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A Review of Trauma in Children with Autism Spectrum Disorder

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Understanding Autism Spectrum Disorder

Autism spectrum disorder (ASD) is defined as "a developmental disability (DD) characterized by impairment in two core areas: (1) social communication/social interaction and (2) restricted, repetitive patterns of behavior, interests, or activities" (p. 193; Williams et al., 2017). To better understand this definition, one must also be familiar with the definition of developmental disability, "a severe, chronic disability that is attributable to a mental or physical impairment, is evident prior to age 22, and results in substantial functional limitations in three or more areas of major life activity." (p. 193; Williams et al., 2017). This disability has been classified as a spectrum because individuals with ASD present symptoms differently, and the amount of support needed depends on the particular severity of each individual case (Williams et al., 2017).

As many as one in 59 children may have ASD (Baio et al., 2018). Table 1 shows some of the diagnostic criteria for ASD (American Psychiatric Association, 2013). Most children begin to present some of the symptoms of ASD as young as 9 months of age (Valley CoPA, 2007). Parents often begin to see the first symptoms in the areas of speech and language (Martinez-Pedraza & Carter, 2011). Children with ASD will often develop in these areas normally and will then regress, or loss those abilities around age 2 years (Martinez-Pedraza & Carter, 2011). It can be difficult, however, to make a diagnosis before age 2-3 years because regular childhood development can mimic some of the signs of ASD. For example, children often begin to repeat words that they hear around age 18 months to 2 years, which can mimic the ASD symptom of echolalia. (Martinez-Pedraza, Carter, 2011). Because of this, when assessing a child who may have ASD the child's parents or guardians answer extensive questions, and

interactive assessments are completed with the child in order to distinguish between normal development, ASD, or another form of DD.

Table 1

Diagnostic criteria for autism spectrum disorder

Domain of ASD symptomatology	Area of Delay or Impairment
Social Interaction	Nonverbal Behaviors Peer Relationships Sharing of Enjoyment Social and Emotional Reciprocity
Communication	Spoken Language Conversation Abilities Spontaneous Play
Restricted and Repetitive Behaviors	Preoccupation with Restricted Interests Motor Mannerisms Preoccupation with Parts of Objects Nonfunctional Routines and Rituals

Note; Table adapted from Martinez-Pedraza et al., 2011

The History of Autism Spectrum Disorder

The first records of ASD were provided by Leo Kanner and Georg Frankl. Kanner gave the first published account of ASD in his paper, <u>Autistic Disturbances of affect contact,</u> published in 1943 (Harris, 2016). In his study, Kanner chose to exclude children who had existing genetic syndromes, brain injuries, or severe intellectual disabilities because he viewed autism as a distinctive neurodevelopmental disorder (Harris, 2016). He believed that this disorder was rare and complex, occurring in 2-4 children per 10,000. Kanner classified his cases as a children suffering from a form of childhood schizophrenia, or infantile psychosis, until 1980

when the term infantile autism was created by the Diagnostic and Statistical Manual of Mental Disorders, edition 3 (DSM-III), under the category pervasive developmental disorder (Harris, 2016). At the introduction of this new terminology, it was recognized that this disorder was distinct from the childhood schizophrenia, as was previously thought by Kanner (Harris, 2016).

Frankl published a paper in the same year entitled, Language and affective contact (Harris, 2016). Frankl's paper gave description of a boy whom he described as having tuberous sclerosis complex (TSC). He described the boy's condition as a disorder in social communication, with him having no interest in other people and using neither words nor gestures to communicate with others (Harris, 2016). Frankl contrasted this to a group of deaf children who used signs in order to communicate with those around them despite lack of vocal language development (Harris, 2016). The boy in this study reportedly had none of the other symptoms of autism as described in Kanner's paper, such as obsessive preservation of sameness and repetitive stereotypes. This was the differentiating factor between Kanner's definition of autism and the boy discussed in Frankl's paper (Harris, 2016).

As more work on ASD was conducted, it was recognized that the previous criteria for the condition were too restrictive. Thus the criteria were broadened in the publishing of the Diagnostic and Statistical Manual of Mental Disorders, edition 4 (DSM-IV; Harris, 2016). The DSM-IV created a variety of categories for diagnosing various forms of the disorder, including Asperger's disorder and Rett's syndrome (Harris, 2016). Asperger's syndrome is defined as "qualitative impairment in social interaction together with restricted, repetitive and stereotyped patterns of behavior, interests and activities without significant delay in language, cognitive development, self help skills, adaptive behavior or curiosity about the environment in

childhood." (p. 477; Badone et al., 2016). Rett's syndrome is described as, "apparently normal development until 6 to 18 months of age and then a severe regression that includes profound impairments in expressive language and purposeful hand use." (p. 336; Rose et al., 2019). All of those categories fell under three parent categories: autism, pervasive developmental disorder-not otherwise specified, and Asperger syndrome. (Johnson et al., 2015). Under the DSM-V, all of these categories were collapsed under the term ASD, with varying degrees of severity noted.

Currently it is believed that ASD is influenced by genetics. It is also thought that environmental factors and maternal immune-mediated responses could be factors (Johnson et al., 2015). Researchers are looking further into the possibility that environmental factors could affect gene expression in children and enhance the likelihood of ASD. There is also some discrepancy regarding the connection of the ASD genotype to the ASD phenotype. Some researchers believe that ASD is a disruption of rhythms in physiological and behavioral responses that in turn affect a child's ability for social communication and their gravitation toward repetition in both behavior and interest (Johnson et al., 2015). No matter the genetic relation, there is currently no known cure for ASD.

Characteristics of Autism Spectrum Disorder

Although ASD is a spectrum, the research literature generally refers to people as either having high functioning or low functioning ASD. These terms refer to the range of symptoms (minimal to severe), and how the level of severity impacts the individual's ability to follow behavioral and interactional norms (Williams et al., 2017). Those who are referred to as high functioning have more minimal symptom presentation and have an IQ above the range of intellectual disability (Williams et al., 2017). Those who are low functioning tend to have much

more severe symptom presentation and an IQ within the range of intellectual disability (Williams et al., 2017).

The two most notable categories of symptoms of ASD are social communication challenges and restricted, repetitive behaviors (M, S et al., 2019). Social communication challenges refer to things such as language, eye contact, facial expression and tone of voice. Emotional recognition in others is another notable communication challenge for many people with ASD. Individuals may struggle with reading faces or understanding tone of voice and interpreting the mood or feeling of the conversation based on those things. Restricted and repetitive behaviors vary greatly in each case of ASD, but can include repetitive body movements and extreme interest in specific topics (M, S et al., 2019). Individuals with ASD may also struggle with interoception, or knowledge and understanding of the emotions that they are experiencing (Shah, 2016). These categories present differently in each person with autism, and can vary depending on the level of functioning.

Sensory abnormalities are another common symptom for many people with ASD. There are three categories of sensory disorders that often impact those with ASD: sensory overresponsivity (SOR), sensory underresponsivity, and sensory-seeking behavior (Hazen, 2014). SOR refers to when a person is distressed or has an extreme negative response to some form of sensory input, often leading to avoidance of that sensory input (Hazen, 2014). Sensory underresponsitivity is when a person has no response or a delayed response to a sensory stimulus that would normally elicit a response (Hazen, 2014). Sensory-seeking behavior is present when an individual craves and ultimately certain sensory experiences to an unusual level (Hazen, 2014).

In one study, it was found that the group with the most severe responses to sensory symptoms were those with a diagnosis of autism spectrum disorder. It was also found that individuals who had a lower IQ and more severe symptoms of ASD had more severe reactions to sensory stimuli (Hazen, 2014). It is believed that sensory processing abnormalities could be the root of various repetitive behaviors for some individuals and may lead to some self-injurious behaviors in individuals (Hazen, 2014).

Some individuals with ASD also prefer to be alone. Some people with ASD do not acknowledge the absence of others and do not mind the fact that they are alone. Children with ASD often do not anticipate physical or social contact (Schreibman, 2007). For example, children with ASD may resist or actively run away from physical touch from parents and relatives, regardless of the appropriateness of a situation.

There are several symptoms regarding speech that are also common among individuals with ASD. One is scripting, or the consistent use of heard words or phrases within normal conversation (Schreibman, 2007). Individuals who engage in scripting may use words or phrases from toys, television, or from hearing the conversations of others' to form a script. They then will substitute these phrases into regular conversation, and at times can become agitated if another person responds outside of the script that they are referring to (Schreibman, 2007).

Another common linguistic symptom of ASD is the presence of echolalia, both immediate and delayed. Echolalia is the repetition of a phrase someone or something else said, similar to scripting (Schreibman, 2007). Immediate echolalia is when a child immediately spits back a word or phrase another person says to them, and this is generally associated with a lack of understanding (Schreibman, 2007). This can be seen within a classroom setting. For example, if

a teacher gives an instruction and a student does not understand, the student will repeat the instruction while looking at the teacher. Delayed echolalia is less clear in its cause, but is believed to be a presentation of knowledge (Schreibman, 2007). For instance, a student who used a phrase in the past to get something they wanted may believe that any time they use those words they will get their way. When that individual wants something, they will repeat that phrase whether it makes sense in the given context or not.

Pain management is another variable in ASD, and one that can pose a major problem for parents and caretakers. Individuals with ASD may have a low response to pain, and will not respond like an individual without ASD does (e.g., falling and scraping a knee and getting right back up rather than crying and running to a parent; Schreibman, 2007). This poses a concern because when an individual is injured, failing to tell someone could lead to further injury, permanent damage, or in some cases death.

Another symptom ASD is self injurious behavior (SIB). This behavior can range anywhere from biting one's hand to slamming one's head against the desk. This can be incredibly dangerous because children with ASD often do not stop when the injuries become serious as individuals without ASD would. SIB can continue until incredibly serious injuries occur such as fractures, large calluses, and brain trauma (Schreibman 2007).

Types of Interventions for Autism Spectrum Disorder

There are a variety of interventions aimed at ASD, and some have proven to work better than others. Because ASD is very case specific, families have a variety of treatment options. Due to the high cost of some interventions, however, some families may opt to try dietary interventions or medications with no proven impact, simply because they are lower in cost and

easier to implement in a home setting (Johnson et al., 2015). Medical interventions for ASD generally target the developmental, psychiatric, neurologic and gastrointestinal disorders that can co-occur with ASD (Johnson et al., 2015). The most common co-occuring issues that can be directly treated for those who have ASD are seizures (30% occurrence in those with ASD), gastrointestinal issues, and sensory abnormalities (Johnson et al., 2015). Since there can be a wide range in both ASD symptoms and co-occurring medical condition symptoms, medication and treatment are case specific. At this time there is no medication to directly treat the deficits that are seen in ASD. Many individuals with ASD are prescribed psychotropic medications in order to combat challenging behaviors (Johnson et al., 2015). The likelihood of a person with ASD being prescribed psychotropic drugs increases with age (Johnson et al., 2015). At this time, it has been found that medication can be an effective form of intervention for behavioral struggles such as restricted repetitive behavior, but it works best when paired with behavioral interventions.

Educational interventions are also very important with ASD. After a diagnosis is given, the Individuals with Disabilities Education Improvement Act (IDEIA) requires that parents of children with ASD (ages 3-21) are actively involved with decisions regarding services and accommodations for their child (Johnson et al., 2015). School districts are required by the same act to both identify students with ASD and provide appropriate services for those students. These can include academic interventions for curriculum access as well as speech and language therapy and occupational therapy (Johnson et al., 2015). For students under the age of 3 years with a diagnosis of ASD, districts are required to provide early intervention services. These services must be provided in natural environments (such as at home and in public settings where children

without ASD are present; Johnson et al., 2015).

Behavioral interventions have been found to be one of the most effective forms of intervention for students with ASD, particularly applied behavior analysis (ABA; Johnson et al., 2015). ABA is an approach for both comprehensive and focused interventions. ABA uses the ABC format (antecedent, behavior, consequence) to reduce problem behaviors and teach new skills. Once problem behaviors and their components have been assessed, a professional develops a plan to decrease those behaviors and replace them with appropriate behavior that has the same function for the individual. This technique has been shown to improve cognitive performance, language skills, and adaptive behavior skills (Johnson et al., 2015).

Perspectives of ASD from those on the Spectrum

To better understand the thinking patterns of a person with ASD, the experiences and perspectives of people on the spectrum should be considered. Temple Grandin has extensively written about her experiences as a person with ASD. In particular, she has provided some personal insight into her thought and functioning processes on a daily basis. She has described her thinking process as a web browser, highlighting her ability to think in pictures rather than in words, as most people do. Words in her mind are simply a narration for the pictures that she keeps filed away and sees. She also emphasizes that when making a decision, she uses pure logic. She has the ability to set aside all of her emotions when she makes decisions, in order to come up with the most logical conclusion (Grandin, 2000). It is difficult and incredibly rare to make a decision based purely on logic, whether that is conscious or not. Grandin also describes her ability to visualize things in her mind, describing how she can mentally construct an image of something, then rotate it, perform test-runs, and even walk around the image, all within the

confines of her mind (Grandin, 2000).

Another common thinking pattern for those with ASD is the construction of thoughts through memory of audio tapes. Some people with ASD have much more sensitive hearing than vision (Kuschke, et. al, 2016), so they mentally record and store audio clips, then use them when constructing thoughts. An example of this is an animal trainer who learns to listen to different breathing patterns and foot patterns rather than looking at the animal (Grandin, 2000). One of the reasons given for this is that many people with ASD have trouble comprehending texts (Sartini, et. al, 2018); the words seem to jumble together and not make sense, almost as if there is a disconnect between the eye and the brain. So for them, it is significantly easier to use their hearing as their main method of thought (Grandin, 2000). Grandin also mentions that her mind thinks from specific to general. By starting with small pieces, she can sort them into larger categories, then use those categories to form a whole concept. This allows for an argument to be built quickly with the information already present, rather than choosing an argument and presenting supporting information afterwards (Grandin, 2000).

Another person with ASD has described their experience being in an educational setting. "I really couldn't deal with being in a classroom with other people all day, when all I wanted was to be alone. I didn't know how to talk to people or make friends and being close to others made me very uncomfortable." (Anonymous, 2018; https://www.autism.org.uk/about/adult-life/stories/school-support.aspx). This quote comes from a British website that publishes information and resources about ASD, much like Autism Speaks. This quote was written by a teenage girl with ASD who wanted to remain anonymous, but share her experiences with other individuals with ASD. In this person's experience, school was

revolting because it was big and noisy, and full of people who this individual would rather not be around. They explained their desire to be socially isolated and independent, which is consistent with the social communication difficulties that are symptomatic of ASD.

Baldwin and Costley (2016) found that some individuals with ASD may seek to hide their struggles with social interaction and communication by using masking. An individual who masks attempts to cover up their issues with socialization and communication, often by using generic or heard responses to situations to match with what they have heard others saying (Baldwin & Costley, 2016). This habit can be incredibly detrimental because it can cause a lack of services to be given to an individual if some of their needs are being disguised and not identified (Baldwin & Costley, 2016). Although masking has a tendency to be more common in girls with ASD, it can occur in any individual with ASD (Baldwin & Costley, 2016).

In addition, Egilson et al., (2016) found that when given a self-report questionnaire regarding quality of life (QOL), individuals with ASD scored themselves lower than individuals without ASD. The category with the largest difference was in social aspects of the individuals' lives, with the individuals with ASD scoring their QOL in that category much lower than those without ASD. Some of the other categories examined in the study, such as parent relationship, were rated more closely between the two groups. Overall, it was mentioned that the individuals with ASD reported having very positive feelings about their lives.

Stress, an Antecedent of Trauma

Stress is defined as, "the nonspecific response of the body to any demand" (p. 4; Fink, 2016). Stress can be broken down into three distinct categories. The first category is positive stress, which is defined as periods of stress in a person's life that are short lived. Positive stress is

classified by short increases in a person's heart rate or slight changes in hormones in the body (Center on the Developing Child, 2014). This type of stress occurs frequently in any person's life and leads to a healthy development of coping mechanisms. This form of stress can be easily managed by children with the help of positive, caring relationships, particularly from a trusted adult (Center on the Developing Child, 2014).

The second category of stress is tolerable stress. This form of stress has the potential to cause harm to a developing brain (particularly that of a young child), but often happens infrequently enough that the brain has time to recover between periods of tolerable stress (Center on the Developing Child, 2014). Tolerable stress can also be dealt with appropriately by a child with the support of a caring adult who creates a safe environment for that child. By supporting the child and helping them through the period of tolerable stress, the role-model will teach them how to appropriately deal with the stressor, so that the child can learn to more adequately deal with it themselves (Center on the Developing Child, 2014). In the absence of a trusted adult, tolerable stress can begin to have a negative effect on various systems of the developing body (Center on the Developing Child, 2014). This includes the body's ability to regulate the fight or flight system, which can lead to increased or suppressed stress responses as the individual grows (Center on the Developing Child, 2014). This bodily response to a tolerable stress without the development of a coping mechanism can mean that the individual reacts to tolerable stress as they do to severely as toxic stress.

The third category of stress is toxic stress. Toxic stress is defined by long, frequent periods of stimulation of the person's bodily stress management system, or hypothalamic-pituitary-adrenocortical (HPA) system (Center on the Developing Child, 2014).

This type of stress often occurs when a child has ongoing stressors and no caring adult to help them learn how to cope with them (Center on the Developing Child, 2014). Toxic stress has been shown to negatively impact the brain structure of children and can lead to the brain failing to shut off the body's fear response/stress management system. This can lead to an oversensitivity to lower levels of stress, lack of behavioral control, and a reduced ability for planning and reasoning (Center on the Developing Child, 2014).

Trauma Definition and Description

Trauma is defined as "an event, series of events, or set of circumstances experienced by an individual as physically or emotionally harmful or life-threatening with lasting adverse effects on the individual's functioning and mental, physical, social, or spiritual well-being" (p. 1-2; Bartlett & Smith, 2019). Trauma is most often tied directly to toxic stress. Particularly when a child is unable to get support from a trusted adult, toxic stress can lead to a later diagnosis of trauma. Early childhood trauma in particular is any trauma that occurs during a sensitive period of the brain's development that leaves the child more susceptible to trauma (Bartlett & Smith, 2019). The most sensitive period of brain development is during a child's infancy, but the brain continues major growth and development through puberty (DeBellis & Zisk, 2014). Traumatic events up to pubescence can have lasting impacts on a child's ability to deal with stress.

There are two main categories of trauma: acute and chronic. Acute trauma refers to experiencing a single traumatic event (Dye, 2018). Some examples are getting into a car accident or being the victim of a robbery. Chronic trauma is defined as repeated exposure to traumatic events, whether that is the same traumatic event on a regular basis or a variety of traumatic events experienced close together (Dye, 2018). Some examples of chronic stress are continued

emotional or physical abuse or the loss of a job.

Betrayal trauma is one type of trauma often experienced by children with ASD. Betrayal trauma is defined as a traumatic experience during which the victim is violated in some way by a person of trust or an individual who the victim is dependent upon for survival (Choi & Kangas, 2019). Often in betrayal trauma, the victim must retain a relationship with the perpetrator due to the necessity of the relationship (Choi & Kangas, 2019). For example, a child who is beaten by their single parent often will stay quiet and remain in the toxic environment because they do not know where else to go and the parent provides food, clothing and shelter.

Social Buffering and Stress

Social buffering is defined as a reduction of the body's physiological stress responses when another person is present and helping during an event that would otherwise cause major stress (Hostinar & Gunnar, 2015). Having support will increase social buffering and in turn dull the responsivity of the hypothalamic-pituitary-adrenal (HPA) axis, the body's stress response system. Having support that allows for social buffering reduces the likelihood of a child experiencing toxic stress or trauma, and reduces the likelihood of alterations in brain development during sensitive periods of development (Hostinar & Gunnar, 2015). This can mean that a child who has social buffering from a support system will have greater success rates due to their ability to control their emotions, deal with stressors appropriately, and have a decreased likelihood of behavioral and emotional control issues (Hostinar & Gunnar, 2015).

The Hypothalamic-Pituitary-Adrenal Axis and its Relation to Trauma

The hypothalamic-pituitary-adrenal (HPA) axis is brain a system that compensates for stress (Hankin et al., 2017). When the brain perceives a threatening event or situation, the body

activates the HPA axis which in turn releases cortisol. Cortisol interacts with the cognitive

functions of the brain and the physical functions of the body in order to allow a person to deal

with a stressor (Dye, 2018). This system also has an automatic negative feedback loop, which

allows for the HPA axis to shut off the release of cortisol automatically once the stressor has

been removed (Ryan et al., 2017). While this is a positive bodily response that helps an

individual deal with stress, trauma can have a negative impact on this system. Consistent and

high level stressors can cause dysregulation of the HPA axis, causing the body to overproduce

cortisol even during periods when it is not needed. Children are particularly susceptible to

dysregulation of the HPA axis because their brains are still developing (Dye, 2018). This

dysregulation will cause the body's stress response system to become sensitized such that it

reacts strongly to minor stressors. Children respond to this with elevated emotional reactions to

stress and a suppression of emotional and behavioral control (O'Connor et al., 2017).

Sensitive Periods of Brain Development

A child's brain begins to develop in the fourth week of gestation, and development

occurs in a hierarchical manner. First to develop are the lower neural regions (in the brainstem)

which are responsible for basic physiological systems such as the respiratory and cardiac

systems(Ryan et al., 2017). Next, the midbrain processing centers develop, which are responsible

for sensory processing and integration, basic motor function, and pain control. Following this,

the relaying and processing centers for both sensory and motor processing are developed, and the

stress response system is formed. Last, the cortical neural structures develop. By the end of the

8th week of gestation, the major structures of the brain have been formed (Ryan et al., 2017).

However, these structures continually develop as a child ages, and they will not be fully formed

until around age 18 years (Ryan et al., 2017). This means that children's brains are particularly susceptible to stress and trauma during the first 18 years of their lives. Trauma can cause the alteration of some of these structures and their functions, which can in turn cause lasting damage to a child's ability to function normally (Ryan et al., 2017).

Trauma and Emotional Regulation and Attachment in Children

For many children, betrayal trauma can negatively impact both emotional regulation and emotional attachment. After the trauma has occurred, the victim is often left confused and unsure of how to relate to those who are close to them. This particularly occurs because the perpetrator of betrayal trauma is often a trusted individual on whom the victim is reliant for some form of safety or survival (Choi & Kangas, 2019). The individual who inflicted the trauma may also tell the victim that they cannot trust what they are feeling or that they deserved what happened to them, leading to confusion and lack of emotional trust of oneself (Choi & Kangas, 2019).

If the victim begins to question the validity of their feelings and emotions in order to maintain a relationship with the perpetrator, they may begin to develop some maladaptive regulation strategies. These can include avoidance, suppression of one's emotions, or insecure attachment styles (Choi & Kangas, 2019). These maladaptive strategies can last into adulthood, and can lead to a reduction in the quality of relationships the individual has with others (Choi & Kangas, 2019).

Attachment is defined as "an affectional tie that one person or animal forms between himself and another specific one—a tie that binds them together in space and endures over time." (p. 512; Junewicz & Billick, 2018). Attachment relationships are developed as a child grows from birth to maturity, and attachment complexity increases as the child grows (Erozkan, 2016).

Four types of attachment are formed from this growth, the first being secure attachment. With this style, the child has experienced having a reliable caregiver and has developed a positive self-view and view of others (Erozkan, 2016). Individuals who have secure attachment also have had no issues depending on other people in the past (Erozkan, 2016).

The next three forms of attachment are all insecure attachments. Dismissing attachment is when an individual has had caregiving that was unresponsive to their needs, and thus the individual has developed a strong sense of self sufficiency with little to no reliance on others (Erozkan, 2016). Preoccupied attachment occurs when an individual has had a lack of consistency with their caregiver. The individual then begins to develop a thought that they are unlovable and incapable of giving others support (Erozkan, 2016). The individual may also become clingy around individuals who they begin to trust, wondering if they will get the care and attention that they need (Erozkan, 2016). The third form of insecure attachment is fearful attachment. In this form, an individual has suffered rejection at the hands of one or multiple caregivers and has a desire for intimacy that is often overcome by a fear of rejection. These individuals often alternate between wanting to approach and avoid people who they would like to get close to (Erozkan, 2016).

In addition to trauma's ability to negatively affect a child's emotional regulation and attachment, it also affects the ability to judge the trustworthiness of others. When betrayal trauma occurs, the child can be left confused about why a person they trusted committed these acts, and their ability to make healthy trust decisions can be altered (Gobin & Freyd, 2013). Children who have experienced betrayal trauma and have an impaired trustworthiness radar either become overly trusting of adults or become closed off an unwilling to trust any adult whether that adult

should actually be trusted or not. This impairment of trust decisions may lead to increased likelihood of revictimization of the individual (Gobin & Freyd, 2013).

Trauma has been shown to have many lifelong impacts on children, and those impacts play out in a variety of ways. Children who have experienced trauma are often diagnosed with mood or anxiety disorders, have heightened aggression towards others, show deficits in social skills, have more negative relationships with their peers, and can have serious mental illnesses (Shern et al., 2016). Trauma, specifically betrayal trauma, has also been shown to increase children's risk of depression, anxiety, post traumatic stress, and hallucinations (Martin et al., 2016). Trauma has also been shown to have lasting effects on the general health of children, being related to asthma, obesity, and cardiovascular disease (Shern et al., 2016).

Trauma has also been shown to link directly to issues with children's sensory modulation. It has been shown to directly correlate with sensory overresponsitivity (SOR), which is defined as a negative response to a sensation that most people are not bothered by (Ryan et al., 2017). Children who have been diagnosed with SOR may be over-responsive to human touch, lighting, or noise. SOR has also been linked to heightened arousal and vigilance (Ryan et al., 2017).

Treatment of Trauma

CBT Treatment

Cognitive behavioral therapy (CBT) is a treatment that focuses on decreasing dysfunctional thoughts, behavior, and emotional responses. It does this by teaching the individual to self-regulate their feelings through changes in their thought and behavior processes (Dye, 2018). Trauma-focused CBT (TF-CBT) is a treatment that pairs CBT with psycho-education parent skill development, relaxation, cognitive processing and the creation of

trauma narratives. This treatment has been shown to be successful for both adults and children, specifically in the treatment of children who have experienced trauma (Silverman et al., 2008).

In any type of CBT treatment, the client-therapist relationship is a critical component of treatment efficacy. The therapist learns about their client's background, offers that client some control over the direction of their treatment, and asks for the client's opinion about the treatment as a whole (Okamoto et al., 2019). The therapist supports the client and the decisions that the client is making, rather than trying to take control of the client and direct their choices (Okamoto et al., 2019). This treatment is also popular because it often involves the therapist giving the client homework or strategies to practice at home, but only stemming from collaborative discussion (Okamoto et al., 2019). By using collaborative discussion as a basis for this development, the client has a say in what they are doing on their own, and both individuals are making a plan of action for the client's well being together (Okamoto et al., 2019).

Hope and Resilience Treatments

Resilience has been defined as a trait, process, and/or outcome that includes both external protective factors and internal psychological characteristics and specific coping behaviors (Munoz et al., 2019). It can be supported by the presence of friends and trusted adults. Children who have higher levels of support both internally (psychological characteristics and coping behaviors) and externally (support from others) have been shown to have better outcomes following traumatic experiences than children who do not (Masten & Tellegen, 2012). Resilience can be used to help children recover from trauma when caretakers teach children coping skills and provide children with trusted support systems for them to process through the events.

Hope is described as a cognitive set of goal directed expectations that consists of agency

and pathways thinking (Munoz et al., 2019). Hope shows an individual's ability to initiate goal

directed thinking (agency thinking), to act on that thinking, and sustain continual action towards

that goal (pathway thinking). Hope has been shown to increase well-being among trauma

survivors. Hope can be used to promote self-control, grit and curiosity, and can be used in order

to help children cope with the trauma they may have encountered. Similar to resilience, teaching

hope means teaching children skills to deal with both the trauma they encountered and with the

aftermath of that trauma.

Child and Parent Treatment

Because children rely heavily on a trusted adult throughout their adolescence, particularly

a parent, it makes sense that when treating a child for trauma sometimes the parent needs to be

treated as well. When a child has experienced a traumatic event, they need to regain a sense of

safety, most often relying on a caregiver or trustworthy person who they can continually go to

for protection and comfort as they deal with the issue. However, sometimes a parent or caregiver

is not available, which can lead to even more negative impacts on the child (Bartlett & Smith,

2019). One way to combat this problem is to address the needs of the parent or caregiver. In this

way the family is strengthened, the child has a trusted adult to go to, and all family members

contribute in creating and making progress towards a goal for the child. By assisting the parent

as well as the child, the family can work through the traumatic experience together and build a

caring support system around the child.

One specific form of child and parent treatment is Child and Family Traumatic Stress

Intervention (CFTSI). This type of treatment aims to increase the communication occurring

within the family and teach specific behavioral coping skills to the individual in order to

decrease the likelihood of PTSD and treat the child's trauma (The National Child Traumatic Stress Network, 2017). Working best for ages 7-18, this treatment focuses on individuals who have a poor social or family support network and who have a significant lack of coping skills (The National Child Traumatic Stress Network, 2017).

Integrative Treatment of Complex Trauma for Children (ITCT-C) is another treatment that works with both the individual child and their family. In this treatment, a child is exposed to a myriad of therapies based on their particular experience (The National Child Traumatic Stress Network, 2017). These can include exposure therapy, mindfulness skills, family therapy and cognitive therapy (The National Child Traumatic Stress Network, 2017). This treatment targets children aged 5-12 years, and is one of the forms of treatment that has been most adapted to work with children who are migrants to the United States, both accompanied and unaccompanied (The National Child Traumatic Stress Network, 2017). Although this treatment has been found to be incredibly effective, it is at times not used because it can take so long to complete. With sessions taking place only once every 2-3 months, this treatment can take several years to complete (The National Child Traumatic Stress Network, 2017).

Three Phase Approach to Trauma Treatment

The three-phase approach to trauma treats trauma in three distinct phases (Ducharme, 2017). In the first phase, the individual works on establishing safety, stabilizing their environment, and a reduction of their symptoms. The goals of this phase are to build an individual's stress tolerance and introduce what treatment will look like. This phase is necessary for establishing a connection between the client and therapist and preparing the client for a stable therapeutic journey (Study, 2011).

In the second phase, confrontation of the problem, working through the experience, and integration of traumatic memories are the main focus. This includes the individual going through abreaction, a process where the individual releases strong emotion(s) that is connected to a past experience (Study, 2011). This release is generally a turning point for the individual. After it occurs, the individual generally makes large improvements both in their immediate symptoms and in their overall life (Study, 2011).

In the third and final phase, integration and rehabilitation are the foci (Ducharme, 2017). Individuals begin to have a more positive sense of self and relation to others and are able to develop a sense of internal peace (Study, 2011). Following this third step, the individual should focus less on their trauma and more on life in the present and future (Study, 2011). This approach to trauma treatment focuses on the individual slowly facing the occurrence head on, before moving on from it and learning how to bring their life back as close as possible to the way it was before.

Medication and Trauma

Depending on the symptoms that a child is having following a traumatic incident, medication can be part of treatment. It has shown to be effective in treating anxiety and depression following trauma, but should be used in conjunction with other forms of treatment, such as counseling or therapy (Ducharme, 2017). The medication can be used in conjunction with other therapies rather than a single intervention so that the child learns other ways to deal with the trauma instead of solely relying on the medication (Ducharme, 2017). Since medication is case specific, it is up to the family, therapist, and a psychiatrist or other medical professional to determine what is best for the individual and their particular circumstances (Ducharme, 2017.)

Comorbidity between ASD and Trauma

Although research is still needed, early studies have shown that the likelihood of comorbidity between ASD and trauma is high. Guest and Ohrt (2018) found that in a sample of 69 students diagnosed with ASD, 26% had a history of trauma. Further, Im (2016) found that in a larger sample of 156 students with ASD, 18.5% had a history of physical abuse that had led to trauma and 16.6% had been sexually abused leading to trauma.

One of the reasons that there is a high comorbidity between ASD and trauma is that individuals with ASD have communication deficits. Those who have ASD have higher rates of inappropriate interactions with others, which leaves them more susceptible to becoming victims of traumatic events (Guest & Ohrt, 2018). Fuld (2018) determined that adverse childhood experiences (ACEs) directly lead to stress and trauma, and those who are diagnosed with ASD have a "significantly higher probability" (than those without ASD; p.212) of experiencing one or more ACEs in their childhood. This high occurrence combined with communication deficits means that when a traumatic event occurs, it may be difficult for the victim to come forward and share their experience with someone that they trust (Haruvi-Lamdan et al., 2017).

Another reason that the comorbidity of these conditions is high is perception of what trauma is may differ for those with ASD (when compared to trauma perception for individuals without ASD). For example, children, especially those who have been diagnosed with ASD, are susceptible to bullying and social isolation from their peers (Guest & Ohrt, 2018). Things such as social confusion, peer rejection, social engagements, uncomfortable environments, or even sensory stimuli could be considered traumatic for a child with ASD depending on their particular symptoms (Guest & Ohrt, 2018). More specifically in terms of school interactions, teasing,

bullying, and ostracism have been found to cause trauma in students with ASD (Lamden et al., 2017).

One of the reasons that trauma can have such a negative impact on those with ASD is a lack of coping skills. A common feature of ASD is that the individual may struggle with emotional regulation (Guest & Ohrt, 2018). This can mean that the individual who experiences the trauma is unable to cope with the event and may not build an effective system of response to future stress or trauma. Other symptoms of ASD including mental rigidity, impairment of emotional insight, and lack of cognitive coping skills, can exaggerate the individual's response to the trauma, making it even worse (Guest & Ohrt, 2018). Repetitive behaviors and social avoidance, two other common symptoms of ASD, also make coping more difficult and can lead to an exacerbation of the ASD symptoms (Lamden et al., 2017). Individuals with ASD often also lack the social support systems that those without ASD may have, which have shown to be helpful when a person is dealing with trauma (Lamden et al., 2017).

Difficulty in Diagnosing ASD and Trauma

Diagnostic overshadowing is one of the reasons that comorbidity between ASD and trauma has not been extensively researched. Diagnostic overshadowing is when symptoms that are related to ASD are attributed to a co-occuring disorder, or when emotional or behavioral symptoms are seen as part of an ASD diagnosis (Rosen et al., 2018; Hoover & Romero, 2019). Trauma symptoms can present so similarly to symptoms of ASD that they are often are attributed to that diagnosis, leaving a diagnosis of trauma undetected and untreated (Rosen et al., 2018). ASD has also been shown to mimic other disorders, which can lead to misdiagnosis and

ineffective medication. Thus the individual does not receive appropriate treatment (Westphal, 2016).

Diagnostic overshadowing shows that more research is needed in this field, particularly in looking at psychiatric behaviors through the lens of ASD and determining how psychiatric symptoms can present differently in an individual who also has ASD (Westphal, 2016). Some of the complicating factors in this research include variation in intellectual and verbal ability levels of the individuals and limited measures to assess and diagnose psychiatric conditions in conjunction with ASD (Rosen et al., 2018). Another issue that has arisen in a diagnosis of trauma for a person with ASD is the variation of symptoms in response to trauma. Each individual can react to their individual traumatic event differently which makes it difficult to identify generally (Robinson, 2018). The time and resources needed in order to investigate the comorbidity of these conditions are another factor that has prohibited in depth research at this time (Rosen et al., 2018).

Problems with Assessments

Another problem is the way that various self-assessments are perceived by individuals who have a diagnosis of ASD. Individuals with ASD most likely perceive the questions and their own feelings differently than those without, so their responses when reporting psychological symptoms on behavior rating scales can vary widely (Hoover & Romero, 2019). In self-reporting, individuals with ASD often self-enhance answers and interpret questions literally, leading to results that are skewed or inaccurate. This causes many clinicians to rely on parents, caregivers, and other observatory reporters, which can also skew the results as the individual

most likely sees the events very differently than what others are observing (Hoover & Romero, 2019).

Limited availability of assessments also challenges the ability to find a comorbid diagnosis of ASD and trauma (Rosen et al., 2018). Assessments that are available for comorbid diagnoses along with ASD often do not look for trauma exposure or experience, and fail to assess when trauma is actually present (Grassetti et al., 2018). There are also a lack of assessments that provide individuals with multiple modalities through which to view and answer questions. This is problematic because that there can be a wide variety of needs, preferences and abilities in this population, and certain individuals may work better with certain modalities (Hoover & Romero, 2019).

One beneficial form of assessment is one that added pictures of animals rather than humans. King et al. (2017) found that adding animal characters to self-assessments was beneficial when working with young children. Having a gender neutral animal for the children to relate to was easier than relating to another child or to an adult. For young children specifically, relation to animal characters was significantly easier, and made them more comfortable when filling out the assessment.

Another important factor to assessments is their relation to the DSM-5 requirements of specific types of trauma, for example PTSD (Hoover & Romero, 2019). PTSD has five criterion domains for diagnosis, so an assessment looking to measure or diagnose PTSD in individuals with ASD not only needs to be realistic and accessible to the population, but accurate in terms of what and how it is looking to measure (Hoover & Romero, 2019).

Another assessment that has had a positive response is the use of web-based assessments

for trauma evaluation in individuals with ASD. A web-based assessment allows for access across

a multitude of ability levels, and is a format that is familiar to those with ASD (Hoover &

Romero, 2019). Increasingly, individuals with ASD are using tablets, smartphones, computers

and other electronic platforms in order to access material and information. Hoover and Romero

(2019) used a web-based assessment measure to assess trauma in individuals with ASD. They

found that 88% of participants rated the assessment as "good" or "really good" (p. 1689; Hoover

& Romero, 2019). The study found that using a web-based measure, individuals were very

comfortable filling out the self-assessment and gave accurate feedback (Hoover & Romero,

2019).

Treatment for a Comorbid ASD and Trauma Diagnosis

One of the biggest problems when treating ASD comorbid with trauma is that typically

recommended treatments simply treat the seen behaviors rather than the mental health issues that

underlie those behaviors (Fuld, 2018). One reason for this targeted treatment is a lack of adapted

treatments to individuals with ASD. Another reason may be that when individuals with ASD

suffer a traumatic event, there has been shown to be an increase in their aggressive behavior. In a

study of 69 individuals with ASD, 26% percent were diagnosed with trauma and 94.4% of those

individuals showed heightened aggression following that trauma (Guest & Ohrt, 2018).

Some therapies have begun to be developed to function well for those individuals who

have ASD, many of them being adapted forms of CBT. One is emotion focused therapy for

complex trauma (EFTT). Khayyat-Abuaita et al. (2019) described EFTT as "the processing of

trauma material by helping clients to access previously suppressed adaptive emotions so that the

associated meanings can be used to help modify maladaptive emotions such as shame or fear." (p. 1). EFTT is a treatment that focuses on building a trusting relationship between the individual and the therapist and emotionally processing through the trauma that was experienced (Robinson, 2018).

This therapy also focuses on accessing the memories of trauma within an individual in order to process through them in a safe space and effect positive change (Khayyat-Abuaita et al., 2019). By having the individual process through their memories of trauma, the individual also can begin to construct new meaning regarding the traumatic event (Khayyat-Abuaita et al., 2019). One of the biggest differences between EFTT and other treatments is that emotional skills are introduced to the individual based on their particular case, need and ability to regulate their own emotions (Khayyat-Abuaita et al., 2019). Other treatments introduce many skills at the beginning of treatment, rather than only giving the individual skills that may directly benefit or work well for them (Khayyat-Abuaita et al., 2019). EFTT can be used in group settings in order to help individuals relate to one another and process through different emotions together (Robinson, 2018).

Another therapy that has been developed is emotion focused therapy for autism spectrum (EFT-AS). This therapy functions much like EFTT, but uses smaller groups and is organized around markers specific to ASD. Therapists use these markers to gauge where the participating individuals are with processing the traumatic events and use video assisted interpersonal process recall (IPR) to help individuals gain awareness of the situation.

This treatment is structured in a small group setting, alternating between group therapy sessions and group IPR sessions (Robinson & Elliott, 2017). The IPR videos are created by

taping the group video sessions. The individuals then watch the videos back together, focusing on their interactions with one another, and practice empathy and relationship building with one another as well as the therapist (Robinson & Elliott, 2017). These videos help individuals to process their trauma by seeing how others in the video are dealing with trauma and coping (Robinson, 2018). The videos are meant to help individuals relate to their peers, process their trauma, and increase communication between participants and the therapist (Meekums et al., 2016). This particular therapy is still being tested, but preliminary findings have shown positive results for individuals with ASD who have suffered from trauma (Robinson, 2018).

Another therapy that may be used is child centered play therapy (CCPT). CCPT is used for very young children, but focuses on a child's natural inclination towards positive growth and resilience (Guest & Ohrt, 2018). This therapy has children playing with a therapist or counselor who oversees and helps to direct that play so as to process and move on from emotions following trauma. The child may be encouraged to act out their emotions or feelings using toys or stuffed animals, using that as a medium through which to process through their emotions (Guest & Ohrt, 2018). This therapy has been shown to reduce aggressive behavior following a traumatic experience as well as decreasing other behavior problems and some internalizing problems (Guest & Ohrt, 2018).

Conclusion

Through my research into this topic, my belief is that ASD and trauma have a high instance of comorbidity (Guest & Ohrt, 2018; Im, 2016). However, I also think that the number of challenges in diagnosing ASD and trauma consecutively could mean that clear steps to a comorbid diagnosis are far from being developed. Particularly with diagnostic overshadowing, I

believe that a large amount of research needs to be done regarding how to diagnose this and what a diagnosis in this could mean (Hoover & Romero, 2019; Rosen et al., 2018; Westphal, 2016). Lack of proper assessment tools is another big factor. I believe that the number of individuals with ASD and trauma is high, but there simply is not enough assessment tools or expertise to diagnose it properly (Rosen et al., 2018). I also think that difference in symptom presentation could be one of the reasons for a lack of research, as it is difficult to diagnose an individual if every case looks completely different (Robinson, 2018).

This research has also shown me that the reason behind the likelihood of high occurrence in comorbidity of ASD and trauma lies in the perception and communication deficits characteristic of ASD (Haruvi-Lamdan et al., 2017). If an individual has trouble communicating feelings and processing emotions, they will absolutely be more likely to experience trauma and have trouble dealing with trauma in the future. Without a solid routine and system of processing an individual will suffer even more from traumatic events (Guest & Ohrt, 2018).

The differences in perception between an individual with ASD and an individual without ASD are one of the things that I think contribute most to a high rate of comorbidity between ASD and trauma. With things such as physical discomfort, social discomfort, or bullying can cause trauma for an individual with ASD, it is clear that trauma is very individual to each person especially with ASD (Guest & Ohrt, 2018). I believe that this may be one of the reasons that not much research has been done into this, because if an individual doesn't perceive something as traumatic and an individual with ASD cannot communicate their discomfort, then it would be almost impossible to know that they had experienced trauma.

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