

# PTSD and Autism Spectrum Disorder: Co-Morbidity, Gaps in Research, and Potential Shared Mechanisms

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**Background:** While autism and trauma were often linked in psychoanalytic theory, very few scientific attempts have been made to explore the associations and comorbidity between the two. Instead, each area has grown separately, yielding large bodies of theoretical and clinical knowledge. **Theoretical framework:** In this article, we suggest several possible pathways that may link trauma and autism. First, autism spectrum disorder (ASD) may serve as a vulnerability marker for posttraumatic stress disorder (PTSD), specifically by increasing the risk for exposure to traumatic events. Second, PTSD, once it has appeared, may exacerbate certain ASD symptoms, for example, through maladaptive coping strategies and reduced help-seeking. Third, there may be shared underlying mechanisms for PTSD and ASD, including neurological abnormalities associated with both disorders, as well as cognitive and behavioral mechanisms, such as increased rumination, cognitive rigidity, avoidance, anger, and aggression. In addition, the unique characteristics of ASD may determine which events are experienced as particularly traumatic (e.g., social insults and degradation, sensory overstimulation, abrupt changes in known routines) and affect both the manifestation and severity of posttraumatic sequelae among diagnosed individuals. **Conclusions and recommendations:** Research conducted separately in the areas of PTSD and ASD strongly suggests several potential pathways connecting both disorders. We conclude that there is a pressing need for more PTSD-ASD research, focusing not only on the prevalence of traumatic stress in individuals with autism, but also on their potentially unique perception of traumatic events, particularly from the social sphere. Such research may carry important clinical implications.

**Keywords:** PTSD, autism, comorbidity, at-risk population, social trauma

Autism spectrum disorder (ASD) is a neurodevelopmental condition, characterized by marked, pervasive, and persistent impairments in communication, social skills, and interpersonal relationships, accompanied by restricted and repetitive behaviors and interests. According to the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed., *DSM-5*), ASD has three levels of symptom severity, determined according to one's level of impairment and need for support. ASD may be with or without accompanying intellectual disabilities, and with or without accompanying language impairment (American Psychiatric Association, 2013). During the last decades, the prevalence of ASD has seen a substantial increase, with current epidemiological surveys showing that as much as 1 in 68 children are diagnosed by the age of 8 in the United States (Centers for Disease Control and Prevention,

2014). Despite its high prevalence, however, it was not until the past decade that knowledge about psychiatric comorbidities of ASD has expanded. Studies show that 65% to 94% of those with ASD also suffer from comorbid disorders, with attention-deficit/hyperactivity disorder (ADHD), anxiety disorders, and major depressive disorder being the most commonly diagnosed (Aman & Langworthy, 2000; Davis et al., 2011; Mukaddes & Fateh, 2009; Rieffe, De Bruine, De Rooij, & Stockmann, 2014). Nonetheless, knowledge regarding ASD comorbidities is still rather limited, with particularly scarce research on ASD's comorbidity with posttraumatic stress disorder (PTSD). The main aim of this article is to highlight the current research suggesting a possible link between autism and PTSD, as well as to point at the gaps in knowledge and the crucial need for more studies in this area.

ASD and trauma share an historical background, the origins of which may be found in early to mid-20th century psychoanalytic theory (e.g., Alvarez, 1992; Bettelheim, 1967). However, this theoretical link between trauma and autism was abandoned over the years and certainly was never subject to rigorous empirical investigation. Following the work of Rutter and colleagues (Folstein & Rutter, 1977; Rutter & Bartak, 1971) and Rimland and colleagues (Boullin, Coleman, O'Brien, & Rimland, 1971; Rimland, 1972), who demonstrated the genetic nature of ASD, the association between ASD and trauma was pushed further aside.

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This article was published Online First July 20, 2017.

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Evidence supporting the genetic basis of ASD has further cemented its status as a neurodevelopmental disorder, which does not seem to be the result of family dynamics or external environmental events, as previously suggested. In addition, over the years, both PTSD and ASD have become more diagnostically clear and were included in the DSM with concise symptomatic definitions (American Psychiatric Association, 2013). In the empirical and clinical realms, each field was significantly expanded and developed.

Presently, empirical evidence regarding the associations between trauma and ASD is very scarce and mostly stems from studies examining the prevalence of PTSD among individuals with ASD. This article reviews the literature in this area and also suggests several possible pathways that may link trauma and autism. We will discuss the following issues: (a) the prevalence and nature of ASD-PTSD comorbidity; (b) potential shared underlying mechanisms for ASD and PTSD; (c) The subjective perception of trauma among individuals with ASD; and (d) the clinical picture of PTSD among those diagnosed with ASD.

### PTSD-ASD Comorbidity

The salient lack of research on PTSD-ASD comorbidity may seem surprising, considering psychiatry's recent emphasis on co-occurring disorders (Abram et al., 2015). Moreover, based on some characteristics associated with ASD, such as social vulnerability, communication difficulties, emotional expression deficits, decreased emotion regulation, and high rates of psychiatric comorbidities, one would expect it to be a natural candidate for comorbidity studies in the field of trauma. As will be outlined in the following sections, these clinical features of ASD, and others, share similarities with those of PTSD. In addition, they may render individuals with ASD more vulnerable to experience trauma, and, subsequently, PTSD symptoms.

The comorbidity of PTSD with other disorders is extensive, with over 80% of individuals with PTSD suffering from at least one additional disorder (Creamer, Burgess, & McFarlane, 2001). To the best of our knowledge, only four studies to date have addressed the issue of PTSD-ASD comorbidity, three of them focusing on children and adolescents. Mehtar and Mukaddes (2011) examined the prevalence of PTSD among individuals aged 6 to 18, with a *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text revision; *DSM-IV-TR*) diagnoses of autistic disorders (ADs), Asperger syndrome (AS), and pervasive developmental disorder not otherwise specified (PDD-NOS), with a broad range of IQ levels—from normal IQ to severe intellectual impairment. The authors revealed that 17.4% of participants with ASD reporting prior exposure to potentially traumatic events endorsed the full criteria for *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., *DSM-IV*) PTSD. In contrast, de Bruin and colleagues (2007) and Storch and colleagues (2013) reported PTSD rates of 0% and 3%, respectively, in two independent samples of treatment-seeking children diagnosed with AD, AS, and PDD-NOS, all with an IQ >70. In a fourth and final study examining a variety of psychiatric comorbidities among patients with ASD (Strunz, Dziobek, & Roepke, 2014), the rate of PTSD was found to be 7%. The study was conducted among adults with AS or high-functioning autism (HFA), all without intellectual impairment. As can be seen, findings regarding PTSD-ASD comorbidity rates are inconclusive at best.

There is currently an ongoing debate regarding the specific nature of PTSD's comorbidity with other disorders. Several com-

peting models were suggested over the years, to understand psychiatric comorbidity following trauma. Each of these models argues for a different directionality of associations between PTSD and other disorders. For example, one model posits that PTSD is the "primary," antecedent disorder following trauma, which may cause subsequent distress in the form of other psychiatric disorders (Wittchen, Beesdo, Bittner, & Goodwin, 2003). A second model suggests that the opposite direction of causality may also occur, looking at PTSD as a disorder that may develop on the basis of other posttraumatic conditions, such as major depressive disorder (Schindel-Allon, Aderka, Shahar, Stein, & Gilboa-Schechtman, 2010). A third model postulates that PTSD and comorbid disorders may be independent manifestations of a larger posttraumatic "meta-factor" (e.g., negative affectivity, stress-related biological processes), which may serve as a risk factor for a variety of posttraumatic conditions (Breslau, Davis, Peterson, & Schultz, 2000). Longitudinal studies focusing on various posttraumatic samples have shown evidence supporting each of these models, with inconclusive results (Dekel, Solomon, Horesh, & Ein-Dor, 2014; Horesh, Lowe, Galea, Uddin, & Koenen, 2015).

The consideration of different directionalities seems to be highly relevant to PTSD-ASD comorbidity as well. One possibility is that ASD serves as a vulnerability marker for PTSD, specifically by increasing the risk for traumatic exposure. A prevailing assumption is that those diagnosed with ASD may be exposed to more traumatic events. Mehtar and Mukaddes (2011), for example, have found a history of exposure to various traumas (sexual/physical abuse, accidents, disasters, witnessing, or being a victim of violence) in 26.1% of youth attending an outpatient ASD clinic. In another study, Mandell and colleagues (Mandell, Walrath, Mantuffel, Sgro, & Pinto-Martin, 2005) reported trauma exposure in 30.7% of children with HFA or AS, sampled at community mental health services for children and their families. Stressful experiences found to be especially common among individuals with ASD were those related to school, and included teasing, bullying, and ostracism. Children and adults with ASD often have difficulties adopting socially appropriate behaviors. This, in turn, may render them more vulnerable to victimization (Kerns, Newachaffer, & Berkowitz, 2015). After summarizing data from various parent and child surveys, Storch and colleagues (2013) reported that 44%–77% of children with ASD have been bullied within a 1-month period, compared with a rate of 2%–17% among typically developing children (Van Roekel, Scholte, & Didden, 2010). In a study by Cappadocia, Weiss, and Pepler (2012), 67% of parents to children diagnosed with high-functioning ASD (including *DSM-IV*'s AS, HFA, and PDD-NOS) reported that their child had experienced physical, social, verbal, and/or cyber bullying in the preceding month. Of that group, 46% reported to have experienced frequent peer victimization at least once a week. Studies also indicate that children with ASD are more often bullied than those with intellectual disabilities alone (Zeedyk, Rodriguez, Tipton, Baker, & Blacher, 2014), as well as typically developing siblings (Nowell, Brewton, & Goin-Kochel, 2014).

Individuals with ASD may be expected to show more severe emotional reactions to traumatic events because of several vulnerability factors (Dell'Osso, Dalle Luche, & Carmassi, 2015; Hoover, 2015). First, they often may lack the social support networks that have been shown to protect one in the aftermath of trauma (Estell et al., 2009). Second, delays in language develop-

ment may increase posttraumatic symptomatology among those with ASD in several ways. Most notably, these difficulties may get in the way of reporting abuse or posttraumatic distress, thus delaying the possibility of receiving treatment (Cook, Kieffer, Charak, & Leventhal, 1993). In addition, even following help-seeking, traumatized individuals with ASD may find it difficult to take part in traditional trauma-focused therapies, because those may involve the verbal retelling of traumatic narratives and emotional expression, whether in individual therapy or in a socially demanding group setting. Such processes may be difficult or even impossible for children with ASD (Howlin & Clements, 1995).

Looking at the limited extant literature, it seems difficult to determine any causal relationship between PTSD and ASD. However, there is a possibility that PTSD, once it has appeared, may exacerbate certain ASD features and symptoms. In a recent review by Kerns and colleagues (2015), the authors focused on the notion that trauma has the capacity to alter one's developmental trajectory. For example, the enhanced psychological vulnerability incurred by the original trauma may increase the risk that one will experience future traumas and reduce his or her capacity to cope with them. Wood and Gadow (2010) suggest that youth with ASD may turn to maladaptive coping strategies, such as repetitive behaviors and social avoidance, as a means of escaping negative affect. These patterns may also arise when coping with trauma-related emotions, ultimately resulting in an even more severe ASD profile. In addition, one study has shown that autistic traits in adulthood (as opposed to ASD as a diagnosis) may also be associated with early trauma exposure (Roberts, Koenen, Lyall, Robinson, & Weisskopf, 2015).

Several studies have also focused on the association between parental, especially maternal, trauma, PTSD symptoms, and ASD in offspring. While these studies do not directly address the issue of PTSD-ASD comorbidity, their findings may nonetheless hint at possible pathways connecting both disorders (Roberts, Lyall, Rich-Edwards, Ascherio, & Weisskopf, 2016). Roberts and colleagues (2014) have found strong associations between mother's PTSD symptoms and the child's ASD. The authors suggested three possible paths for this association: (a) Maternal PTSD and child's ASD may be associated because of a common cause for both disorders, such as shared genetic risk. ASD has been associated with psychiatric disorders in family members, including schizophrenia (Sullivan et al., 2012), obsessive-compulsive disorder (Hodge, Hoffman, & Sweeney, 2011), and major depression (Bölte, Knecht, & Poustka, 2007). These associations have been hypothesized to be primarily the result of a shared genetic risk for ASD and other psychiatric disorders. Twin studies similarly suggest that genetic risk for PTSD overlaps with other psychiatric disorders, including depression (Koenen et al., 2008), generalized anxiety disorder, and panic disorder (Afifi, Asmundson, Taylor, & Jang, 2010). Nonetheless, the specific genetic connection between ASD and PTSD has yet to be examined. (b) Mother's PTSD symptomatology prior to the child's birth may affect the developing fetus through stress-related neurobiological processes. (c) The child's ASD may increase the risk of mother's PTSD symptoms following birth, because having a child with ASD is often associated with low social support and greater parenting-related stress (Hayes & Watson, 2013; Roberts et al., 2014), two factors that may increase the risk of developing PTSD following a traumatic event (Acierno et al., 2007; Schumm, Briggs-Phillips, & Hobfoll, 2006). It should also be noted that many parents of children with

ASD were found to show partial manifestations of ASD themselves (Baron-Cohen & Hammer, 1997). These, in turn, may be associated with PTSD following their own life experiences, both prior to, and after, giving birth to a child with autism.

Finally, another perspective regarding comorbidity suggests that there are shared underlying mechanisms that may play a role in both PTSD and ASD independently (for a review, see Kerns et al., 2015). First, several neurological abnormalities associated with trauma exposure are also found in individuals with ASD. These include alterations in the functional connectivity of the amygdala and prefrontal cortex (Grant, Cannistraci, Hollon, Gore, & Shelton, 2011; Mazefsky et al., 2013; Williams et al., 2006), as well as dysregulation of the Hypothalamic-Pituitary-Adrenal (HPA) axis (Baumeister, Lightman, & Pariante, 2014; Corbett, Schupp, Levine, & Mendoza, 2009). Hippocampal abnormalities were also identified in both disorders (Ben Shalom, 2003, 2009; Lindauer et al., 2004; Wignall et al., 2004).

Problems in emotion regulation also seem to characterize both disorders. Individuals with PTSD often have difficulties regulating negative affect (Mazefsky & White, 2014; Orth & Wieland, 2006; Seligowski, Lee, Bardeen, & Orcutt, 2015). Similarly, individuals with ASD often exhibit poorly differentiated emotional responses and self-knowledge (Konstantareas & Stewart, 2006) and are harder to soothe once aroused, relative to non-ASD peers (Mazefsky & White, 2014). Problems in autobiographical memory were also found in both disorders. Autobiographical memory in ASD has consistently been shown to be characterized by reduced specificity (Brezis, 2015; Crane & Goddard, 2008; Crane, Goddard, & Pring, 2013; Maister, Simons, & Plaisted-Grant, 2013), with slower and more effortful retrieval, compared with controls (Chaput et al., 2013; Crane, Pring, Jukes, & Goddard, 2012; Goddard, Howlin, Dritschel, & Patel, 2007). Also, the personal narratives of adults with ASD are less likely to have an organization high-point and resolution (McCabe, Hillier, & Shapiro, 2013). Similarly, the intentional recall of patients with PTSD is often fragmented, details may be missing, and they often have difficulty recalling the exact temporal order of events (Ehlers & Clark, 2000; Halligan, Michael, Clark, & Ehlers, 2003). Individuals with PTSD also frequently exhibit a difficulty in retrieving specific autobiographical memories (McNally, 2006; McNally, Litz, Prassas, Shin, & Weathers, 1994; Van Vreeswijk, & de Wilde, 2004), and less specific autobiographical memory was found to be a predictor of chronic PTSD (Kleim & Ehlers, 2008). Other cognitive and behavioral mechanisms were also found to be associated with both ASD and PTSD. These include cognitive rigidity (Leung, Zakzannis, & Baron-Cohen, 2014; Palm & Follette, 2011); internal, stable, and global attribution style (Barnhill & Myles, 2001; Massad & Hulsey, 2006); manifestations of anger and aggression (Matson & Adams, 2014); and a tendency for avoidance (Wood & Gadow, 2010; Hetzel-Riggin & Meads, 2016). Increased rumination may also serve as an underlying mechanisms connecting ASD and PTSD (Razik, Ehling, & Emmelkamp, 2013; Wells & Sembi, 2004). Impairments in cognitive flexibility and a difficulty to shift focus may lead to increased rumination among individuals with ASD (Hill, Berthoz, & Frith, 2004; Ozonoff et al., 2004). For example, rumination was found to be more prevalent among adults with ASD compared with typical controls in studies of depression (Crane et al., 2013). Youth with ASD were also found to struggle to disengage from thoughts or memories of distressing stimuli



(Kerns et al., 2015). As for PTSD, numerous studies have found it to be associated with various aspects of rumination (e.g., Michael, Halligan, Clark, & Ehlers, 2007).

As shown previously, while trauma and ASD mostly yielded completely separate bodies of research, there are interesting similarities between both disorders. Thus, the overlapping mechanisms presented here (see Table 1 for summary) may account for a shared vulnerability, which warrants a deeper, more comprehensive empirical examination.

### ASD and the Subjective Perception of Traumatic Experiences

We would like to argue here for the possible existence of another path connecting PTSD and ASD, in which the subjective meaning of trauma may be the key factor. In other words, we wish to explore the possibility that ASD may influence important aspects of how a trauma is experienced and perceived. Although empirical evidence in this area are very scarce, books written by adults with ASD, such as *Nobody Nowhere* by Donna Williams (1992), offer a window into the unique perception of traumatic and stressful experiences among this population. Williams describes her personal struggle to survive trauma, neglect, exploitation, and incomprehension. Her unique description of these experiences seems to suggest that the subjective perception of trauma should be one central focus of future ASD research. However, much more empirical data in this area are needed to more fully understand if, and how, trauma may be uniquely perceived by individuals with ASD.

The definition of what constitutes a traumatic event was, and still is, the subject of significant debate (Weathers & Keane, 2007). This point may perhaps best be exemplified by the frequent changes made in criterion A (the traumatic event criterion) in different DSM editions. As years go by, an increasing number of events, which in the

past would not have met the criterion A threshold, are now accepted as potentially traumatic. One of the main reasons behind this process was the acknowledgment, largely promoted in *DSM-IV*, that one's subjective perception of an event may play an important role in its definition as traumatic. Similarly, the cognitive model of PTSD, as presented by Ehlers and Clark (2000), emphasizes the importance of subjective perception in the development and persistence of PTSD. Despite these developments, the subjective perception of trauma among children and adults with ASD has not received scientific attention and therefore to date remains unclear.

We would like to argue that the unique characteristics of sensation, perception, social awareness, cognition, and global understanding in ASD (Lai, Lombardo, & Baron-Cohen, 2014) may alter what events and stimuli are experienced as traumatic, and subsequently also the nature and severity of posttraumatic sequelae. It may be assumed that individuals with ASD experience unique sources of stress that are potentially traumatic, compared with the general population (Kerns et al. 2015). Unusual fears, difficulties with sensory overstimulation, changes in routine, and social demands (e.g., public speaking or communicating needs to others) are typical sources of stress for individuals with ASD (Gillott & Standen, 2007; Groden et al., 2001; Jansen, Gispens-de Wied, van der Gaag, & van Engeland, 2003; Kerns et al., 2014). In addition, it was found that many individuals with ASD are painfully aware of their differences from others and are hypersensitive to environmental stimuli (White & Roberson-Nay, 2009). For example, Hirvikoski and Blomqvist (2015) found that adults with ASD reported significantly higher subjective stress and poorer ability to cope with stress in everyday life, compared with typical adults.

Extant literature shows that negative social experiences may constitute a specific source of emotional pain for individuals with ASD. Those suffering from ASD often experience a need for

Table 1  
*Studies Examining Factors That May Serve as Shared Mechanisms for Posttraumatic Stress Disorder (PTSD) and Autism Spectrum Disorder (ASD)*

Vulnerability	ASD	PTSD
Alterations in the functional connectivity of the amygdala and prefrontal cortex	Mazefsky et al., 2013	Grant, Cannistraci, Hollon, Gore, and Shelton, 2011 Williams et al., 2006
Dysregulation of the LHPT axis Hippocampus abnormality	Corbett, Schupp, Levine, and Mendoza, 2009 Ben Shalom, 2003, 2009	Baumeister, Lightman, and PARIANTE, 2014 Lindauer et al., 2004 Wignall et al., 2004
Problems in emotion regulation	Mazefsky and White, 2014 Mazurek, Kanne, and Wodka, 2013	Orth and Wieland, 2006 Seligowski, Lee, Bardeen, and Orcutt, 2015
Reduced specificity of autobiographical memory	Brezis, 2015 Crane and Goddard, 2008 Crane, Goddard, and Pring, 2013 Goddard, Dritschel, Robinson, and Howlin, 2014 Maister, Simons, and Plaisted-Grant, 2013 Leung, Zakzanis, and Baron-Cohen, 2014	Kleim and Ehlers, 2008 McNally, 2006 McNally, Litz, Prassas, Shin, and Weathers, 1994 Van Vreeswijk, and de Wilde, 2004
Cognitive rigidity Internal, stable, and global attribution style	Barnhill and Myles, 2001 Hill, Berthoz, and Frith, 2004	Palm and Follette, 2011 Massad and Hulsey, 2006 Razik, Ehling, and Emmelkamp, 2013
Increased rumination	Ozonoff et al., 2004 Crane, Goddard, and Pring, 2013	Wells and Sembi, 2004 Michael, Halligan, Clark, and Ehlers, 2007
Increased anger and aggression	Matson and Adams, 2014 Rieffe, Camodeca, Pouw, Lange, and Stockmann, 2012	Begic and Jokic-Begic, 2001 Orth and Wieland, 2006
A tendency for avoidance	Wood and Gadow, 2010	Hetzl-Riggin and Meads, 2016

interpersonal relationships, but face barriers in establishing them because of impaired social skills and increased social rejection (e.g., Causton-Theoharis, Ashby, & Cosier, 2009). They often experience greater social isolation and distress compared with typically developing peers who face social difficulties (Tani et al., 2012). These social and interpersonal problems generally persist, and sometimes worsen, in adulthood, contributing to functional impairment (e.g., Mazurek, 2013). Moreover, compared with their typically developing peers, children and adults with ASD face the risk of verbal, physical, or emotional bullying (e.g., Zeedyk et al., 2014). Although there is some literature on bullying in children with ASD, there is very little information about its prevalence and psychopathological effects (Hoover, 2015). This stands in contrast with the general field of trauma studies, where bullying and cyber-bullying are being widely studied (Nielsen, Tangen, Idsoe, Matthiesen, & MogerØy, 2015; Tehrani, 2012). For example, Newman, Holden, and Delville (2005) suggested that being a victim of bullying is a chronic stressor that often results in post-traumatic reactions. Mikkelsen and Einarsen (2002) also reported that victims of bullying were more affected by other distressing life events, and more likely to suffer from posttraumatic symptoms. In addition, victims of bullying reported more negative basic assumptions about themselves, about others and about the world, compared to nonbullied controls. It should be noted that bullying is not always viewed as a potentially traumatic event, and thus its relevance to the PTSD event criterion is often discussed (Idsoe, Dyregrov, & Idsoe, 2012). However, bullying, and negative social interactions in general, are the subject of most studies examining exposure to adverse experiences in children with ASD. Beyond these types of events, there is little clear information about the rate and effects of traumatization in this population (Hoover, 2015). Moreover, even within the literature of bullying experiences among individuals with ASD, none of the studies have measured posttraumatic symptoms in a systematic way. Thus, much more research is needed in this area.

### The Unique Posttraumatic Clinical Picture in Individuals With ASD

There is by now reason to believe that individuals with ASD may manifest symptoms of traumatic stress in a distinct manner, compared with typically developing individuals. Mitchell and Clegg (2005), for example, have found that while adults with intellectual disabilities reported “classic” DSM-defined PTSD symptoms, those were accompanied by additional symptoms, such as self-injury, disorganized behavior, and various physical symptoms. Bitsika and Sharpley (2014) have similarly shown that children with ASD expressed relatively high levels of somatic complaints in response to peer victimization. Mitchell, Clegg, and Furniss (2006) suggested that the previously mentioned impact on physical health may be related to a difficulty in verbalizing and processing the trauma. In several studies, peer victimization was associated with increased anxiety, hypersensitivity, fearfulness, self-injury, stereotyped behaviors, and hyperactivity in children with ASD (Cappadocia et al., 2012; Sreckovic, Brunsting, & Able, 2014; Zablotzky, Bradshaw, Anderson, & Law, 2013; Zeedyk et al., 2014). Rieffe and colleagues (2012) have found that compared with their typically developing peers, adolescents with ASD ex-

perienced and expressed more anger and nervousness when bullied and also tended to engage more in aggressive behavior themselves (Zablotzky et al., 2013).

A related issue is the one of complex traumatic experiences. In a published case study, King and Desaulnier (2011) discussed the clinical presentation of individuals with ASD who were exposed to repeated trauma. They describe a child diagnosed with ASD and intellectual disabilities who was the victim of peer victimization. The authors present a very broad posttraumatic clinical picture, which, to their eyes, seemed to resemble what is known as Complex PTSD (Herman, 1992). Complex PTSD refers to the unique symptomatic picture that may arise following exposure to chronic, interpersonal trauma. In addition to more “classic” PTSD symptoms (e.g., intrusion, avoidance, hyperarousal), Complex PTSD also includes significant changes in one’s emotion regulation, perception of self and others, and sense of identity, and may manifest itself as vast alterations in character or personality traits. In their case report, King and Desaulnier argue that complex PTSD symptoms were undetected among the subject of their case report, who subsequently did not receive proper treatment. It should be noted that the possibility that posttraumatic reactions among individuals with ASD may resemble Complex PTSD has not received additional empirical support and requires further investigation.

These findings highlight the need for further research examining the possibility of a unique posttraumatic symptomatology among those suffering from ASD. This is particularly true in light of the more recent efforts to categorize PTSD into specific subtypes (Armour, Elklit, Lauterbach, & Elhai, 2014), as opposed to the more traditional “one-size-fits-all” approach to this disorder. It would therefore be important to understand whether specific PTSD symptom clusters are more dominant among individuals with ASD, and whether PTSD in this population carries with it specific comorbidities and symptoms.

### Concluding Comments and Future Research

The main aim of this article was to explore the possible pathways connecting traumatic stress and ASD. As can be seen, there are many potential reasons why the two should be studied in relation to one another. Still, to date there have only been a very small number of empirical investigations of trauma and ASD, most of them focusing on children and adolescents, and thus large gaps in knowledge exist. Moreover, the majority of these studies focused on individuals diagnosed with high-functioning ASD, because of both the accessibility of this population and the recognition that trauma and PTSD symptoms among lower-functioning individuals may be harder to identify and study.

Future studies are encouraged to take several steps to advance the understanding of ASD-PTSD comorbidity. Studies assessing the prevalence of traumatic stress among individuals with ASD are of the highest priority. If and when sufficient evidence is accumulated to support ASD-PTSD comorbidity, it would also be very important to study individuals with ASD’s potentially unique perception of traumatic events, particularly from the social sphere. A deeper understanding of the subjective perception of traumatic events, and the role of unique neurodevelopmental characteristics of ASD in this perception, is still required. Next, it would be important to conduct an

in-depth examination of the posttraumatic clinical picture in individuals with ASD, and to understand whether there are unique symptom profiles among this population.

Studies addressing these issues would carry important clinical implications. Evidence-based interventions have been developed for both PTSD and ASD, with highly impressive results. Interventions from the fields of cognitive-behavioral therapy (CBT), narrative therapy, technology-assisted therapy, and group therapy have all been shown to be effective in alleviating distress among these populations (Bishop-Fitzpatrick, Minshew, & Eack, 2014; Cusack et al., 2016). However, we currently know of no specific intervention program targeting PTSD-ASD comorbidity. Considering the potential underlying mechanisms suggested previously, such interventions, if and when developed, may target shared factors such as emotion regulation, impaired social cognition and avoidance, and thus reduce symptoms and distress among those suffering from both disorders. We believe such interventions are needed, just as other interventions were developed for comorbidities of PTSD, most notably substance abuse (e.g., Najavits, 2002). We would like to argue that psychiatric comorbidity is more than simply the sum of its parts, and thus an integrative approach to treatment is required.

When conducting future studies regarding PTSD-ASD comorbidity, researchers are encouraged to consider the heterogeneity of both disorders. Age and level of functioning must be considered when it comes to ASD, as well as whether the individual lives on his or her own, with his or her family, or in supported housing, and what kind of social and familial support one receives. These factors, as well as others, should be considered to conduct ASD-sensitive trauma studies. More specifically, much more research is needed to understand posttraumatic reactions and their correlates among lower functioning individuals with ASD. Finally, there is a need to develop more sensitive diagnostic measures for PTSD, tailored to the specific characteristics of individuals with ASD. We currently know of only one attempt to develop such a measure (the Trauma symptoms Investigation Form in Autistic Spectrum Disorders [TIF-ASD]; Mehtar & Mukaddes, 2011). Additional attempts in that direction would enable a more accurate evaluation of posttraumatic responses among this clinical population.

The world of mental health has made a long journey to understand the multifaceted nature of resilience and vulnerability in the face of traumatic stress. Those affected by developmental difficulties could significantly benefit from special scientific and clinical attention, as there is reason to believe that they may face increased risk for both trauma exposure and adverse posttraumatic implications. Despite numerous overlaps, the fields of ASD and trauma have yet to be sufficiently integrated.

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Received April 4, 2017

Accepted May 20, 2017 ■