

Bullying and PTSD Symptoms

Thormod Idsoe · Atle Dyregrov · Ella Cosmovici Idsoe

Published online: 6 March 2012
© Springer Science+Business Media, LLC 2012

Abstract PTSD symptoms related to school bullying have rarely been investigated, and never in national samples. We used data from a national survey to investigate this among students from grades 8 and 9 ($n=963$). The prevalence estimates of exposure to bullying were within the range of earlier research findings. Multinomial logistic regression showed that boys were 2.27 times more likely to be exposed to frequent bullying than girls. A latent variable second-order model demonstrated an association between frequency of bullying exposure and PTSD symptoms ($\beta=0.49$). This relationship was not moderated by gender. However, the average levels of PTSD symptoms as well as clinical range symptoms were higher for girls. For all bullied students, 27.6% of the boys and 40.5% of the girls had scores within the clinical range. A mimic model showed that youth who identify as being both a bully and a victim of bullying were more troubled than those who were victims only. Our findings support the idea that exposure to bullying is a potential risk factor for PTSD symptoms among students. Future research could investigate whether the same holds for PTSD through diagnostic procedures, but this will depend on whether or not bullying is decided to comply with the DSM-IV classification of trauma required for diagnosis. Results are discussed with regard to their implications for school interventions.

Keywords Bullying · Victimization · PTSD symptoms · School

Even though there has been discussion whether exposure to bullying complies with the classification of trauma required for diagnosis of Posttraumatic Stress Disorder (PTSD) as defined within the DSM-IV-TR (APA 2000), practitioners often report PTSD symptoms in victims of bullying (Scott and Stradling 1992; Weaver 2000). Research focusing on workplace bullying has established a relationship with PTSD symptoms that appears to be quite strong (Björkqvist et al. 1994; Leymann and Gustafsson 1996; Matthiesen and Einarsen 2004; Mikkelsen and Einarsen 2002). Few studies have investigated this in relation to school bullying (McKenney et al. 2005; Mynard et al. 2000), and none in national samples. The aim of our study was to examine the relationship between being bullied and PTSD symptoms in a representative sample of Norwegian pupils.

Bullying

Bullying is regarded as a subtype of aggressive behavior (Berkowitz 1993) in which an individual or a group repeatedly and over time direct negative actions against individuals who are not able to defend themselves, meaning there is an imbalance of power between perpetrators and victims (Bowes et al. 2009; Herba et al. 2008; Olweus 1994; Salmivalli 2010). The prevalence among children and young people varies depending on the defining criteria used and the population studied. Estimates indicating peer maltreatment of some sort range from 20% to 45% (Craig et al. 2009; Hawker and Boulton 2000; Klomek et al. 2007;

T. Idsoe (✉) · E. C. Idsoe
Centre for Behavioural Research, University of Stavanger,
4036 Stavanger, Norway
e-mail: thormod.idsoe@uis.no

T. Idsoe · A. Dyregrov
Center for Crisis Psychology,
Bergcn, Norway

Nansel et al. 2001; Roland and Idsoe 2001; Solberg and Olweus 2003), while rates as high as 32% have been reported for being bullied once a week or more often (Berger 2007).

In a recent review of empirical evidence to evaluate whether being a victim of bullying is a significant risk factor for pathology, Arseneault et al. (2010) conclude that exposure to bullying contributes independently to children's mental health, over and above genetic background, family factors or pre-existing symptoms of mental health problems. Serious negative psychological and physical effects have been reported, including decreased school attendance and performance, reduced self-esteem, depression, loneliness, anxiety, suicide ideation, suicide attempts and completed suicides (Hawker and Boulton 2000; Herba et al. 2008; Klomek et al. 2007; Klomek et al. 2009; Olweus 1994; Roland 2002; Smith 1997). Qualitative studies suggest that school bullying can, in some cases, cause wide-ranging long-term effects similar to those experienced by survivors of child abuse (Carlisle and Rofes 2007).

PTSD Symptoms

By having an established etiological link between exposure to a trauma and a major psychiatric disorder, PTSD differs from most other psychiatric disorders (Kilpatrick et al. 2009). In order to be diagnosed with PTSD, one must have six key diagnostic criteria (labeled A through F in the DSM-IV-TR). A severe trauma (A) must cause clinically significant distress (F) for more than a month (E). The trauma (A) has two components. The A1 criterion states that "the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others;" while the A2 criterion states that "the person's response involved intense fear, helplessness, or horror." Furthermore, symptoms occur within three clusters, "the traumatic event is persistently re-experienced" (B), there is "persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness" (C), and there are "persistent symptoms of increased arousal" (D) (APA 2000; Rubin et al. 2008) DSM pp 467–468. In the proposed draft revision of PTSD in the DSM Disorders and Criteria (DSM V) (Weathers and Keane 2007) the A2 criterion has been dropped while the A1 criterion is largely upheld.

Symptomatology following trauma or stress may indicate differential diagnosis (APA 2000). Adjustment Disorder is currently assigned when symptoms consistent with PTSD occur in response to a stressor that is "not extreme" or consistent with A1 criteria. Onset of symptoms must occur within 3 months after the stress exposure and resolve within 6 months. However, they may persist beyond 6 months if

they occur in response to a chronic stressor. If bullying is not consistent with the A1 criterion of PTSD, Adjustment Disorder should be used (APA 2000). Acute Stress Disorder is appropriate when symptoms consistent with PTSD last for a minimum of 2 days and a maximum of 4 weeks after the traumatic event. If symptoms last for more than 4 weeks, the diagnosis of PTSD may be used (APA 2000). We see that Adjustment Disorder is differentiated from PTSD mainly because the eliciting event is not consistent with the A1 criterion. Acute Stress Disorder and PTSD share the A1 criterion, but differ in duration.

Although the diagnosis of PTSD, when first formulated in 1980, was not believed to be relevant to children and adolescents, a developmental perspective has gradually been introduced through the various versions of the DSM. The diagnosis of PTSD in children and adolescents is almost isomorphic to the adult core criteria while at the same time encompassing features specific to children such as: repetitive play; trauma-specific re-enactment; frightening dreams without specific content; foreshortened future; careful evaluation of avoidance of stimuli associated with the trauma as children have difficulties reporting diminished interest in significant activities and constriction of affect; and physical symptoms such as stomach aches and headaches (APA 2000).

Bullying and PTSD Symptoms

People who have experienced events of an interpersonal nature show significantly higher levels of PTSD symptoms than those who have experienced other types of events (Lancaster et al. 2009). Bullying is an interpersonal event, and there are many salient aspects of children's development that may make repeated bullying experiences especially harmful. Bullying happens at a time when the brain is undergoing development in several bio-psycho-social systems that regulate behavior. During childhood and adolescence there is a gradual development and strengthening of brain systems involving a variety of cognitive, emotional and behavioral systems, from self-regulation and emotional processing to executive functions, from social connectivity to perception of threat (Bremner 2006; Cicchetti and Curtis 2006; Derryberry and Tucker 2006; Johnson and de Haan 2006). In adolescence, bullying might affect the development of executive functioning (see Giedd 2008), including attention, response inhibition, organization and planning. The effects of bullying on the development of these bio-psycho-social systems are not known, but a developmental perspective on trauma is needed both for understanding how the diagnosis of PTSD can be applied to this population, as well as for how potential traumatic effects can be reduced. A discussion of some of these salient points is provided by Pynoos et al. (2009).

A few studies have examined the incidence of PTSD symptoms resulting from school bullying (Nader and Koch 2006). In a study examining relations between bullying and PTSD in high school students, Mynard et al. (2000) found that 37% of the victims reported PTSD symptoms. Furthermore, Rivers (2004) reported symptoms of PTSD related to bullying in school, and approximately 25% of these participants reported being troubled by memories of bullying well after leaving school. Finally, a recent Canadian study reported a significant relation between being bullied and PTSD symptoms among school children (McKenney et al. 2005).

Some recent research on the potential relationship between bullying and PTSD symptoms has focussed on workplace bullying among adults. Tehrani (2004) found that 40% of 165 employees investigated within the healthcare sector reported being bullied over a two-year period. 44% of them experienced high level of PTSD symptoms. Two Norwegian studies gave evidence for even higher rates. In one of them 63% of a sample of victims of workplace bullying ($n=102$) reported high levels of PTSD symptoms, especially intrusive memories and avoidance (Matthiesen and Einarsen 2004). In the other study 76% of those being bullied at work ($n=118$) reported PTSD symptoms (Mikkelsen and Einarsen 2002).

Aggressive Victims

Bullies and victims do not seem to be exclusive categories as some victims also report being bullies and research shows that these bully/victims are more depressed and function more poorly than those who are only victims (Klomek et al. 2007; Nansel et al. 2001; Veenstra et al. 2005). Klomek et al. (2007) also found that those who are both victims and bullies demonstrated higher levels of suicide ideation and suicide attempts than those who were victims only. Given that this group could be the most troubled, we found it important to investigate whether involvement in bullying others (in addition to being a victim) affected levels of PTSD symptoms. It has been suggested that the choice of cut-off point has a major impact on the prevalence of bully/victims (Solberg et al. 2007). On the basis of their own and others' studies, these researchers suggest applying stricter criteria including only those victims who frequently bully others. In accordance with this we might expect that only victims involved in frequent bullying of other pupils would add to the variance explained in PTSD symptoms.

This Study

Although many children and adolescents are often exposed to bullying, the relationship between such exposure and

PTSD symptoms has as far as we know never been investigated in national representative samples. There has been a call for more studies to help us understand the post-traumatic effects of bullying among school children (McKenney et al. 2005; Mynard et al. 2000; Nader and Koch 2006; Rivers 2004), and we wanted to investigate this in a representative sample of Norwegian pupils.

On the basis of our outline, we expected that as many as 40%–50% of the pupils would report exposure to bullying in some way, but that fewer would report more frequent bullying. Traditionally more boys than girls are found to be exposed to bullying (Craig et al. 2009), but more recent studies that have included more indirect forms of bullying do not support this (Marsh et al. 2011). Therefore we wanted to explore possible gender differences in exposure. The central question in our study was, however, to investigate to what extent we would find an association between bullying and PTSD symptoms. Since girls have a higher risk than boys of developing PTSD following trauma (Bokszczanin 2007; Laufer and Solomon 2009) we also expected to find higher levels of PTSD symptoms among bullied girls. Because research suggests that greater frequency of trauma exposure is associated with greater likelihood of scores within a clinical PTSD range (Thabet et al. 2004) we expected to find a relation between the frequency of exposure to bullying and PTSD symptoms. Several researchers (see e.g. Klomek et al. 2007; Nansel et al. 2001; Veenstra et al. 2005) found that those who are both victims and bullies were even more troubled than those who were only victims. We therefore wanted to explore how involvement in bullying others (in addition to be a victim) would affect the levels of PTSD symptoms. We also wanted to see whether these possible associations were moderated by gender.

Method

Sample and Procedure

We used data from a national survey conducted in Norway in 2008. A representative sample of municipalities were randomly selected in accordance with the Norwegian Central Bureau of Statistics' standard of municipality classification (school size in Norway is closely related to the degree of urbanization). Schools were then randomly selected within each of the sampled municipalities. The survey comprised 3,905 students from grades 5 through 9. We used data from grades 8 and 9, and a total of 1,104 students were recruited for this sub-sample. The total response rate for grades 8 and 9 was 87.3% and the resulting net sample was $N=963$. Response rates from grade levels 8 and 9 within schools ranged from 85.7% to 97.7% except for grade 8 within one school where the response rate was

76.3%. Girls comprised 48.7%. The students' were asked about their perceptions of family economy, and 4.7% perceived their families as "poor" or "very poor". This was in accordance with Norwegian Governmental statistics, ranking 5% of the population as poor.

Consent was obtained from the local school authorities and the schools. According to the standards prescribed by the Norwegian Data Inspectorate, written informed consent is needed from the parents of students younger than 15 years of age. Therefore, the parents were asked to give their consent in writing after receiving a written description of the project. The main teacher of the class administered the study according to written instructions. No one at school would see the answers. The students filled in the forms electronically. The teacher was to ensure that the students worked alone. The school was asked to conduct the study in all classes at the same time. Our investigation did meet and has been performed in accordance with common ethical standards as it was approved by the Norwegian Social Science Data Services in accordance with The National Committee for Research Ethics in the Social Sciences and the Humanities.

Instruments

Bullying was measured with the instrument developed by Roland and Idsoe (2001), based on Bru et al. (1998). In this measure, the students were first given a written standard explanation of the bullying behavior. This explanation was intended to incorporate the main elements of the definition of bullying: harming the victim by intention, repetition over time and the imbalance of power between the victim and the bully. The scales concerning "being bullied" and "bullying others" were each composed of four items: bullying by verbal means, social means, physical means, and a general question about being bullied/bullying. The scoring system was 0 (never), 1 (now and then), 2 (weekly), and 3 (daily). Cronbach's alphas for being bullied were 0.94 for boys and 0.88 for girls, and for bullying others 0.93 for boys and 0.90 for girls.

After the students had answered about the bullying, there was a written instruction so that only the students that said they had been bullied were asked about PTSD symptoms, and they were explicitly asked about symptoms related to the bullying. PTSD symptoms were assessed with The Children's Impact of Events Scale (CRIES-8) (Perrin et al. 2005) that consists of four items measuring Intrusion and four items measuring Avoidance. Even though the original Impact of Events Scale (IES) (Horowitz et al. 1979), designed to measure PTSD symptoms, has been used in several studies with respondents from 8 years and above, two important studies (Dyregrov et al. 1996; Yule 1992) found that some of the items are misinterpreted by children.

On the basis of these studies, researchers from the Children and War Foundation developed an eight item solution that was adjusted especially for children. It was found that a combined score (Intrusion + Avoidance) of 17 or more misclassified fewer than 10% of the children with PTSD (Yule 1992). Providing validity data from two samples of children, Perrin et al. (2005) also demonstrated that this combined score of 17 or more gave a very high probability that a clinical interview would verify a diagnosis of PTSD as separately judged from the Anxiety Disorder Interview Schedule.

As part of the scale development, five items that were designed to reflect the DSM-IV Cluster D symptoms of Arousal were also added, so it became a scale with a total of 13 items measuring the three clusters of PTSD symptoms. However, Perrin et al. (2005) found that the CRIES-8 performs equally well as the CRIES-13, and therefore recommend using the CRIES-8 as a screening tool. This is the scale we used for our investigation. The students were given the following instruction before answering: "Below is a list of comments about how one can react after being bullied. Please tick each item showing how frequently these comments were true for you during the past week". Answers are scored on a four-point scale: Not at all=0, Rarely=1, Sometimes=3 and Often=5. We used a combined score (Intrusion + Avoidance) as recommended. Alphas for Intrusion were 0.91 and 0.89 for boys and girls respectively. For Avoidance they were 0.91 and 0.92, and for the full scale they were 0.96 and 0.95. Because the study was part of a longer survey that took approximately one school lesson, we do not think that participants who had been bullied would on average use more time to complete the questionnaire than those not involved in bullying, even though they had to fill in eight extra items.

Analyses

Conventional analyses as well as binary and multinomial logistic regressions were carried out using the SPSS program (SPSS 2009). To investigate the relationship between frequency of exposure to bullying and PTSD symptoms we used latent variables within Structural Equation Modeling (SEM). Models were fitted to the data with Mplus (Muthén and Muthén 2011) by means of a robust maximum likelihood procedure (MLR) with standard errors and tests of fit that are robust according to non-normality. As suggested by Jöreskog (1993), first the measurement models were estimated and evaluated separately from the structural models. Goodness of fit was evaluated by use of frequently applied indices (Browne and Cudeck 1993). The Tucker-Lewis Index (TLI) and the Confirmatory Fit Index (CFI) are measures where values above 0.90 and 0.95 indicate acceptable and excellent fit respectively. These are reported. The "root

mean square error of approximation” (RMSEA) is also reported, and values below 0.05 indicate close fit while values below 0.08 indicate acceptable fit (Browne and Cudeck 1993). Measurement invariance and different structural relations among constructs across gender were evaluated with the multiple group procedure in Mplus. Chi-square difference tests were used to compare alternative nested models. However, because we applied a Satorra–Bentler scaled χ^2 statistic, we could not conduct a conventional χ^2 difference testing because a difference between two scaled χ^2 is not distributed as χ^2 (Muthén 2007). For this reason, we used an adjusted test following calculations suggested by Satorra and Bentler (1999). A useful description of the calculations we followed is given on <http://www.statmodel.com/chidiff.html> (Muthén 2007). We used the full-information MLR estimator in Mplus to account for missing data (Enders 2001; Graham 2009).

Schools and classes can differ in their bullying climate, and it is recommended that separate levels are included when analyzing clustered data (Sentse et al. 2007). As conventional modelling ignores such possible two-level data structures (Muthén 1997), two-level models of factor analysis (Longford and Muthén 1992) were conducted in Mplus to test the impact of the hierarchical data structure. We did not have enough schools to do this for the school level, but we had enough classes to check the class level.

Results

Intra-class correlations (ICC’s) for our measures ranged from 0.024 to 0.053, with only one out of 16 exceeding 0.05. Two of the measures barely exceeded a design effect= 2. This did not strongly suggest any two-level models according to criteria suggested by Muthén (1997), and indicates that there is no specific cluster effect of bullying or PTSD symptoms that will exert any practical influence. We proceeded with individual level analyses.

Measurement Models

Bullying We estimated the measurement model for bullying separately from PTSD symptoms. All parameters were constrained to remain equal across gender. The solution

provided a fair fit to the data, RMSEA=0.076, 90% CI (0.065, 0.088); CFI=0.95; TLI=0.94. A model with free parameters across gender did not give significantly better goodness of fit, $\Delta\chi^2(6)=0.41, p>0.05$, and we kept the invariant solution. Inspection of the modification index suggested that the residuals of the two items about physical bullying – the one for being bullied physically and the one for bullying others physically - were covaried. But this was not suggested for the verbal and social items. This may give conceptual meaning if we consider investigations of directional ordering of “bullying others” and “being bullied” across time. Marsh et al. (2011) found reciprocal effects between “bullying others” and “being bullied”, but this pattern was specific to the physical domain. Furthermore, multigroup analyses (by Marsh et al. 2011) showed that this generalized across gender. The information from our modification index might reflect this, so we modified the model by estimating this parameter. Our modified solution gave significant improvement in model fit, $\Delta\chi^2(2)=15.09, p<0.05$. Factor loadings in completely standardized metric were all above .78 and this model gave acceptable goodness of fit, RMSEA=0.064, 90% CI (0.051, 0.076); CFI=0.97; TLI=0.96.

PTSD Symptoms The invariant two-factor model of Intrusion and Avoidance gave acceptable fit to the data, RMSEA=0.059, 90% CI (0.035, 0.081); CFI=0.97; TLI=0.97. A model with free parameters across gender did not give any significant improvement in model fit, $\Delta\chi^2(8)=14.49, p>0.05$. We fitted a second-order factor to the data to capture the overall PTSD symptoms construct, and this also gave acceptable fit indices, RMSEA=0.058, 90% CI (0.034, 0.080); CFI=0.97; TLI=0.97.

Exposure to Bullying

Cross tabulation demonstrated that gender had a significant main effect on the distribution of frequencies of being bullied, $\chi^2(3)=9.946, p<0.05$. As can be seen in Table 1, a total of 40 to 50% (slightly more boys) reported being exposed to bullying somehow. From this group, about 30% from both genders said they were bullied “now and then”. The gender difference is more evident when we look at more frequent bullying, especially bullying taking place

Table 1 Frequencies (%) for being bullied among boys (B), (N=494) and girls (G) (N=469) in grade 8 and grade 9

	Never		Now and then		Weekly		Daily	
	B	G	B	G	B	G	B	G
Bullied this school year ^a :	55.7	58.7	29.8	32.8	5.6	4.3	8.9	4.1

B boys, G girls. ^aBased on answers to four items reflecting verbal, social and physical bullying

daily. About twice as many boys (about 9%) were exposed to daily bullying as girls. Multinomial logistic regression (Table 2) showed that gender did not significantly predict whether you were bullied “now and then” compared to never. The same occurred for being bullied “weekly” compared to never. However, the gender of the student significantly predicted whether they were bullied daily compared to never, $b=0.82$, Wald $\chi^2(1)=8.08$, $p<0.05$. The odds ratio tells us that boys were 2.27 times more likely to be bullied daily (compared to never) than girls.

As mentioned initially, it is common to investigate frequent bullying by placing a cut-off at bullying that takes place “weekly or more often”. If we merge the categories for “weekly” and “daily” we have an estimate for this. The odds ratio from a multinomial regression showed that boys were 1.8 times more likely to be bullied weekly or more often (compared to never) than girls.

PTSD Symptoms

Among the students who reported being bullied, the average summarized score for PTSD symptoms was 13.70 (sd=11.90) which is below the clinical range. Furthermore, 33.7% of the students who were bullied had scores within the clinical range (cutoff ≥ 17). When splitting for gender we found that the summarized score was 12.41 (sd=11.95) for boys and 15.18 (sd=11.70) for girls. This difference was significant ($p<0.05$). We also found a gender difference in clinical range symptoms with 27.6% of the bullied boys and 40.5% of the bullied girls scoring equal to or greater than 17. A logistic regression showed that this difference was also significant ($p<0.01$), and the odds ratio illustrated that the chance of falling within the clinical range for PTSD symptoms was 1.92 times higher for girls than for boys. All in all, the summarized scores and the clinical range scores showed that girls had higher levels of PTSD symptoms related to bullying than boys.

We estimated a structural model to investigate whether PTSD symptoms were related to frequency of bullying episodes and, as expected, we found a significant positive association between the two constructs. Gender did not moderate the effect, $\Delta\chi^2(1)=-0.12$, $p>0.05$. In our first step

to investigate aggressive victims, we found no linear relation between “bullying others” and PTSD symptoms. However, we did find a curve linear relation between the two constructs. This could indicate that only the victims who also bullied others frequently demonstrated higher PTSD symptoms than the others. We were precluded from further investigations of this through multigroup procedures because the sub-samples were too small. Instead we modeled the effects of subgroups (frequency of bullying others) by means of contrast variables implemented in a mimic model (Muthén and Muthén 2011). We had four categories for frequency of bullying others, so we computed three deviation contrasts to be implemented in the model. This solution did fit the data, RMSEA=0.056, 90% CI (0.044, 0.067); CFI=0.95; TLI=0.95. Gender did not moderate the effects, $\Delta\chi^2(4)=-0.03$, $p>0.05$, meaning there were no interactions between the independent variables and gender. We pooled the data into one group to increase the power. This solution also fitted the data, and as can be seen from Figure 1, the only contrast which had an effect on PTSD symptoms was the variable for the subgroup of students who reported bullying others on a daily basis.

Discussion

Using a nationally representative sample of children in grades 8 and 9, we investigated exposure to bullying and associations with PTSD symptoms. As far as we know, this has rarely or never been investigated in national representative samples. On the basis of prevalence rates, which were in accordance with earlier studies, we found associations between exposure to bullying and PTSD symptoms that are noteworthy for researchers and for practice. Even though gender did not moderate this association, bullied girls had higher levels of symptoms in general. We also found that those victims of bullying who were also themselves involved in frequent bullying of others (so-called bully-victims/aggressive victims) were the most troubled.

The pupils reported prevalence of exposure to bullying in accordance with our first expectation. We can see that the total prevalence was within the range of findings from

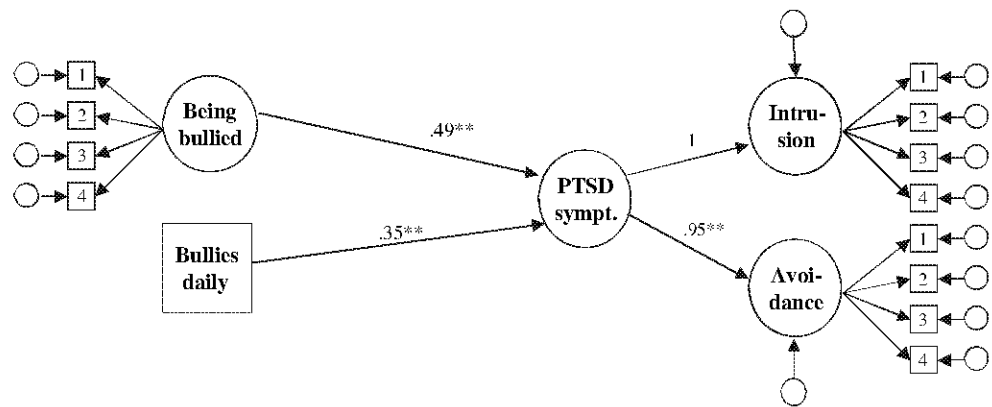
Table 2 Multinomial logistic regression predicting exposure to bullying by gender

	Predictor	B	SE	OR	95% CI	Wald statistic	p
1 “Sometimes”	Gender	-0.04	0.15	0.96	[0.72, 1.27]	0.09	0.76
2 “Weekly”	Gender	0.30	0.31	1.36	[0.74, 2.48]	0.98	0.32
3 “Daily”	Gender	0.82	0.29	2.27	[1.29, 4.00]	8.08	0.01

Reference category=0 “never”

CI confidence interval for odds ratio (OR)

Fig. 1 Latent variable second-order mimic model (in completely standardized metric) for bullied students' self-reported frequency of exposure to bullying and the association with PTSD symptoms, with subgroup effect for those victims who are also frequently involved in bullying others



Goodness of fit: RMSEA = .050, 90%CI (.039,.061); CFI = .97; TLI = .96

earlier studies which indicate that as many as 45% of children reported being bullied in some way (Craig et al. 2009; Hawker and Boulton 2000; Klomek et al. 2007; Nansel et al. 2001; Roland and Idsoe 2001; Solberg and Olweus 2003). For bullying taking place “now and then”, “weekly, or “daily”, we also found estimates to be in accordance with earlier findings. We should be careful, though, in attributing differences found in studies to real life differences in prevalence of bullying, as variations between different investigations could depend on the defining criteria used and the population studied. We did, however, keep our conceptual and operational definitions in line with mainstream definitions from the field (Bowes et al. 2009; Herba et al. 2008; Olweus 1994; Salmivalli 2010).

We found gender differences in reported exposure to bullying in that boys were almost two and a half times more likely to be bullied daily (compared to never) than girls. However, neither weekly exposure nor exposure that took place “now and then” showed any gender differences. But when we merged the categories for “weekly” and “daily” (a very commonly applied unit of measurement within bullying research) we found that boys were almost twice as likely as girls to be exposed to bullying taking place weekly or more often. So it seems that exposure to frequent bullying is more common among boys than girls, but when it comes to less frequent bullying we found no gender differences.

The main purpose of our study is, however, about the associations between bullying exposure and PTSD symptoms. The level of PTSD symptoms among the bullied children was quite high. Slightly more than one third of the students who reported being bullied had scores within the clinical range for PTSD symptoms. When splitting for gender, we found that girls had significantly higher average levels and clinical range levels of PTSD symptoms. The chance of falling within the clinical range for PTSD symptoms was about twice as high for girls as for boys. Our findings support our expectation that the level of PTSD symptoms would be higher among the girls, and is in accordance with earlier studies which have found higher risk

for girls developing PTSD after trauma (Bokszczanin 2007; Laufer and Solomon 2009). Meta-analyses have demonstrated that females are more likely to meet criteria for PTSD although they are less likely to experience traumatic events (Brewin et al. 2000). It has been suggested that greater exposure to sexual abuse could account for a greater vulnerability, but the evidence for this is mixed (Tolin and Foa 2006). Further research is needed to understand the gender difference.

According to our next assumption, we expected frequency of exposure to be related to the level of PTSD symptoms. From our SEM model we found a quite strong association between frequency of exposure to bullying and PTSD symptoms, and the magnitude of this relation was the same for boys and girls. This supports earlier studies that have stated an association between frequency of trauma exposure and PTSD symptoms (Thabet et al. 2004).

When it comes to the bully-victims, we found that belonging to this group had an additional effect on PTSD symptoms. This is in accordance with well established findings involving other psychiatric problems like depressive symptoms, suicide ideation, and suicide attempts (Klomek et al. 2007; Nansel et al. 2001; Solberg et al. 2007; Veenstra et al. 2005). Furthermore, it was only being involved in frequent bullying (on a daily basis) that added to the variance explained in PTSD symptoms. This supports Solberg et al. (2007) who suggest, on the basis of their own and other studies, applying stricter criteria when investigating victims who bully, so only those victims who frequently bully others are included. According to Bowers et al. (1994) bully-victims seem to come from more problematic family conditions characterized by less involved parents who are also more hostile and rejecting. Bully-victims may therefore have witnessed domestic violence or been abused and modeled their own aggressive strategies on these experiences. This could explain their bullying behavior. At the same time, this poor level of family functioning could also be a risk factor for later-onset PTSD (Gilbert et al. 2009).

Limitations

The average response rate for pupils was 87.3%, ranging from 85.7% to 97.7% within schools, except for grade 8 within one school with a response rate of 76.3%. Although this may have led to some skewness in the sample, we do not believe there are fewer victims among the non-responders, so that we have at least not over-estimated the prevalence.

One limitation of our study is that we used a self-report measure of bullying, and this should ideally be supported through peer, parent, and/or teacher report. Using results from an epidemiological cohort of children obtained through the Environmental Risk Longitudinal Twin Study, Shakoor et al. (2011) found modest agreement between self-reports and mother reports of prevalence of bullying victimization. Our prevalence estimates should therefore be interpreted cautiously. However, Shakoor et al. (2011) also found that children's reports and mothers' reports were similarly associated with children's emotional problems. This is important for us because it is linked to the main aim of our study. Shakoor et al. (2011) conclude that self-reports are a viable alternative in the absence of mothers' reports and vice versa. On this basis, and because our main aim was to investigate the associations between bullying and PTSD symptoms rather than to give prevalence estimates, we believe that our findings have enough validity to provide important information.

Another issue that must be considered is that the associations in our study could be inflated by shared method variance. In a meta-analytic review of cross-sectional studies of peer victimization and psychosocial maladjustment, Hawker and Boulton (2000) found that mean effect sizes from studies with shared method variance gave a score that on average was .11 (ranging from 0.04 to 0.18) higher than the comparable mean effect sizes without shared method variance. Even if the associations reported in our study are inflated, they are still of a magnitude that supports our substantive conclusions. However, the strength of the effects should, of course, be interpreted with the results from Hawker and Boulton's study in mind.

Furthermore, our cross-sectional study does not give design support to causality so other study designs should be considered in future research. This is very important when handling issues like vulnerability to different types of victimization (Arseneault et al. 2010) because some PTSD symptoms could be present even before the bullying started. This may indeed be the case as child abuse can place children at risk for victimization by peers (Shields and Cicchetti 2001). Ideally this would be investigated using longitudinal designs. We do believe, however, that we minimized the threat as much as possible by explicitly asking the students to rate symptoms related to the bullying episodes only.

Are the children scoring above the clinical cutoff for risk of developing PTSD? Even though we applied a measure with a validated clinical cutoff (Perrin et al. 2005) we must be careful with interpretations because of our methodological limitations. A reliable measure of criterion E (onset and duration of symptoms) would have brought us one step closer to consider the differential diagnosis of Acute Stress Disorder. Since we lack this information, we do not know whether the victims who report clinical range symptoms have developed Acute Stress Disorder rather than PTSD. This is a limitation of our study, and should be addressed in future research. But it is important to note that individuals with Acute Stress Disorder are at increased risk of developing PTSD, although the strength of the predictive power varies between studies. It has been reported that as many as 80% of victims of violent crime (Brewin et al. 1999) and survivors of vehicle accidents (mean age 35 years) (APA 2000) that initially met the criteria for Acute Stress Disorder have developed PTSD. Also in studies of children, the Acute Stress Disorder diagnosis has demonstrated good prediction of later PTSD, correctly classifying as many as 82.8% of PTSD cases (Meiser-Stedman et al. 2005). However, in another study of children hospitalized for injuries after a traffic crash, the prediction was not of the same magnitude ($r=0.56$; $p<0.0005$), and 60% of the children who went on to develop PTSD did not meet the criteria for even subsyndromal Acute Stress Disorder within the first month after injury (Kassam-Adams and Winston 2004).

Another possible differential diagnosis is Adjustment Disorder. This question is related to whether bullying constitutes exposure to a stressor that satisfies the A1 criterion or not, and whether the symptoms are in excess of what would be expected given the nature of the stressor. While Matthiesen and Einarsen (2004) refer to discussions about bullying and A1, Mikkelsen and Einarsen (2002) argue that distress displayed by victims of bullying is not in excess of what might be expected. At the same time there is considerable controversy around the interpretation and definition of the A1 criterion in general (Bedard-Gilligan and Zoellner 2008; Brewin et al. 2009; Kraemer et al. 2009; Long et al. 2008; Van Hooff et al. 2009; Weathers and Keane 2007). Bedard-Gilligan and Zoellner (2008) examined three diverse samples to determine the predictive utility of criterion A requirements for PTSD symptoms. The criterion did not predict much better than chance across all samples. Other studies have found that individuals exposed to traumatic events reported similar (Robinson and Larson 2010), if not lower, levels of PTSD symptoms than individuals exposed to non-traumatic stressful life events such as death (not unexpected)/serious illness of someone close to them, romantic relationship problems, family relationship problems, medical problems (non-life-threatening) for self (Gold et al. 2005). Other researchers found the same for burglary

without confrontation with the burglar, relational problems, problems with study or work, chronic illness or non-sudden death of a loved one, and serious illness (self) (Mol et al. 2005). Some researchers have therefore suggested that criterion A could be a dispensable part of the diagnosis of PTSD, because it is not necessary for the identification of people with PTSD symptoms (Brewin et al. 2009; Kraemer et al. 2009). Other researchers argue that criterion A could include less severe, but still serious life events such as bullying (Matthiesen and Einarsen 2004). Since newer versions of the A1 criteria have emphasized perceived life threat (see Weathers and Keane 2007), many children who experience bullying would probably qualify under this criterion.

In general, our findings add to the discussion of the stressor criterion that has received increased attention with the release of DSM 5. If bullying does not satisfy the A1 criterion, our results add to findings that posttraumatic symptomatology may nonetheless be present among individuals who have experienced stressful life events. No matter what, we believe our findings must be interpreted carefully, and future research should prioritize investigating bullied children through diagnostic procedures to find out more about this. At the same time we do believe that the high levels of symptoms reported from a representative sample of bullied children provide important information which should be communicated to clinical practice and schools.

Implications for Practice

Our study suggests several psycho-educational implications for practice. Children who report being bullied should be checked for trauma related symptoms. Mental health practitioners evaluating PTSD symptoms should consider bullying one of the potential risk factors. Although girls report less frequent bullying, more girls score in the clinical range of the scale and could thereby need special attention. School psychologists and teachers should be informed about these findings. Teachers could become more competent and sensitive to identifying PTSD symptoms in order to refer the children to specialists and re-adjust teaching and learning environments in order to alleviate symptoms.

The issue of PTSD symptoms among victims or how to deal with them is virtually non-existent in many well-known anti-bullying programmes. Our results show that it is important for intervention programmes aimed at bullying to address PTSD symptoms among victims, and how schools can deal with these in an appropriate way. A school-based intervention for treating this particular group of children might be needed. As the actual number of children who experience bullying and resulting post-traumatic reactions yearly is high, developing appropriate group approaches could be a priority

Acknowledgments We thank the anonymous reviewers for their valuable comments. We also thank Julia Norman for checking on the language.

Conflict of interest The authors declare that they have no conflict of interest.

References

- APA. (2000). *Diagnostic and statistical manual of mental disorders (Text revision)* (4th ed.). Washington, DC: American Psychiatric Association.
- Arsenault, L., Bowes, L., & Shakoor, S. (2010). Bullying victimization in youths and mental health problems: 'much ado about nothing'. *Psychological Medicine*, *40*(5), 717–729. doi:10.1017/S0033291709991383.
- Bedard-Gilligan, M., & Zoellner, L. A. (2008). The utility of the A1 and A2 criteria in the diagnosis of PTSD. *Behaviour Research and Therapy*, *46*, 1062–1069. doi:10.1016/j.brat.2008.06.009.
- Berger, K. S. (2007). Update on bullying at school: science forgotten? *Developmental Review*, *27*(1), 90–126. doi:10.1016/j.dr.2006.08.002.
- Berkowitz, L. (1993). *Aggression: its causes, consequences, and control*. New York: McGraw-Hill.
- Björkqvist, K., Österman, K., & Hjeltbäck, M. (1994). Aggression among university employees. *Aggressive Behavior*, *20*, 173–184.
- Bokszczanin, A. (2007). PTSD symptoms in children and adolescents 28 months after a flood: age and gender differences. *Journal of Traumatic Stress*, *20*(3), 347–351. doi:10.1002/jts.20220.
- Bowers, L., Smith, P. K., & Binney, V. (1994). Perceived family relationships of bullies, victims and bully/victims in middle childhood. *Journal of Social and Personal Relationships*, *11*(2), 215–232. doi:10.1177/0265407594112004.
- Bowes, L., Arsenault, L., Maughan, B., Taylor, A., Caspi, A., & Moffitt, T. E. (2009). School, neighborhood, and family factors are associated with children's bullying involvement: a nationally representative longitudinal study. *Journal of the American Academy of Child and Adolescent Psychiatry*, *48*(5), 545–553. doi:10.1097/CHI.0b013e31819cb017.
- Bremner, J. D. (2006). Traumatic stress from a multiple-levels-of-analysis perspective. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: developmental neuroscience* (Vol. 2, pp. 656–676). Hoboken: John Wiley & Sons, Inc.
- Brewin, C. R., Andrews, B., Rose, S., & Kirk, M. (1999). Acute stress disorder and posttraumatic stress disorder in victims of violent crime. *The American Journal of Psychiatry*, *156*(3), 360–366.
- Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology*, *68*(5), 748. doi:10.1037/0022-006X.68.5.748.
- Brewin, C. R., Lanius, R. A., Novac, A., Schnyder, U., & Galca, S. (2009). Reformulating PTSD for DSM-V: life after criterion A. *Journal of Traumatic Stress*, *22*(5), 366–373. doi:10.1002/jts.20443.
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park: Sage.
- Bru, E., Boyesen, M., Munthe, E., & Roland, E. (1998). Perceived social support at school and emotional and musculoskeletal complaints among Norwegian 8th grade students. *Scandinavian Journal of Educational Research*, *4*, 339–356. doi:10.1080/0031383980420402.
- Carlisle, N., & Rofes, E. (2007). School bullying: do adult survivors perceive long-term effects? *Traumatology*, *13*(1), 16–26. doi:10.1177/1534765607299911.

- Cicchetti, D., & Curtis, J. (2006). The developing brain and neural plasticity: Implications for normality, psychopathology, and resilience. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: developmental neuroscience* (Vol. 2, pp. 1–64). Hoboken: John Wiley & Sons, Inc.
- Craig, W., Harel-Fisch, Y., Fogel-Grinvald, H., Dostaler, S., Hetland, J., Simons-Morton, B., & Due, P. (2009). A cross-national profile of bullying and victimization among adolescents in 40 countries. *International Journal of Public Health, 54*, 216–224. doi:10.1007/s00038-009-5413-9.
- Derryberry, D., & Tucker, D. M. (2006). Motivation, self-regulation, and self-organization. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: developmental neuroscience* (Vol. 2, pp. 502–532). Hoboken: John Wiley & Sons, Inc.
- Dyregrov, A., Kuterovac, G., & Barath, A. (1996). Factor analysis of the impact of event scale with children in war. *Scandinavian Journal of Psychology, 36*, 339–350. doi:10.1111/j.1467-9450.1996.tb00667.x.
- Enders, C. K. (2001). A primer on maximum likelihood algorithms available for use with missing data. *Structural Equation Modeling, 8*(1), 128–141. doi:10.1207/S15328007SEM0801_7.
- Giedd, J. N. (2008). The teen brain: insights from neuroimaging. *Journal of Adolescent Health, 42*(4), 335–343. doi:10.1016/j.jadohealth.2008.01.007. Review.
- Gilbert, R., Widom, C. S., Browne, K., Fergusson, D., Webb, E., & Janson, S. (2009). Burden and consequences of child maltreatment in high-income countries. *The Lancet, 373*(9657), 68–81. doi:10.1016/S0140-6736(08)61706-7 |.
- Gold, S. D., Marx, B. P., Soler-Baillo, J. M., & Sloan, D. M. (2005). Is life stress more traumatic than traumatic stress? *Journal of Anxiety Disorders, 19*(6), 687–698. doi:10.1016/j.janxdis.2004.06.002.
- Graham, J. W. (2009). Missing data analysis: making it work in the real world. *Annual Review of Psychology, 60*, 549–576. doi:10.1146/annurev.psych.58.110405.085530.
- Hawker, D. S. J., & Boulton, M. J. (2000). Twenty years' research on peer victimization and psychosocial maladjustment: a meta-analytic review of cross-sectional studies. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 41*(4), 441–469. doi:10.1111/1469-7610.00629.
- Herba, C. M., Ferdinand, R. F., Stijnen, T., Veenstra, R., Oldchinkel, A. J., Ormel, J., & Verhulst, F. C. (2008). Victimization and suicide ideation in the TRAILS study: specific vulnerabilities of victims. *Journal of Child Psychology and Psychiatry, 49*(8), 867–876. doi:10.1111/j.1469-7610.2008.01900.x.
- Horowitz, M. J., Wilner, N., & Alvarez, W. (1979). Impact of event scale: a measure of subjective stress. *Psychosomatic Medicine, 41*, 209–218.
- Johnson, M. H., & de Haan, M. (2006). Typical and atypical human functional brain development. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: developmental neuroscience* (Vol. 2, pp. 197–215). Hoboken: John Wiley & Sons, Inc.
- Jöreskog, K. G. (1993). Testing structural equation models. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 294–316). Newbury Park: Sage.
- Kassam-Adams, N., & Winston, F. K. (2004). Predicting child PTSD: the relationship between acute stress disorder and PTSD in injured children. *Journal of the American Academy of Child and Adolescent Psychiatry, 43*(4), 403–411.
- Kilpatrick, D. G., Resnick, H. S., & Aciermo, R. (2009). Should PTSD criterion a be retained? *Journal of Traumatic Stress, 22*(5), 374–383. doi:10.1002/jts.20436.
- Klomek, A. B., Marrocco, F., Kleinman, M., Schonfeld, I., & Gould, M. S. (2007). Bullying, depression, and suicidality in adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 46*(1), 40–49. doi:10.1097/01.chi.0000242237.84925.18.
- Klomek, A. B., Sourander, A., Niemela, S., Kumpulainen, K., Piha, J., Tamminen, T., & Gould, M. (2009). Childhood bullying behaviors as a risk for suicide attempts and completed suicides: a population-based birth cohort study. *Journal of the American Academy of Child and Adolescent Psychiatry, 48*(3), 254–261. doi:10.1097/CHI.0b013e318196b91f.
- Kraemer, B., Wittmann, L., Jenewein, J., Maier, T., & Schnyder, U. (2009). Is the stressor criterion dispensable? *Psychopathology, 42* (5), 333–336. doi:10.1159/000232976.
- Lancaster, S. L., Melka, S. E., & Rodriguez, B. F. (2009). An examination of the differential effects of the experience of DSM-IV defined traumatic events and life stressors. *Journal of Anxiety Disorders, 23*, 711–717. doi:10.1016/j.janxdis.2009.02.010.
- Laifer, A., & Solomon, Z. (2009). Gender differences in PTSD in Israeli youth exposed to terror attacks. *Journal of Interpersonal Violence, 24*(6), 959–976. doi:10.1177/0886260508319367. Article.
- Leymann, H., & Gustafsson, A. (1996). Mobbing at work and the development of post-traumatic stress disorders. *European Journal of Work and Organizational Psychology, 5*, 251–275. doi:10.1080/13594329608414858.
- Long, M. E., Elhai, J. D., Schweinle, A., Gray, M. J., Grubaugh, A. L., & Fruch, B. C. (2008). Differences in posttraumatic stress disorder diagnostic rates and symptom severity between criterion A1 and non-criterion A1 stressors. *Journal of Anxiety Disorders, 22*, 1255–1263. doi:10.1016/j.janxdis.2008.01.006.
- Longford, N. T., & Muthén, B. O. (1992). Factor analysis for clustered observations. *Psychometrika, 57*(4), 581–597. doi:10.1007/BF02294421.
- Marsh, H. W., Nagengast, B., Morin, A. J. S., Parada, R. H., Craven, R. G., & Hamilton, L. R. (2011). Construct validity of the multidimensional structure of bullying and victimization: an application of exploratory structural equation modeling. *Journal of Educational Psychology, 103*(3), 701–732. doi:10.1037/a0024122.
- Matthiesen, S. B., & Einarsen, S. (2004). Psychiatric distress and symptoms of PTSD among victims of bullying at work. *British Journal of Guidance and Counselling, 32*(3), 335–356. doi:10.1080/03069880410001723558.
- McKenney, K. S., Pepler, D. J., Craig, W. M., & Connolly, J. A. (2005). Psychosocial consequences of peer victimization in elementary and high school - an examination of posttraumatic stress disorder Symptomatology. In K. A. Kendall-Tackett & S. M. Giacomoni (Eds.), *Child victimization*. Kingston: Civic Research Institute.
- Meiser-Stedman, R., Yule, W., Smith, P., Glucksman, E., & Dalgleish, T. (2005). Acute stress disorder and posttraumatic stress disorder in children and adolescents involved in assaults or motor vehicle accidents. *The American Journal of Psychiatry, 162*, 1381–1383. doi:10.1176/appi.ajp.162.7.1381.
- Mikkelsen, E. G., & Einarsen, S. (2002). Basic assumptions and symptoms of post-traumatic stress among victims of bullying at work. *European Journal of Work and Organizational Psychology, 11*(1), 87–111. doi:10.1080/13594320143000861.
- Mol, S. S. L., Arntz, A., Metsmakers, J. F. M., Dinant, G.-J., Vilters-van Montfort, P. A. P., & Knottnicus, J. A. (2005). Symptoms of post-traumatic stress disorder after non-traumatic events: evidence from an open population study. *The British Journal of Psychiatry, 186*, 494–499. doi:10.1192/bjp.186.6.494.
- Muthén, B. O. (1997). Latent variable modeling of longitudinal and multilevel data. In A. Raftery (Ed.), *Sociological methodology* (pp. 453–480). Boston: Blackwell Publishers.
- Muthén, B. O. (2007). *Chi-square difference testing using the Satorra-Bentler scaled chi-square*, from <http://www.statmodel.com/chidiff.shtml>.
- Muthén, L. K., & Muthén, B. O. (2011). *Mplus version 6.11*. Los Angeles: Muthén & Muthén.
- Mynard, H., Joseph, S., & Alexander, J. (2000). Peer victimization and posttraumatic stress in adolescents. *Personality and Individual Differences, 29*, 815–821. doi:10.1016/S0191-8869(99)00234-2.

- Nader, R., & Koch, W. J. (2006). *Does bullying result in posttraumatic stress disorder?*, from <http://www.drwilliamkoch.com/articles/Bullying%20and%20PTSD%20Review.doc>.
- Nansel, T. R., Overpeck, M., Pilla, R. S., Ruan, W. J., Simons-Morton, B., & Scheidt, P. (2001). Bullying behaviors among US youth: prevalence and association with psychosocial adjustment. *Journal of the American Medical Association*, *285*, 2094–2100. doi:10.1001/jama.285.16.2094.
- Olweus, D. (1994). Bullying at school: basic facts and effects of a school based intervention program. *Journal of Child Psychology and Psychiatry*, *35*(7), 1171–1190. doi:10.1111/j.1469-7610.1994.tb01229.x.
- Perrin, S., Meiser-Stedman, R., & Smith, P. (2005). The Children's Revised Impact of Event Scale (CRIES): validity as a screening instrument for PTSD. *Behavioural and Cognitive Psychotherapy*, *33*(4), 487–498. doi:10.1017/S1352465805002419.
- Pynoos, R. S., Steinberg, A. M., Layne, C. M., Briggs, E. C., Ostrowski, S. A., & Fairbank, J. A. (2009). DSM-V PTSD diagnostic criteria for children and adolescents: a developmental perspective and recommendations. *Journal of Traumatic Stress*, *22*(5), 391–398. doi:10.1002/jts.20450. Proceedings Paper.
- Rivers, I. (2004). Recollections of bullying at school and their long-term implications for lesbians, gay men and bisexuals. *Crisis: The Journal of Crisis Intervention and Suicide Prevention*, *24*, 169–175. doi:10.1027/0227-5910.25.4.169.
- Robinson, J. S., & Larson, C. (2010). Are traumatic events necessary to elicit symptoms of posttraumatic stress? *Psychological Trauma: Theory, Research, Practice, and Policy*, *2*(2), 71–76. doi:10.1037/a0018954.
- Roland, E. (2002). Aggression, depression and bullying others. *Aggressive Behavior*, *28*(3), 198–206. doi:10.1002/ab.90022.
- Roland, E., & Idsoc, T. (2001). Aggression and bullying. *Aggressive Behavior*, *27*(6), 446–462. doi:10.1002/ab.1029.
- Rubin, D. C., Boals, A., & Berntsen, D. (2008). Memory in posttraumatic stress disorder: properties of voluntary and involuntary, traumatic and nontraumatic autobiographical memories in people with and without posttraumatic stress disorder symptoms. *Journal of Experimental Psychology*, *137*(4), 591–614. doi:10.1037/a0013165.
- Salmivalli, C. (2010). Bullying and the peer group: a review. *Aggression and Violent Behavior*, *15*(2), 112–120. doi:10.1016/j.avb.2009.08.007 |.
- Satorra, A., & Bentler, P. M. (1999). *A scaled difference chi-square test statistic for moment structure analysis*, from <http://www.stat.ucla.edu/papers/preprints/260/>.
- Scott, M. J., & Stradling, S. C. (1992). *Counselling of post traumatic stress disorder*. London: Sage.
- Sentse, M., Scholte, R., Salmivalli, C., & Voeten, M. (2007). Person-group dissimilarity in involvement in bullying and its relation with social status. *Journal of Abnormal Child Psychology*, *35*(6), 1009–1019. doi:10.1007/s10802-007-9150-3.
- Shakoor, S., Jaffee, S. R., Andreou, P., Bowes, L., Ambler, A. P., Caspi, A., & Arseneault, L. (2011). Mothers and children as informants of bullying victimization: results from an epidemiological cohort of children. *Journal of Abnormal Child Psychology*, *39*, 379–387. doi:10.1007/s10802-010-9463-5.
- Shields, A., & Cicchetti, D. (2001). Parental maltreatment and emotion dysregulation as risk factors for bullying and victimization in middle childhood. *Journal of Clinical Child Psychology*, *30*(3), 349–363. doi:10.1207/S15374424JCCP3003_7.
- Smith, P. K. (1997). Commentary III. Bullying in life-span perspective: what can studies of school bullying and workplace bullying learn from each other? *Journal of Community and Applied Social Psychology*, *7*, 249–255. doi:10.1002/(SICI)1099-1298(199706)7:3<249::AID-CASP425>3.3.CO;2-U.
- Solberg, M. E., & Olweus, D. (2003). Prevalence estimation of school bullying with the Olweus Bully/victim questionnaire. *Aggressive Behavior*, *29*, 239–268. doi:10.1002/ab.10047.
- Solberg, M. E., Olweus, D., & Endresen, I. M. (2007). Bullies and victims at school: are they the same pupils? *British Journal of Educational Psychology*, *77*(2), 441–464. doi:10.1348/000709906X105689.
- SPSS. (2009). *SPSS for windows, Rel. 18.0.0*. Chicago: IBM SPSS Inc.
- Tehrani, N. (2004). Bullying: a source of chronic posttraumatic stress? *British Journal of Guidance and Counselling*, *32*, 357–366. doi:10.1080/03069880410001727567.
- Thabet, A. A. M., Abed, Y., & Vostanis, P. (2004). Comorbidity of PTSD and depression among refugee children during war conflict. *Journal of Child Psychology and Psychiatry*, *45*(3), 533–542. doi:10.1111/j.1469-7610.2004.00243.x.
- Tolin, D. F., & Foa, E. B. (2006). Sex differences in trauma and posttraumatic stress disorder: a quantitative review of 25 years of research. *Psychological Bulletin*, *132*(6), 959. doi:10.1037/0033-2909.132.6.959.
- Van Hooff, M., McFarlane, A. C., Baur, J., Abraham, M., & Barnes, D. J. (2009). The stressor Criterion-A1 and PTSD: a matter of opinion? *Journal of Anxiety Disorders*, *23*, 77–86. doi:10.1016/j.janxdis.2008.04.001.
- Veenstra, R., Lindenberg, S., Oldchinkel, A. J., De Winter, A. F., Verhulst, F. C., & Ormel, J. (2005). Bullying and victimization in elementary schools: a comparison of bullies, victims, bully/victims, and uninvolved preadolescents. *Developmental Psychology*, *41*(4), 672. doi:10.1037/0012-1649.41.4.672.
- Weathers, F. W., & Keane, T. M. (2007). The criterion a problem revisited: controversies and challenges in defining and measuring psychological trauma. *Journal of Traumatic Stress*, *20*(2), 107–121. doi:10.1002/jts.20210.
- Weaver, A. (2000). Can post-traumatic stress disorder be diagnosed in adolescence with catastrophic stressor? A case report. *Clinical Child Psychology and Psychiatry*, *5*(1), 2–7. doi:10.1177/1359104500005001008.
- Yule, W. (1992). Post traumatic stress disorder in child survivors of shipping disasters: the sinking of the “Jupiter”. *Journal of Psychotherapy: Psychosomatics*, *57*, 200–205.