high functioning ASD have more severe autistic social impairment, ADHD and ODD symptoms between than did pure victims, and pure perpetrators with ASD.

2. Methods

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2.1. Participants

The study participants were enrolled from five child psychiatry outpatient clinics in Taiwan, including three university-affiliated teaching hospitals, one regional teaching hospital and one child psychiatry specified clinic. The Taiwan National Health Insurance allows patients visiting the outpatient clinics of teaching hospitals without transference of general practitioners. Therefore, the adolescents of these five child psychiatry outpatient clinic in the present study are representative of those of similar age in Taiwan. The participants were required to meet the following criteria for inclusion in the study: (1) age, 11-18 years; (2) having a diagnosis of ASD according to the DSM-5; (3) full-scale intelligence quotient determined using the Chinese version of the WISC-IV >80; (4) having verbal communication ability; and (5) currently studying in inclusive classroom but not being pulled out to special education room. Those who fitted the criteria were consecutively recruited into this study between August 2013 and July 2016. Parents who had intellectual disability, schizophrenia, bipolar disorder, or any cognitive deficits that resulted in significant community difficulties were excluded. A total of 228 adolescents with high-functioning ASD were invited into this study. Of them, 219 (96.1%) adolescents and their parents agreed to participate in this study and were interviewed by the research assistants based on the research questionnaire. The Institutional Review Board (IRB) of Kaohsiung Medical University (KMUHIRB-20120084).

2.2. Measures

Chinese version of the School Bullying Experience Questionnaire (C-SBEQ). The self-reported and parent-reported C-SBEQ was used to evaluate adolescents' involvement in school bullying in the previous one year with 16 items answered on a Likert 4-point scale range with 0 indicating "never", 1 indicating "just a little", 2 indicating "often", and 3 indicating "all the time" [27,28]. This scale was composed of four 4-item subscales evaluating being a victim of passive bullying (items 1 to 4, including social exclusion, being called a mean nickname, and being spoken ill of), being a victim of active bullying (items 5 to 8, including being beaten up, being forced to do work, and having

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money, school supplies, and snacks taken away), being a perpetrator of passive bullying (items 9 to 12), and being a perpetrator of active bullying (items 13 to 16). Participants who answered 2 or 3 on any item among items 1 to 4, items 5 to 8, items 9 to 12, and items 13 to 16 were identified as self-reported and parent-reported victims of passive bullying, victims of active bullying, perpetrators of passive bullying, and perpetrators of active bullying, respectively. Four groups were also distinguished by type of bullying involvement: pure perpetrators, those who bullied others but were not bullied by others; pure victims, those who were bullied by others but did not bully others; victim-perpetrators, those who were bullied by others and also bullied others; and a neutral group, those who neither bullied others nor were bullied by others. The results of the previous study examining the psychometrics of the C-SBEQ have been described elsewhere and supported that the C-SBEQ has good reliability and validity [28]. In the present study we invited both adolescents and their parents to rate adolescents' involvement in school bullying.

Chinese Social Responsiveness Scale (SRS). The parent -reported Chinese version of the SRS contains 60 items evaluated on a 4-point Likert scale that assess adolescents' extent of autistic social impairment [19,20]. The Chinese version of the SRS was composed of four subscales, including socio-communication, autism mannerisms, social awareness, and social emotion. A higher total score if the subscale indicates greater autistic social impairment. Research has found that the SRS effectively distinguish between children and adolescents with and without ASD [19,20].

Short version of the Swanson, Nolan, and Pelham Version IV Scale-Chinese version (SNAP-IV). The short version of the SNAP-IV-Chinese version contains 26 items comprising the core DSM-IV-derived ADHD subscales of inattention, hyperactivity/impulsivity, and ODD symptoms [29,30]. Each item is rated on a 4-point Likert scale from 0 (*not at all*) to 3 (*very much*). Higher total scores of the subscales indicate greater ADHD and ODD symptoms. The Cronbach's α values of the inattention, hyperactivity/impulsivity, and ODD subscales in the present study were .91, .91 and .92, respectively.

Demographic characteristics. The present study examined adolescents' age and sex and parental marital status of (married and living together vs. divorced or separated) and educational duration.

2.3. Procedure

Adolescents with high-functioning ASD and their parents were invited to complete the research questionnaires. Research assistants conducted the interview to collect adolescents' self-reported school bullying experiences based on the C-SBEQ. The parents completed the C-SBEQ, the Chinese SRS, short version of SNAP-IV and the questionnaire for demographic characteristics. The parents can ask the research assistants if they had problems in completing the questionnaires. Data analysis was performed using SPSS 20.0 statistical software (SPSS Inc., Chicago, IL, USA).

2.4. Statistical analysis

Participants' demographic characteristics, the levels of social communication deficits and ADHD and ODD symptoms, and the prevalence of self-reported and parent-reported bullying involvement were calculated using descriptive statistics. The associations of demographic characteristics, autistic social impairment and ADHD and ODD symptoms (independent variables) with being pure bullying victims, pure bullying perpetrators, and victim-perpetrators (dependent variables) were firstly examined using bivariate logistic regression analysis by using the neutral group as the reference. The significant variables were further selected into multi-variable logistic regression analysis to adjust the effects of other variables. The related factors of being victim-perpetrators were also examined by using the pure victims and pure perpetrators as the references. Odds ratio (OR) and its 95% confidence interval (CI) were used to represent the statistical significance.

3. Results

3.1. Prevalence of school bullying involvement

Table 1 shows demographic characteristics and the levels of autistic social impairment and ADHD and ODD symptoms among 219 adolescents with high-functioning ASD. Table 2 shows the rates of self-reported and parent-reported bullying involvement, including being pure victims, pure perpetrators, and victim-perpetrators. Compared with the rates of bullying involvement experiences reported by adolescents themselves, parents reported higher rates of adolescents' pure bullying victimization (23.7% vs. 17.8%) and victimization-perpetration (28.8% vs. 9.1%) but a lower rate of pure bullying perpetration (5.9% vs. 9.1%). The agreement between self-reported and parent-reported bullying involvement was low (kappa = .101). Only 10 (4.6%), 1 (0.5%), and 8 (3.7%) participants were simultaneous self-reported and parent-reported pure victims, pure perpetrators, and victims-perpetrators, respectively. Parents identified a half (n = 70) of the self-reported neutrals as pure victims (n = 31), pure perpetrators (n = 10), or victims-perpetrators (n = 29). Parents also identified 38.5% (n = 15) of the self-reported pure victims and 55% (n = 11) of the self-reported pure perpetrators as victim-perpetrators. Moreover, parents identified 30.8% (n = 12) of the self-reported pure victims, 15% (n = 3) of the self-reported pure perpetrators, and 30% (n = 6) of the self-reported victim-perpetrators as the neutrals.

[Tables 1 and 2 about here]

3.2. Correlates of bullying involvement

Table 3 shows the results of bivariate logistic regression analysis examining the correlates of self-reported bullying involvement. The results indicated that self-reported pure bullying victims had a shorter maternal education duration and more severe deficit in socio-communication compared with self-reported neutrals. Self-reported pure bullying perpetrators had more severe deficit in socio-communication, inattention and hyperactivity/impulsivity symptoms than did self-reported neutrals. Self-reported victim-perpetrators had more severe deficits in socio-communication, autism mannerism, and social emotion than did self-reported neutrals. No difference in demographic characteristics, social communication deficits, or ADHD and ODD

symptoms was found between self-reported victim-perpetrators and self-reported pure victims or between self-reported victim-perpetrators and self-reported pure perpetrators.

[Table 3 about here]

Table 4 shows the results of bivariate logistic regression analysis examining the correlates of parent-reported bullying involvement. The results indicated that parent-reported pure bullying victims had more severe deficits in socio-communication, autism mannerism, and social emotion, and inattention and hyperactivity/impulsivity symptoms than did parent-reported neutrals. Parent-reported pure bullying perpetrators had more severe deficits in socio-communication, autism mannerism, and social emotion, and hyperactivity/impulsivity and ODD symptoms than did parent-reported neutrals. Parent-reported victim-perpetrators were older and had more severe deficits in socio-communication, autism mannerism, social awareness, and social emotion, and inattention, hyperactivity/impulsivity and ODD symptoms than did parent-reported neutrals. Parent-reported victim-perpetrators had more severe deficits in socio-communication and autism mannerism, and ODD symptoms than did parent-reported pure bullying victims. No difference in demographic characteristics, autistic social impairment, or ADHD and ODD symptoms was found between parent-reported victim-perpetrators and parent-reported pure perpetrators.

[Table 4 about here]

The significant variables were further selected into multivariable logistic regression analysis (Table 5). Both self-reported pure victims and self-reported victim-perpetrators had more severe deficit in socio-communication than self-reported neutrals. Moreover, parent-reported victim-perpetrators also had more severe deficit in socio-communication than did parent-reported neutrals. Parent-reported pure victims had more severe hyperactivity/impulsivity symptoms than did parent-reported neutrals. Parent-reported victim-perpetrators had more severe ODD symptoms than did parent-reported neutrals and parent-reported pure victims. Self-reported pure bullying victims had a shorter maternal education duration than did self-reported neutral group.

Parent-reported victim-perpetrators were older than parent-reported neutral group.

[Table 5 about here]

4. Discussion

The present study found that the agreement between self-reported and parent-reported bullying involvement of adolescents with ASD was low. Compared with bullying involvement experiences reported by adolescents themselves, parents reported higher rates of adolescents' pure bullying victimization and victimization-perpetration but a lower rate of pure bullying perpetration. Parents reported that a half of the self-reported neutrals involved in bullying, as well as that nearly one-fourth of the self-reported pure victims and over a half of the self-reported pure perpetrators as victim-perpetrators. Moreover, parents identified one-third of the self-reported pure victims and self-reported victim-perpetrators as the neutrals. The results indicated that mental health and educational professionals must take the self-reported and parent-reported bullying involvement into consideration simultaneous and should not rely on sole information when intervening bullying involvement of adolescents with ASD.

The present study also found that there was difference in the roles of autistic social impairment and ADHD and ODD symptoms between adolescents with ASD who involved in self-reported and parent-reported bullying. Deficit in socio-communication was significantly associated with self-reported but not parent-reported pure victimization. Hyperactivity/impulsivity and ODD symptoms were associated with parent-reported but not self-reported pure victimization and victimization-perpetration, respectively. In the present study autistic social impairment and ADHD and ODD symptoms were rated by parents. Both the data of bullying involvement and related factors from the same reporters may result in shared method variance and influence the significance of the association between parent-reported bullying involvement and deficit in socio-communication, hyperactivity/impulsivity and ODD symptoms. Previous studies using

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parent-report have similar significant association of deficit in socio-communicative skills, ADHD and ODD with bullying involvement in children and adolescents with ASD [8-12]. The results of the present study indicated that the sources of information may influence the relationships of autistic social impairment, ADHD and ODD symptoms with bullying involvement in adolescents with ASD.

The present study found that self-reported pure victims and victim-perpetrators and parent-reported victim-perpetrators had more severe deficit in socio-communication on the Chinese SRS than did the neutrals, whereas no difference in socio-communicative deficit was found between pure perpetrators and the neutrals. The subscale of socio-communication on the Chinese SRS contained items mostly related to social interaction skills, communication skills, and restricted behavior [20]. Two recent studies have found that video modeling [31] and theory of mind performance training [32] can improve the ability of children and adolescents with ASD to appropriately respond to bullying scenarios and reduce involving in bullying. The other three subscales of autistic social impairment on the Chinese SRS include autism mannerism containing items emphasizing the unique behaviors in ASD (e.g., rigid patterns; plays inappropriately), social awareness reflecting the degree of unawareness in a social context (e.g., cannot recognize something unfair; laughs inappropriately); and social emotion incorporating the emotional aspects of behaviors (e.g., literally; overly serious facial expressions) [20]. Contrary to our hypothesis, only socio-communication but not autism mannerism, social awareness or social emotion is significantly associated with bullying involvement in adolescents with high functioning ASD. The mechanisms accounting for the various relationships between the four subscales of autistic social impairment on the Chinese SRS and bulling involvement in adolescents with ASD warrant further study.

The present study did not find significant differences in autistic social impairment and ADHD symptoms between victim-perpetrators, pure victims, and pure perpetrators. A previous study on a large sample of adolescents in community found that victim-perpetrators reported more severe

inattention and hyperactivity/impulsivity than pure perpetrators and pure victims [22]. The discrepancy between the results of the present and previous studies indicates that ADHD symptoms have a different role in bullying victimization-perpetration among adolescents with high functioning ASD compared with general adolescent population in community. However, parent-reported victim-perpetrators had more severe ODD symptoms than did parent-reported pure victims. Owing to bullying victim-perpetrators have the most severe risks of depression, suicide, and alcohol drinking compared with pure victims and pure perpetrators in general adolescent population [22], the possibility of being bullying victim-perpetrators should be monitored in adolescents with ASD and comorbid a high level of ODD symptom.

This study has several limitations. First, we did not include teacher-report or peer-report to determine the accuracy of self-report and parent-report on bullying involvement. Second, the study participants were adolescents with high functioning ASD who visited medical units for treatment or survey. Therefore, the results of this study might not be generalizable to all adolescents with high functioning ASD. Third, we examined ADHD and ODD symptoms but not the diagnoses of ADHD and ODD.

4.1. Conclusion

The present study found that the agreement between self-reported and parent-reported bullying involvement of adolescents with ASD was low. Mental health and educational professionals should collect both the self-reported and parent-reported information to comprehensively detect bullying involvement in adolescents with ASD. Deficit in socio-communication increases the risk of being pure victims and victim-perpetrators. Programs of enhancing socio-communicative ability is needed to help adolescents with ASD reduce the risk of involving in bullying. Parent-reported victim-perpetrators had more severe ODD symptoms than did parent-reported pure victims. The risk of experiencing bullying victimization-perpetration in adolescents with ASD and comorbid a high level of ODD symptom should be prevented and early

intervened.

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Reference

Adams, R. E.; Fredstrom, B. K.; Duncan, A. W.; Holleb, L. J.; Bishop, S. L. Using self-and parent-reports to test the association between peer victimization and internalizing symptoms in verbally fluent adolescents with ASD. *Journal of autism and developmental disorders.* **2014**, 44(4), 861-872. https://doi.org/10.1007/s10803-013-1938-0.

Adams, R.; Taylor, J.; Duncan, A.; Bishop, S. Peer victimization and educational outcomes in mainstreamed adolescents with autism spectrum disorder (ASD). *Journal of autism and developmental disorders*. **2016**, 46(11), 3557-3566. https:// doi.org/10.1007/s10803-016-2931-1.

American Psychiatric Association. *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Association: Washington, USA. **2013**. ISBN: 978-0890425558.

Cappadocia, M. C.; Weiss, J. A.; Pepler, D. Bullying experiences among children and youth with autism spectrum disorders. *Journal of autism and developmental disorders*. **2012**, 42(2), 266-277. https://doi.org/10.1007/s10803-011-1241-x.

Constantino, J. N.; Davis, S. A.; Todd, R. D.; Schindler, M. K.; Gross, M. M.; Brophy, S. L.; Metzger, L. M.; Shoushtari, C. S.; Splinter, R.; Reich, W. Validation of a brief quantitative measure of autistic traits: comparison of the social responsiveness scale with the autism diagnostic interview-revised. *Journal of autism and developmental disorders*. **2003**, 33(4), 427-433. https://doi.org/10.1023/A:1025014929212.

De-la-Iglesia, M.; Olivar, J. S. Risk factors for depression in children and adolescents with high functioning autism spectrum disorders. *The Scientific World Journal*. **2015**, 2015,1-7. https://doi.org/10.1155/2015/127853.

DeNigris, D.; Brooks, P. J.; Obeid, R.; Alarcon, M.; Shane-Simpson, C.; Gillespie-Lynch, K. Bullying and identity development: insights from autistic and non-autistic college students.

Journal of autism and developmental disorders. **2018**, 48(3), 666-678. https://doi.org/10.1007/s10803-017-3383-y.

Gau, S. S. F.; Liu, L. T.; Wu, Y. Y.; Chiu, Y. N.; Tsai, W. C. Psychometric properties of the Chinese version of the social responsiveness scale. *Research in autism spectrum disorders*. **2013**, 7(2), 349-360. https://doi.org/10.1016/j.rasd.2012.10.004.

Gau, S. S.; Shang, C. Y.; Liu, S. K. Psychometric properties of the Chinese version of the Swanson, Nolan, and Pelham, version IV scale – parent form. *International Journal of Methods in Psychiatric Research*. **2008**, 17, 35-44. https://doi.org/10.1002/mpr.237.

Haq, I.; Le Couteur, A. Autism spectrum disorder. *Medicine*. **2004**, 32, 61-63. https://doi.org/10.1383/medc.32.8.61.43165

Hodgins, Z.; Kelley, E.; Kloosterman, P.; Hall, L.; Hudson, C. C.; Furlano, R.; Craig, W. Brief report: Do you see what I see? The perception of bullying in male adolescents with autism spectrum disorder. *Journal of Autism and Developmental Disorders*. **2018**. https://doi.org/10.1007/s10803-018-3739-y

Hong, J.; Bishop-Fitzpatrick, L.; Smith, L. E.; Greenberg, J. S.; Mailick, M. R. Factors associated with subjective quality of life of adults with autism spectrum disorder: Self-report versus maternal reports. *Journal of autism and developmental disorders*. **2016**, 46(4), 1368-1378. https://doi.org/10.1007/s10803-015-2678-0.

Hwang, S.; Kim, Y. S.; Koh, Y. J.; Leventhal, B. L. Autism spectrum disorder and school bullying: who is the victim? Who is the perpetrator? *Journal of autism and developmental disorders*. **2018**, 48(1), 225-238. https://doi.org/10.1007/s10803-017-3285-z.

Kim, Y. S.; Koh, Y. J.; Noh, J. Development of Korean-Peer Nomination Inventory (K-PNI): An inventory to evaluate school bullying. *Journal of Korean Neuropsychiatry Association*. **2001**, 40, 867-875.

Lai, M-C.; Lombardo, M. V.; Chakrabarti, B.; Baron-Cohen, S. Subgrouping the autism ‘‘spectrum’’:

Reflections on DSM-5. *PLoS biology*. **2013**, 11(4),e1001544. https://doi.org/10.1371/journal.pbio.1001544

Liu, M. J.; Ma, L. Y.; Chou, W. J.; Chen, Y. M.; Liu, T. L.; Hsiao, R. C.; Hu, H. F.; Yen, C. F. Effects of theory of mind performance training on reducing bullying involvement in children and adolescents with high-functioning autism spectrum disorder. *PLoS one*. **2018**, 13(1), e0191271. https://doi.org/10.1371/journal.pone.0191271

Maïano, C.; Normand, C. L.; Salvas, M. C.; Moullec, G.; Aimé, A. Prevalence of school bullying among youth with autism spectrum disorders: a systematic review and meta-analysis. *Autism research*. **2016**, 9(6), 601-615. https://doi.org/10.1002/aur.1568.

Matson, J. L.; Nebel-Schwalm, M. Assessing challenging behaviors in children with autism spectrum disorders: A review. *Research in Developmental Disabilities*. **2007**, 28(6), 567-579. https://doi.org/10.1016/j.ridd.2006.08.001

Mayes, S. D.; Calhoun, S. L.; Baweja, R.; Mahr, F. Maternal ratings of bullying and victimization: differences in frequencies between psychiatric diagnoses in a large sample of children. *Psychological reports*. **2015**, 116(3), 710-722. https://doi.org/10.2466/16.PR0.116k30w8.

Paul, A.; Gallot, C.; Lelouche, C.; Bouvard, M. P.; Amestoy, A. Victimisation in a French population of children and youths with autism spectrum disorder: a case control study. *Child and adolescent psychiatry and mental health*. **2018**, 12(1), 48. https://doi.org/10.1186/s13034-018-0256-x.

Rex, C.; Charlop, M. H.; Spector, V. Using video modeling as an anti-bullying intervention for children with autism spectrum disorder. *Journal of autism and developmental disorders*. **2018**, 48(8), 2701-2713. https://doi.org/10.1007/s10803-018-3527-8.

Richa, S.; Fahed, M.; Khoury, E.; Mishara, B. Suicide in autism spectrum disorders. *Archives of Suicide Research*. **2014**, 18(4), 327-339. https://doi.org/10.1080/13811118.2013.824834.

Sterzing, P. R.; Shattuck, P. T.; Narendorf, S. C.; Wagner, M.; Cooper, B. P. Prevalence and

correlates of bullying involvement among adolescents with an Autism Spectrum Disorder. *Archives of pediatrics & adolescent medicine*. **2012**, 166(11), 1058-1064. doi: 10.1001/archpediatrics.2012.790

Swanson, J. M.; Kraemer, H. C.; Hinshaw, S. P.;Arnold, L. E.; Conners, C. K.; Abikoff, H. B.; Clevenger, W.; Davies, M.; Elliott, G.; Greenhill, L. L.; Hechtman, L.; Hoza, B.; Jensen, P. S.; March, J. S.; Newcorn, J. H.; Owens, E. B.; Pelham, W. E.; Schiller, E.; Severe, J. B.; Simpson, S.; Vitiello, B.; Wells, K.; Wigal, T.; Wu M. Clinical relevance of the primary findings of the MTA: success rates based on severity of ADHD and ODD symptoms at the end of treatment. *Journal of the American Academy of Child & Adolescent Psychiatry.* **2001**, 40, 168-179. https://doi.org/10.1097/00004583-200102000-00011.

Van Roekel, E.; Scholte, R. H.; Didden, R. Bullying among adolescents with autism spectrum disorders: Prevalence and perception. *Journal of autism and developmental disorders*. **2010**, 40(1), 63-73. https://doi.org/10.1007/s10803-009-0832-2.

Wechsler, D. *Wechsler intelligence scale for children-fourth edition-Chinese version.* The Chinese Behavioral Science Corporation: Taipei, Taiwan. **2007**.

Weiss, J. A.; Cappadocia, M. C.; Tint, A.; Pepler, D. Bullying victimization, parenting stress, and anxiety among adolescents and young adults with autism spectrum disorder. *Autism research*. **2015**, 8(6), 727-737. https://doi.org/10.1002/aur.1488.

Woods, S.; White, E. The association between bullying behaviour, arousal levels and behaviour problems. *Journal of adolescence*. **2005**, 28(3), 381-395. https://doi.org/10.1016/j.adolescence.2004.09.002.

Yen, C. F.; Kim, Y. S.; Tang, T. C.; Wu, Y. Y.; Cheng, C. P. Factor structure, reliability, and validity of the Chinese version of the School Bullying Experience Questionnaire. *The Kaohsiung Journal of Medical Sciences.* **2012**, 28, 500-505. https://doi.org/10.1016/j.kjms.2012.04.008.

Yen, C. F.; Yang, P.; Wang, P. W.; Lin, H. C.; Liu, T. L.; Wu, Y. Y.; Tang, T. C. Association

between school bullying levels/types and mental health problems among Taiwanese adolescents. *Comprehensive psychiatry*. **2014**, 55(3), 405-413. https://doi.org/10.1016/j.comppsych.2013.06.001.

Zablotsky, B.; Bradshaw, C. P.; Anderson, C.; Law, P. A. The association between bullying and the psychological functioning of children with autism spectrum disorders. *Journal of Developmental & Behavioral Pediatrics*. **2013**, 34(1), 1-8. https://doi.org/10.1097/DBP.0b013e31827a7c3a.

Zablotsky, B.; Bradshaw, C. P.; Anderson, C. M.; Law, P. Risk factors for bullying among children with autism spectrum disorders. *Autism*. **2014**, 18(4), 419-427. https://doi.org/10.1177%2F1362361313477920.

Table 1 Demographic characteristics, autistic social impairment, and ADHD and ODD symptoms (N = 219)

	n (%)	Mean (SD)	Range
Sex			
Girls	27 (12.3)		
Boys	192 (87.7)		
Age (years)		13.7 (2.1)	11-18
Marriage status of parents			
Married and living together	189 (86.3)		
Divorced or separate	30 (13.7)		
Paternal education duration (years)		14.7 (2.9)	6-23
Maternal education duration (years)		14.2 (2.5)	6-22
Autistic social impairment on the SRS			
Socio-communication		68.5 (14.0)	31-103
Autism mannerism		33.7 (7.5)	14-52
Social awareness		31.5 (4.6)	18-42
Social emotion		20.7 (3.9)	9-31
ADHD and ODD symptoms on the SNAP-IV			
Inattention		14.7 (6.5)	0-27
Hyperactivity/impulsivity		10.0 (6.7)	0-27
ODD		10.7 (6.3)	0-24

ADHD: attention-deficit/hyperactivity disorder; ODD: oppositional defiant disorder; SNAP-IV: Swanson, Nolan, and Pelham, Version IV Scale; SRS: Social Responsiveness Scale

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Table 2 Self-reported and parent-reported bullying involvement (N = 219)

			Parent-reported			
			Neutral	Pure victims	Pure perpetrators	Victim-perpetrators
			n = 91 (41.6%) *n* (%)	*n* = 52 (23.7%) *n* (%)	*n* = 13 (5.9%) *n* (%)	*n* = 63 (28.8%) *n* (%)
Self-reported	Neutral	*n* = 140 (63.9%) *n* (%)	70 (32.0)	31 (14.2)	10 (4.6)	29 (13.2)
	Pure victims	*n* = 39 (17.8%) *n* (%)	12 (5.4)	10 (4.6)	2 (0.9)	15 (6.8)
	Pure perpetrators	*n* = 20 (9.1%) *n* (%)	3 (1.4)	5 (2.3)	1 (0.5)	11 (5.0)
	Victim-perpetrators	*n* = 20 (9.1%) *n* (%)	6 (2.7)	6 (2.7)	0	8 (3.7)

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Table 3 The factors related to self-reported bullying involvement: logistic regression[a]

	Pure victims vs. Neutral		Pure perpetrators vs. Neutral		Victim-perpetrators vs. Neutral		Victim-perpetrators vs. Pure victims		Victim-perpetrators vs. Pure perpetrators	
	OR	95% CI of OR	OR	95% CI of OR	OR	95% CI of OR	OR	95% CI of OR	OR	95% CI of OR
Sex	1.209	.382-3.827	1.244	.265-5.840	.553	.165-1.849	.457	.101-2.063	.444	.072-2.760
Age	1.132	.961-1.332	1.077	.866-1.339	1.006	.808-1.253	.879	.672-1.150	.924	.672-1.270
Marriage status of parents	2.151	.837-5.527	1.471	.385-5.611	2.083	.615-7.053	.969	.253-3.712	1.417	.273-7.342
Paternal education duration	.932	.823-1.056	1.001	.849-1.180	.915	.776-1.079	.984	.827-1.171	.918	.742-1.136
Maternal education duration	.851	.734-.986	.990	.826-1.188	.938	.779-1.129	.1.129	.883-1.444	.936	.714-1.227
Socio-communication	1.027	1.000-1.055	1.040	1.003-1.079	1.063	1.020-1.108	1.026	.984-1.069	1.016	.968-1.067
Autism mannerism	1.040	.989-1.092	1.059	.990-1.133	1.086	1.009-1.168	1.032	.957-1.114	1.015	.930-1.108
Social awareness	.996	.925-1.073	1.077	.966-1.201	.992	.894-1.100	.996	.887-1.119	.889	.748-1.057
Social emotion	1.043	.953-1.140	1.066	.937-1.212	1.155	1.006-1.327	1.064	.936-1.210	1.088	.902-1.313
Inattention	1.001	.948-1.057	1.090	1.005-1.182	1.033	.957-1.115	1.025	.948-1.107	.947	.852-1.053
Hyperactivity/impulsivity	1.018	.962-1.077	1.080	1.010-1.156	1.068	.999-1.142	1.051	.972-1.137	.992	.919-1.070
ODD	.998	.941-1.058	1.054	.977-1.138	1.018	.944-1.098	1.017	.939-1.101	.974	.892-1.064

[a]: compared with the neutral group

CI: confidence interval; OR: odds ratio; ODD: oppositional defiant disorder

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Table 4 The factors related to parent-reported bullying involvement: logistic regression[a]

	Pure victims vs. Neutral		Pure perpetrators vs. Neutral		Victim-perpetrators vs. Neutral		Victim-perpetrators vs. Pure victims		Victim-perpetrators vs. Pure perpetrators	
	OR	95% CI of OR	OR	95% CI of OR	OR	95% CI of OR	OR	95% CI of OR	OR	95% CI of OR
Sex	.756	.283-2.019	-[b]	-	.945	.357-2.502	1.250	.434-3.598	-[b]	-
Age	1.067	.910-1.250	1.277	.975-1.671	1.254	1.066-1.476	1.167	.970-1.403	.953	.697-1.304
Marriage status of parents	1.614	.550-4.740	3.112	.708-13.676	2.441	.935-6.377	1.513	.548-4.173	.784	.187-3.295
Paternal education duration	1.004	.893-1.128	1.079	.901-1.291	1.024	.922-1.136	1.027	.896-1.177	.936	.761-1.152
Maternal education duration	1.036	.908-1.184	1.029	.826-1.283	1.008	.883-1.152	.968	.831-1.128	.974	.759-1.250
Socio-communication	1.065	1.033-1.098	1.060	1.010-1.111	1.111	1.072-1.153	1.049	1.012-1.086	1.059	.996-10125
Autism mannerism	1.122	1.059-1.189	1.109	1.017-1.210	1.193	1.118-1.273	1.069	1.003-1.139	1.077	.968-1.198
Social awareness	1.075	.999-1.156	1.092	.969-1.230	1.107	1.030-1.190	1.038	.945-1.140	1.000	.858-1.166
Social emotion	1.137	1.037-1.246	1.234	1.049-1.452	1.230	1.116-1.355	1.088	.976-1.212	.975	.809-1.176
Inattention	1.104	1.039-1.172	1.100	.996-1.216	1.154	1.088-1.224	1.062	.998-1.131	1.060	.963-1.167
Hyperactivity/impulsivity	1.121	1.055-1.190	1.092	1.001-1.191	1.143	1.078-1.212	1.025	.969-1.084	1.036	.948-1.133
ODD	1.018	.957-1.083	1.154	1.036-1.285	1.162	1.090-1.239	1.112	1.045-1.183	1.012	.923-1.109

[a]: compared with the neutral group; [b]: no parent-reported pure perpetrator was girl

CI: confidence interval; OR: odds ratio; ODD: oppositional defiant disorder

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Table 5 The factors related to self-reported and parent-reported bullying involvement: logistic regression[a]

	Self-reported						Parent-reported							
	Pure victims vs. Neutral		Pure perpetrators vs. Neutral		Victim-perpetrators vs. Neutral		Pure victims vs. Neutral		Pure perpetrators vs. Neutral		Victim-perpetrators vs. Neutral		Victim-perpetrators vs. Pure victims	
	aOR	95% CI of OR	aOR	95% CI of OR	aOR	95% CI of OR	aOR	95% CI of OR	aOR	95% CI of OR	aOR	95% CI of OR	aOR	95% CI of OR
Age											1.339	1.073-1.671		
Maternal education	.845	.727-.983												
Socio-communication	1.028	1.001-1.056	1.021	.972-1.072	1.101	1.011-1.198	1.051	.976-1.132	.999	.891-1.121	1.121	1.037-1.213	1.035	.970-1.106
Autism mannerism					.927	.788-1.092	1.079	.952-1.223	1.031	.827-1.284	1.077	.925-1.254	.982	.872-1.105
Social awareness											.877	.771-1.001		
Social emotion					1.004	.804-1.252	.881	.739-1.051	1.190	.874-1.621	.881	.741-1.048		
Inattention			1.024	.908-1.156			.971	.885-1.067			1.012	.915-1.119		
Hyperactivity/impulsivity			1.043	.951-1.143			1.084	1.000-1.175	.967	.836-1.119	.982	.888-1.087		
ODD									1.162	.995-1.356	1.127	1.022-1.243	1.091	1.020-1.1666

[a]: compared with the neutral group

aOR: adjusted odds ratio; CI: confidence interval; ODD: oppositional defiant disorder