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Post-traumatic stress disorder as a consequence of bullying at work and at school. A literature review and meta-analysis

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ABSTRACT

Bullying has been established as a prevalent traumatic stressor both in school and at workplaces. It has been claimed that the mental and physical health problems found among bullied persons resembles the symptomatology of Post Traumatic Stress Disorder (PTSD). Yet, it is still unclear whether bullying can be considered as a precursor to PTSD. Through a review and meta-analysis of the research literature on workplace- and school bullying, the aims of this study were to determine: 1) the magnitude of the association between bullying and symptoms of PTSD, and 2) whether the clinical diagnosis of PTSD applies to the consequences of bullying. Altogether 29 relevant studies were identified. All had cross-sectional research designs. At an average, 57% of victims reported symptoms of PTSD above thresholds for caseness. A correlation of .42 (95% CI: .36–.48; $p < .001$) was found between bullying and an overall symptom-score of PTSD. Correlations between bullying and specific PTSD-symptoms were in the same range. Equally strong associations were found among children and adults. Two out of the three identified clinical diagnosis studies suggested that bullying is associated with the PTSD-diagnosis. Due to a lack of longitudinal research and structural clinical interview studies, existing literature provides no absolute evidence for or against bullying as a causal precursor of PTSD.

Contents

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1. Introduction

With an estimated prevalence rate of 32% in schools (Solberg & Olweus, 2003) and 15% in workplaces (Nielsen, Matthiesen, & Einarsen, 2010), bullying is a significant social stressor for many adults and children. The concept of bullying refers to a long-lasting and systematic form of interpersonal aggression where an individual is persistently and over time exposed to negative actions from superiors, co-workers or other students, and where the target finds it difficult to defend her-/himself against these actions (Einarsen & Skogstad, 1996; Olweus, 1993). Following this definition, workplace- and school bullying can be described as a two-step process. The first step includes exposure to systematic bullying behavior over time, whereas the second step comprises a subjective interpretation of being victimized by these bullying behaviors (Nielsen & Knardahl, in press). There is no definitive list of bullying behavior, but most often bullying involves repeated exposure to aggression in the form of verbal hostility, teasing, badgering, being made the laughing stock of the department/classroom, and social exclusion (Einarsen, 2000; Solberg & Olweus, 2003).

While there are some differences in the phenomenology of bullying among children and adults, there are also many similarities and continuities (Monks et al., 2009; Smith, 1997). For instance, the most commonly used definitions of school- and workplace bullying are comparable in that they emphasize persistent and repeated negative actions which the target perceive and interpret as intended to intimidate or hurt and a systematic abuse of power as the main definitional characteristics (Smith, Singer, Hoel, & Cooper, 2003). Furthermore, a consistent body of evidence shows that persons who bully others at school also are likely to bully as adults, a finding which indicates that there are intergenerational continuities in bullying tendencies (Ttofi, Farrington, & Losel, 2012). Similarly, retrospective research findings show that victimization from bullying in school increases the risk of being bullied in adult life (Smith et al., 2003). Finally, the predictors and outcomes of bullying in school and at the workplace are similar or overlapping (Smith et al., 2003). These similarities suggest that school- and workplace bullying are strongly interrelated phenomena and that it is meaningful to review findings from the two research fields together.

In the research on psychological effects of bullying, both among children and adults, exposure to systematic and long-lasting hostile and abusive behavior at work has been associated with a range of negative health effects, including somatic as well as psychological symptoms. Several studies have reported both cross-sectional and long-term associations between bullying and symptoms of anxiety and depression, sleeping problems, irritability, lack of concentration and somatic complaints like muscle–skeletal pain, fatigue and gastrointestinal symptoms (Arseneault, Bowes, & Shakoor, 2010; Bowling & Beehr, 2006; Nielsen & Einarsen, 2012). Taken together, these health problems resemble the symptomatology which characterizes post-traumatic stress disorder (PTSD) and it has, therefore, been proposed that exposure to bullying may lead to PTSD (Kreiner, Sulyok, & Rothenhausler, 2008; Leymann & Gustafsson, 1996; Matthiesen & Einarsen, 2004; Tehrani, 2004). Yet, it is heavily debated whether the PTSD diagnosis can be applied to the health consequences of non-physical forms of aggression such as bullying; and it remains unclear whether bullying can be seen as a cause of post-traumatic stress symptoms. Through a review and meta-analysis of the literature on school- and workplace bullying, the present study makes a unique contribution to the research field by being the first comprehensive and exhaustive statistical synthesis and summary of the empirical evidence regarding the impact of bullying on PTSD.

1.1. Background

PTSD is an anxiety disorder consisting of a constellation of three distinct areas of symptoms (persistent re-experiencing the event, avoidance of stimuli associated with the trauma, and persistent arousal), resulting from exposure to a traumatic event (American Psychiatric Association, 2000). A PTSD diagnosis is warranted when at least one symptom of re-experiencing the event, three symptoms of avoidance and two hyper arousal symptoms are present for at least one month to an extent that they cause clinically significant distress or impairment in daily functioning.

When first formulated in 1980, the diagnosis of PTSD was not regarded as relevant for children and adolescents; however, a developmental perspective has gradually been introduced in the different versions of the DSM. The symptoms of PTSD in children and adolescents are almost isomorphic to the adult core criteria. However, encompassing features specific to children, such as repetitive play and trauma specific play reflecting reliving of the trauma, may be conveyed. Children may have difficulties reporting diminished interest in significant activities and constriction of affect (avoidance), and this may only be discovered through careful evaluations with reports from parents, teachers and other observers. Children may also exhibit physical symptoms such as stomachaches and headaches (American Psychiatric Association, 2000; Idsoe, Dyregrov, & Idsoe, 2012).

PTSD differs from other psychiatric diagnoses by its dependence on two distinct processes: 1) The exposure to trauma, and 2) The development of a specific pattern of symptoms in temporal or contextual relation to the traumatic event. The diagnostic A-criterion specifies that the individual must be sufficiently exposed to a qualifying traumatic event to get a PTSD diagnosis. Specifically, the A-criterion states that a person must be directly or indirectly exposed to death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence in order to qualify for the PTSD-diagnosis (American Psychiatric Association, 2013). As bullying does not represent a single traumatizing event, but rather a systematic and exposure to mainly non-physical aggression over a prolonged time-period, it has been suggested that the PTSD-like symptoms found among victims of bullying should rather be subsumed under the diagnoses such as adjustment disorder, depressive disorder, or anxiety, or simply distress that is not part of a defined psychiatric disorder. Yet, others argue that psychosocial events without immediate physical injury should qualify for the diagnosis of PTSD (Rosen, Spitzer, & McHugh, 2008), and the A-criterion has been altered in successive editions of Diagnostic and Statistical Manual of Mental Disorders (DSM). The ongoing debate is both based on the differences in interpretation of the A criterion as a qualifying stressor and on the development PTSD (Brewin, Lanius, Novac, Schnyder, & Galea, 2009; Kraemer, Wittmann, Jenewein, Maier, & Schnyder, 2009; Rosen, Lilienfeld, Frueh, McHugh, & Spitzer, 2010). In DSM version IV, a subjective component was included in the A-criterion and stated as “personal response of intensive fear, helplessness or horror” (American Psychiatric Association, 2000).

Although exposure to bullying constitutes a systematic exposure to a series of negative events over a prolonged time period, rather than one single traumatic event, it has been claimed that the distress many of the victims experience equalizes the stress associated with traumatic events (Matthiesen & Einarsen, 2004; Mikkelsen & Einarsen, 2002; Tehrani, 2004). Building on Janoff-Bulman's (1992) theory of shattered assumptions, it has been suggested that bullying is a traumatic event in that prolonged exposure to the phenomenon shatters the target's most basic cognitive schemes about the world, other people, and ourselves (Mikkelsen & Einarsen, 2002). Insofar as stability is needed in conceptual systems, abrupt changes in core schemas are deeply threatening and may result in traumatization (Janoff-Bulman, 1992). Research supports the notion of non-physical events as potential traumatizing. For instance, in a study of post-traumatic symptoms in health workers, it was found that respondents rated verbal aggression as having a larger impact on posttraumatic stress symptoms than physical aggression (Walsh & Clarke, 2003). Verbal aggression was particularly associated with intrusive recollections.

In addition to the problem of defining the level of trauma qualifying for the diagnosis, the link between stressor and symptoms raise

problems with causality. Causality in psychiatry is complex and will in many cases represent an oversimplification. In causality, one has to take into consideration both pre-event factors for the individual, peri-event factors related to the actual trauma, and post-event factors related to the time after the trauma. Personality traits, like neuroticism, pre-existing psychiatric disorders as anxiety and depression, lack of support or experiencing other stressful life-events, are all risk factors for developing PTSD. Important factors related to the actual trauma may be whether the stressful acute events were non-expected or predictable, as well as whether the individual was able to cope with the situation. Important post-event factors may be lack of support or physical injury as a consequence of the event (Bisson, 2007; Keane, Marshall, & Taft, 2006). Hence, with regard to establishing a causal association between bullying and PTSD, one has to consider both the effect of bullying on post-traumatic stress over time, as well as ruling out the impact of potential pre-, peri-, and post-event factors that may influence the relationship.

1.2. Aims of the study and research questions

In order to add to the understanding of the relationship between bullying and PTSD, the main objective of the current study was to evaluate, on the basis of existing research, whether bullying at work or school may lead to PTSD. By means of literature review and meta-analysis of the existing research literature, the following two research question will be investigated:

1) *What is the magnitude of the association between bullying and symptoms of PTSD?*
2) *Does the diagnosis of PTSD apply to the health consequences found among targets of bullying?*

As discussed above, "the diagnosis of PTSD" and "symptoms of PTSD" are used interchangeably in the literature on posttraumatic stress and workplace bullying. In the present study, we separate between studies where the focus has been the full PTSD-diagnosis and studies where only post-traumatic stress symptoms *(i.e., hyperarousal, intrusion, and avoidance)* have been assessed.

2. Methods

2.1. Material and procedure

To identify relevant studies, we followed the literature search strategies proposed by Durlak and Lipsey (1991). *Bullying*, *harassment*, *mobbing*, *mistreatment*, *emotional abuse*, and *victimization/victimization* are concepts that have been used to describe exposure to long-lasting and systematic psychological and physical aggression (Einarsen, Hoel, Zapf, & Cooper, 2011; Nielsen et al., 2010; Zapf & Einarsen, 2005). While there may be subtle theoretical differences between these concepts, they are all in line with the definition of bullying presented in the introduction of this article which highlighted duration, persistency, and power imbalance as the main definitional characteristics. The above keywords were combined with *post-traumatic stress*, *trauma*, *PTSD*, *PTS*, and *PTSS* and entered in the PsychINFO, ISI Web of Science, Science Direct, Pubmed, and Proquest databases. Internet searches via www.google.com and Google Scholar were also performed to find other available articles. The search included studies published up to October, 2014. Papers on related, but less persistent and long-lasting, phenomena such as incivility, social undermining, general abuse, and aggression were screened in order to reveal studies on the phenomenon of workplace bullying being presented under different labels. Further, the authors' personal collection of publications on bullying from around 1988 to the present was examined to find any missing publications. As a final step, citations in the collected publications were inspected. The study coding form was developed by following the guidelines presented by Lipsey and Wilson (2001).

Only studies that used validated questionnaires to assess post-traumatic stress were included in the review. To be included in the meta-analytic part of the study, studies had to provide the zero-order correlations between bullying and symptoms of post-traumatic stress, or provide sufficient information for these correlations (effect sizes) to be calculated. Studies that lacked this information or reported effect sizes that could not be transformed into correlations were excluded from the meta-analyses. To avoid double-counting data, the sample in a given study should not have been used in a previous study of those included in our review.

2.2. Meta-analytic approach

For all studies, effect sizes were calculated by means of averaged weighted correlations across samples. The *Q* statistic was used to assess the heterogeneity of studies. A significant *Q* value rejects the null hypothesis of homogeneity. An I^2 statistic was computed as an indicator of heterogeneity in percentages. Increasing values show increasing heterogeneity, with values of 0% indicating no heterogeneity, 50% indicating moderate heterogeneity, and 75% indicating high heterogeneity (Higgins, Thompson, Deeks, & Altman, 2003). As considerable heterogeneity was expected between studies, we calculated the pooled mean effect size using the random effects model. Random effects models are recommended when accumulating data from a series where the effect size is assumed to vary from one study to the next, and where it is unlikely that studies are functionally equivalent (Borenstein, Hedges, & Rothstein, 2007). Furthermore, random effects models allow statistical inferences to be made regarding a population of studies beyond those included in the meta-analysis (Berkeljon & Baldwin, 2009).

It is a potential shortcoming of meta-analyses that overall effect sizes can be overestimated due to a publication bias in favor of significant findings. To approach this so-called "file drawer problem" we calculated the Fail-Safe N and Funnel plots. The Fail Safe N reflects the number of studies reporting null results that would be required to reduce the overall effect to non-significance (Borenstein, Hedges, Higgins, & Rothstein, 2009). A funnel plot is a simple scatter plot of the effect estimates from individual studies against a measure of each study's size or precision. In the absence of publication bias, the studies will be distributed symmetrically about the mean effect size. In the presence of publication bias the studies are expected to follow the model with symmetry at the top, a few studies missing in the middle, and more studies missing near the bottom (Borenstein et al., 2009). Meta-analyses and analyses of publication bias were carried out using the Comprehensive Meta-Analysis (version 2) software developed by Biostat (Borenstein, Hedges, Higgins, & Rothstein, 2005).

3. Results

The literature search yielded 29 relevant studies. Altogether 26 papers focused on the association between bullying and PTSD-symptoms. Of these, seven described frequencies of symptoms and 18 provided the zero-order correlations between bullying and symptoms of post-traumatic stress. In addition, one retrospective study showed that recollections of being exposed bullying in childhood was associated with symptoms of posttraumatic stress in adulthood (Murphy, Shevlin, Armour, Elklit, & Christoffersen, 2014) For the association between bullying and the formal diagnosis of PTSD as assessed by clinical interview, only three studies were found. All three were based on adult populations.

3.1. Frequency of PTSD-symptoms

An overview of studies which reported the frequency of PTSD-caseness among victims of bullying is included in Table 1. After weighting rates on the sample size of each study, an average of 57% (95% C.I. = 42–70) of all victims had symptoms scores above thresholds for caseness.

Table 1
Frequency of victims of bullying with Post Traumatic Stress Disorder symptoms above thresholds for caseness.

Sample	Study	N bullied	Location	Bullying measure	PTSD-measure	PTSD symptoms (%)
Adult	Balducci, Alfano, and Fraccaroli (2009)	107	Italy	Negative Acts Questionnaire (NAQ)	MMPI-II	52
Adult	Matthiesen and Einarsen (2004)	102	Norway	NAQ + Self-labeling	PTSS-10 + IES-R	75
Adult	Mikkelsen and Einarsen (2002)	118	Denmark	NAQ + Self-labeling	PDS	76
Adult	Nielsen, Matthiesen, and Einarsen (2005)	199	Norway	NAQ-R + Self-labeling	IES-R	84
Adult	Rodriguez-Munoz, Moreno-Jimenez, Vergel, and Garrosa (2010)	183	Spain	Bullying at Work Questionnaire	SIP	42.6
Adult	Tehrani (2004)	165	UK	Self-labeling	IES-R	44
Children	Idsoe et al. (2012)	450	Norway	Roland & Idsoe's scale	Cries-8	33.7
Children	Mynard, Joseph, and Alexander (2000)	136	UK	Victims scale	IES-R	37
Total	*Average weighted rate*					*57* *(95% C.I. = .42–.70)*

3.2. Review of clinical studies of the relationship between bullying at work and PTSD-diagnosis

In a Swedish study of 64 patients at a rehabilitation center for victims who had experienced bullying at work, the symptoms of PTSD were assessed by a structured psychiatric interview (Leymann & Gustafsson, 1996). The patients were all chronic sufferers after long term bullying. The majority of the patients were referred by social insurance offices in Sweden, whereas a small number were directly referred by the employer. The sample comprised 20 men and 44 women. Patients were rated on several different catastrophic diagnostic instruments. Symptoms of posttraumatic stress were assessed with the 15 items version of the Impact of Event Scale (Horowitz, Wilner, & Alvarez, 1979) and the 10 item Post-traumatic symptom scale (Raphael, Lundin, & Weisaeth, 1989), The DSM-III-R diagnostic manual was used as a diagnostic summary of the questionnaires. Total interview time varied between four to 10 h. Of the 64 patients assessed, 59 (92%) qualified for a diagnosis of PTSD.

In a German study by Kreiner et al., (2008) which included patients from a psychiatric outpatient clinic open to the public, 20 persons who had been severely bullied at work were interviewed with SCID-I which is a validated structured clinical interview aiming at assessing diagnoses according to DSM-IV. Of these patients, 11 (55%) qualified for the diagnosis of PTSD.

In a single-case study from Italy (Signorelli, Costanzo, Cinconze, & Concerto, 2013), the aim was to determine whether "post-traumatic stress disorder" or "adjustment disorder" (AD) was the most appropriate diagnosis for a victim of bullying. The case study is based on a 58-year-old female nurse who, after a brilliant career, underwent bullying at the workplace, and showed depression, anxiety, and sleep disorders that required hospitalization and a substantial intervention. According to the DSM-IV-TR criteria, a diagnosis of AD with anxiety and depressive mood was made. The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID I) excluded any other Axis I Diagnosis, such as major depressive disorder or anxiety disorders. The Clinician-Administered PTSD Scale (CAPS) also excluded PTSD.

3.3. Relationship between bullying and PTSD-symptoms

The 19 studies that provided information on associations between exposure to workplace or school bullying and symptoms of post-traumatic stress were included in the meta-analysis. An overview of the included studies is provided in Table 2. One study included two samples (Laschinger & Nosko, 2013). The total sample size for these 20 samples was 6378 respondents (range: 23 to 1010). Thirteen samples were based on adult populations, whereas seven samples employed children and adolescents in their samples. Of the included studies of adults (K = 12; N = 4246), three originated from Norway, whereas two originated from Italy, two from Lithuania, and two from Denmark. The remaining studies were from Australia, Canada, and Pakistan. The studies on children and adolescents (K = 7; N = 2132) originated from USA (3), UK (2), Italy (1), and Norway (1). With the exception of one study which used the Work Harassment Scale developed by Björkqvist, Österman, and Hjeltbäck (1994), all studies among adults

Table 2
Overview of studies included in meta-analysis.

Sample	Study	N	Location	Bullying measure	PTSD-measure	Weighted correlation	95% C.I.
Adult	Balducci et al. (2009)	107	Italy	NAQ	MMPI-II	.22	.03–.39
Adult	Balducci, Fraccaroli, and Schaufeli (2011)	609	Italy	NAQ	PCL-C	.42	.35–.48
Adult	Bond, Tuckey, and Dollard (2010)	139	Australia	NAQ	PPTSD-R	.52	.39–.63
Adult	Glasø et al. (2009)	72	Norway	NAQ	IES-R	.39	.17–.57
Adult	Høgh et al. (2012)	1010	Denmark	NAQ	IES-R	.42	.37–.47
Adult	Laschinger and Nosko (2013) Sample 1	244	Canada	NAQ	PC-PTSD	.55	.46–.63
Adult	Laschinger and Nosko (2013) Sample 2	631	Canada	NAQ	PC-PTSD	.60	.55–.65
Adult	Malik and Farooqi (2014)	300	Pakistan	WHS	PCL-C	.49	.40–.57
Adult	Malinauskiene and Jonutyte (2008)	370	Lithuania	NAQ	IES-R	.34	.25–.43
Adult	Malinauskiene and Bernotaite (2014)	323	Lithuania	NAQ	IES-R	.50	.35–.62
Adult	Matthiesen and Einarsen (2004)	102	Norway	NAQ	IES-R	.37	.19–.53
Adult	Mikkelsen and Einarsen (2002)	118	Denmark	NAQ	PDS	.34	.17–.49
Adult	Nielsen et al. (2008)	221	Norway	NAQ	IES-R	.41	.29–.51
Children	Beckerman and Auerbach (2014)	23	USA	N/A	PCL	.70	.41–.86
Children	Crosby, Oehler, and Capaccioli (2010)	244	USA	SEQ-SR	TSCC	.66	.58–.73
Children	Guzzo, Pace, Lo Cascio, Craparo, and Schimmenti (2014)	488	Italy	Olweus	TSCC	.16	.07–.24
Children	Idsoe et al. (2012)	936	Norway	Roland & Idsoe's scale	Cries-8	.34	.28–.40
Children	Mynard et al. (2000)	136	UK	Victims scale	IES-R	.24	.06–.41
Children	Pessall (2001)	104	UK	DIPC	DTS	.31	.13–.47
Children	Storch and Esposito (2003)	201	USA	SEQ	TSCC	.35	.22–.47

used the Negative Acts Questionnaire (Einarsen, Hoel, & Notelaers, 2009) to measure exposure to workplace bullying. Different questionnaires, such as the four item scale developed by Roland and Idsoe (2001), were used in the studies of children.

Table 3 presents the main findings from the meta-analyses. After weighting each correlation by sample size, an average correlation of .42 (95% CI: 36–.48; $p < .001$) was established between exposure to bullying and an overall symptom-score of PTSD. A significant Q-statistic ($Q = 148.93$; $df = 19$; $p < .001$) and an I^2 of 87.24 indicated high levels of heterogeneity between the meta-analyzed studies. With a total of 5247 non-significant studies needed to reduce the overall effect to non-significance, the fail-safe N estimates indicate that the effect size observed in the present meta-analysis is likely to be robust ($z = 31.81$; $p < .001$). A funnel plot disclosed moderate asymmetry between the individual effect sizes (see Fig. 1). Analyses of effect size among children ($r = .39$; 95% C.I. = .24–.52; $p < .001$) and adults ($r = .44$; 95% C.I. = .38–.50; $p < .001$) indicated no significant differences in average weighted correlations for the two groups ($Q_{between} = .42$; $df = 1$; $p > .05$). This finding suggests that bullying has an equally strong association with symptoms of post-traumatic stress among children and adults. Still, the larger confidence interval among children indicates a larger variation in findings for this group compared to adults.

In order to investigate the relationship between exposure to bullying and the individual symptoms of post-traumatic stress (*i.e.*, avoidance, intrusion, and hyper-arousal), a meta-analysis was conducted on studies which presented findings on the three distinct symptom scores. In all, five studies reported findings on the relationship between bullying and the PTSD symptoms that could be included in the meta-analysis (Glasø, Nielsen, Einarsen, Haugland, & Matthiesen, 2009; Høgh, Hansen, Mikkelsen, & Persson, 2012; Matthiesen & Einarsen, 2004; Mikkelsen & Einarsen, 2002; Nielsen, Matthiesen, & Einarsen, 2008). The total sample size for these studies was 1501 respondents. All studies were based on adult populations. An average correlation of .37 (95% CI: .32–.43; $p < .001$) was established between exposure to bullying and avoidance, whereas a correlation of .39 (95% CI: .35–.46; $p < .001$) was found between bullying and intrusion. The strongest association was found between bullying and hyper arousal ($r = .41$; 95% CI: .32–.43; $p < .001$). However, as indicated by the overlapping confidence intervals, the differences between the symptoms scores were not significant ($Q = .58$; $df = 2$; $p > .05$).

4. Discussion

This review of the existing research literature on the relationship between bullying and the diagnosis of PTSD, shows that bullying is associated with symptoms of post-traumatic stress, but that there is a shortage of clinical and prospective research on the association. With regard to clinical assessments, only three studies were identified. The number of participants in these studies was small and in two of the studies patients were recruited from rehabilitation centers for victims of long-term bullying. The degree of bullying and pre-,peri-, and post-event factors were not very well described and this limits the generalizability of the results. While the results of the clinical assessments in two of the clinical studies indicate an association between bullying at work and diagnosis of PTSD, the single-case study by Signorelli et al. (2013) found that PTSD was not an adequate diagnosis for the investigated victim of bullying.

Our findings show that an average of 57% of victims of bullying report symptom scores for PTSD above cut-off thresholds for caseness. In comparison, the estimated lifetime prevalence of PTSD among adult Americans is 7.8%.[1] This suggests that PTSD symptoms are overrepresented among bullied persons. Further information about the association between bullying and posttraumatic stress was provided in the meta-analytical part of this study in that exposure to bullying at work and in school was found to be significantly associated with post-traumatic stress symptoms. Following the recommendations of Cohen (1988), the established average correlation was moderate to strong (0.42). Compared to findings from previous meta-analysis on outcomes of bullying, this association is stronger than correlations between bullying at work and outcomes such as psychological distress, physical health and well-being, general strain, and burnout (Hershcovis, 2011; Nielsen & Einarsen, 2012)

Looking at the association between the three symptoms clusters (B—intrusion, C—avoidance/numbing and D—hyper arousal) the highest correlation was found for hyper arousal (0.41) while the correlation for intrusion and avoidance was 0.37 and 0.39, respectively. The differences in average scores between symptoms were not significantly different. Earlier studies have found the avoidance/numbing symptoms (cluster C) to be the strongest determinants of PTSD (Breslau, Reboussin, Anthony, & Storr, 2005; Ehlers, Mayou, & Bryant, 1998) and that meeting group C criteria after a traumatic event was associated with functional impairment from post-traumatic symptoms (Breslau et al., 2005). As described in the DSM-V manual (American Psychiatric Association, 2013), the definition of post-traumatic stress disorder (PTSD) requires that there is a single traumatic event which caused a threat of or actual death or serious injury in order to apply the diagnosis of PTSD. Hence, although exposure to bullying is associated with the three symptom clusters, it is still open to discussion whether bullying can be considered to constitute a life threatening event (Walsh & Clarke, 2003; Weaver, 2000).

The results from the meta-analyses showed equally strong associations between exposure to bullying in school and at the workplace. Hence, this finding supports previous notions about similarities and continuities in bullying among children and adults (Monks et al., 2009; Smith et al., 2003). Furthermore, this degree of consistency in the correlates of bullying in different environments and at substantially different ages points to continuity in the outcomes of bullying. That is, while it is likely that coping mechanisms and capabilities to respond to bullying are different between adults and children, there is still an equally strong direct association between bullying and symptoms of posttraumatic stress which operates independently of context and age. This latter view is supported by findings from study of sense of coherence as a potential protective factor in the relationship between workplace bullying and posttraumatic stress which found that sense of coherence offered the most protective benefits to targets exposed to low levels of bullying, whereas the benefits of SOC diminished as bullying became more severe (Nielsen et al., 2008). Consequently, bullying seems to be a traumatic experience for those exposed to it, regardless of available coping resources.

Table 3
Summary of the meta-analysis of studies on the association between workplace bullying and PTSD-symptoms (Random effects model).

Sample	Association	K	N	Mean r	95% C.I.	Q	I^2
Overall PTSD symptom-score							
Children	Bullying – PTSD	7	2132	.39	.24–.52	71.46*	91.60
Adults	Bullying – PTSD	13	4246	.44	.38–.50	53.18	77.44
Total	*Bullying – PTSD*	*20*	*6378*	*.42*	*.36–.48*	*148.93**	*87.24*
Symptoms of PTSD							
Adults	Bullying – Hyperarousal	5	1501	.41	.35–.46	5.24	23.62
Adults	Bullying – Avoidance	5	1501	.37	.32–.43	4.91	18.55
Adults	Bullying – Intrusion	5	1501	.39	.35–.44	2.47	0.00

Note. K = number of correlations; N = total sample size for all studies combined; *mean r* = average weighted correlation coefficient; *95% CI* = lower and upper limits of 95% confidence interval

* $p < .01$

[1] PTSD, N. (2006). Facts about PTSD. *Psych Central*. Retrieved on February 26, 2014, from http://psychcentral.com/lib/facts-about-ptsd/000662.

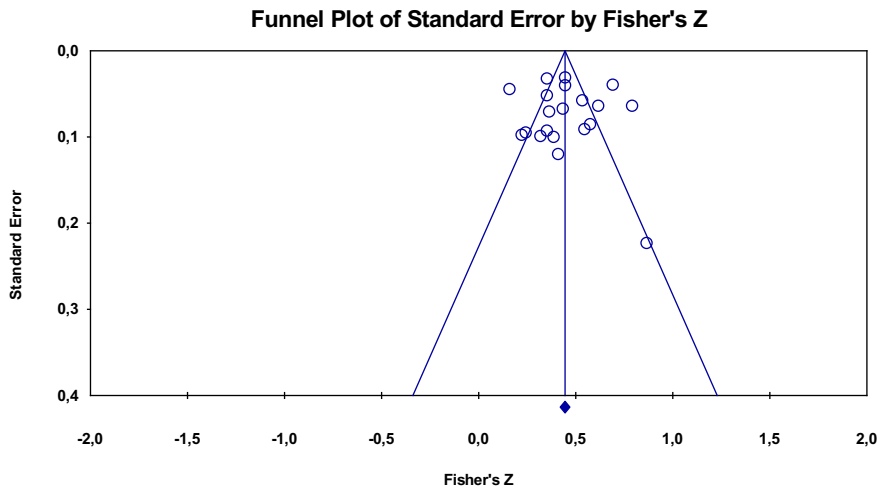

Fig. 1. Funnel plot of effect sizes for studies on the association between bullying and symptoms Post Traumatic Stress Disorder (overall).

4.1. Methodological considerations

All the studies we found in our literature review were cross-sectional and mainly based on survey data, something which limits the conclusions we can draw from them. Experimental or longitudinal studies are needed in order to make conclusions about causal factors. As experimental studies on bullying and posttraumatic stress would breach the ethical boundaries for research, longitudinal studies, be it quantitative or qualitative, should be the preferred method. Building on findings from longitudinal studies on the relationship between bullying and mental health in general, there are strong reasons to conclude that bullying does have a negative effect on distress (Finne, Knardahl, & Lau, 2011; Kivimäki et al., 2003; Lahelma, Lallukka, Laaksonen, Saastamoinen, & Rahkonen, 2011). For instance, in a recent meta-analysis of time-lagged associations between bullying and psychological distress it was established that exposure to bullying was positively related to subsequent symptoms of distress with an Odds Ratio of 1.68 (Nielsen, Magerøy, Gjerstad, & Einarsen, 2014). However, it was also found that existing mental health problems increased the risk of being exposed to bullying at a later time-point with an Odds Ratio of 1.77, thus indicating a reciprocal relationship between the variables. Hence, this suggests that it is also important to assess vulnerability factors such as earlier trauma or co-morbid psychiatric disorders.

Earlier studies have shown that parental maltreatment in earlier childhood can set children at risk for victimization by peers (Shields & Cicchetti, 2001). In this case, the PTSD symptoms might be attributed to the parental maltreatment and could very well be present even before the bullying started. For instance, personality traits of neuroticism and introversion, early conduct problems, a family history of psychiatric disorders, and pre-existing psychiatric disorders are associated with increased risk for exposure to traumatic events (Breslau, 2002). Among children and adolescents, it is also likely that associations between bullying and symptoms of posttraumatic stress can be complicated by family- or home violence, neglect, or other forms of abuse outside school. In addition, there are many demographical characteristics, such as gender, sexual orientation, race and ethnicity, which may function as vulnerability factors in the relationship between bullying and posttraumatic stress which remain unaccounted for. With regard to mastery of the trauma, social support and coping abilities are important moderating factors in the development of symptoms of distress after bullying. However, no matter the nature or origin of the symptoms, they are noteworthy for researchers and for practice because of the consistency in the findings.

In the vast majority of the reviewed studies on the association between workplace bullying and PTSD symptoms, assessment of PTSD symptoms was made by questionnaires like the Impact of Event Scale (IES; Weiss & Marmar, 1997) and post-traumatic stress scale (Raphael et al., 1989) with cut-off scores indicating a diagnosis of PTSD (Creamer, Bell, & Failla, 2003, for IES-R). However, in research on post-traumatic stress disorder, it is essential to use a strict application of the diagnostic criteria. Applying symptom checklists can confuse psychopathology with normal reactions to psychosocial stress or other psychiatric problems. Their summarized symptoms scores and thresholds defining caseness can fail to ensure fulfillment in the diagnostic algorithm of PTSD. Basing diagnosis on number and intensity of symptoms conveyed, rather than adherence to the algorithms of criteria described in DSM-IV, might lead to over-diagnosis of PTSD. Measuring symptoms may have useful applications, but it cannot substitute for assessing full diagnostic criteria (Nemiah, 1995).

4.2. Conclusion and suggestions for future research

Our literature review and meta-analysis establish an association between exposure to workplace or school bullying and symptoms of PTSD with an average weighted correlation of 0.42. An association between bullying and PTSD is also supported by the fact that an average of 57% of victims report symptom scores above threshold for caseness of PTSD. However, due to the limited number of clinical assessments of the diagnosis of PTSD, as well as the total lack of prospective studies on the association it is at this time not possible to conclude whether exposure to bullying actually leads to PTSD or whether PTSD is an adequate diagnosis for targets of bullying. With regard to the PTSD diagnosis, it should be emphasized that the DSM A-criterion, as it is currently described in diagnostic manuals (report of serious injuries or threats to physical integrity), generally will not be fulfilled by victims of bullying in that bullying is considered as a non-physical stressor (Karatuna & Gok, 2014). Alternative, but related diagnoses, such as adjustment disorder or psychological distress, should, therefore, also be considered in diagnostic interviews.

Although the number of studies on the relationship between bullying and posttraumatic stress is steadily increasing, and the methodological quality of the research is becoming more and more sophisticated, our understanding of the relationship will benefit from further studies with more refined research designs. To assess whether bullying at work or at school can lead to the diagnosis of PTSD, longitudinal studies with representative samples of persons are needed. The degree of bullying must be assessed by validated questionnaires and a comprehensive

assessment of risk factors (personality, earlier psychopathology, family disposition, other life-stress or trauma and social support) must be performed. The past and current psychiatric disorders must be assessed by validated structured clinical interviews.

In this review and meta-analysis, we have focused on a simple cause-and-effect relationship between bullying and posttraumatic stress. However, it is theoretically likely that the relation between the variables is complex and that more attention should be devoted to identifying and testing plausible mediating and moderating variables, as well as reversed associations between variables, in order to fully understand their relationships. While there are some studies on interventions against bullying and rehabilitation of victims, mainly from research in schools, there are, to our knowledge, no such studies which assess trauma specific interventions or therapeutic treatment. Hence, an important issue for upcoming research is to develop sound interventions against bullying, as well as treatment procedures in the aftermath of bullying, which can be used to limit the potential traumatic consequences of this form of systematic and persistent mistreatment.

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