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TREATMENT APPROACH

Trauma in Context: an Integrative Treatment Model

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Abstract
Evidenced based trauma treatments benefit children, but they rarely suffice for youth with multiple and complex comorbidities. After the completion of standard treatments, many children continue to show residual social, behavioral, and emotional difficulties. Part of the difficulty is that while the literature on trauma describes numerous facets that contribute to the severity, expression, and outcomes of trauma exposure, clinical assessments and interventions do not sufficiently reflect that literature. Clinicians thus have little guidance on how to integrate the intricacies of client's circumstances into a trauma-informed framework. To expand the scope and efficacy of treatments and guide clinicians in selecting appropriate interventions, this paper explores factors associated with pretreatment traumatic responses and proposes an integrative treatment model that includes the trauma experience, itself, combined with pre- and post-trauma factors that are both internal and external to the child and family. Pre-trauma experiences influence the severity of traumatic responses, while post-trauma factors impact a person's ability to cope and recover. Both are important targets for direct intervention.

Keyword Trauma · Complex trauma · Comorbidities · Psychotherapy · Assessment: Genetics · Environment: Poverty · Racism

As researchers increasingly confirm that childhood trauma generally translates into increased risks for poorer adult physical and mental health, developing interventions to avert those outcomes has become a pressing mental health priority. In response, evidence-based trauma treatments for children, such as Trauma-Focused Cognitive Behavior Therapy (TF-CBT), Child Parent Psychotherapy (CPP) and Eye Movement Desensitization and Reprocessing (EMDR) have been recommended as efficacious treatments (Bennett et al., 2020; National Institute for Health Care Excellence, 2018). Despite their successes, trauma treatments fall short in a number of ways. Evidence-based treatments are based upon typical reactions to trauma, especially those codified into the diagnosis of posttraumatic stress disorder (PTSD) (American Psychiatric Association, 2013; World Health Organization, 2018) and do not reflect the heterogeneity of symptoms and circumstances noted in client populations (Bryant, 2021; Cloitre, 2015). Since multiple pathways lead from a traumatic event to the development of PTSD, traumatic reactions do not manifest identically in all children. Treatments also tend to be plagued by high drop-out rates, especially amongst youth of diverse ethnic and racial backgrounds (Eslinger et al., 2014; Wamser-Nanney & Steinzor, 2016; Yasinski et al., 2018). Part of the reason is that most interventions lack comprehensive attention to how racism, culture, and structural inequities influence the type and provision of services (Comas-Diaz, 2016; Ennis et al., 2019; Price et al., 2013). Furthermore, evidence-based treatments rarely meet the full needs of youngsters showing complex symptoms, especially those with co-morbid mental illness and/or executive functioning differences. In studies comparing youth with PTSD to those with complex trauma who completed TF-CBT, children with complex trauma showed higher symptom levels both pre- and posttreatment than those with simple PTSD (Sachser et al., 2017) and slower rates of change (Ross et al., 2021). At treatment's end, residual social, behavioral, and emotional difficulties remained. A tight focus on trauma alone, rather than the whole of a person's difficulties and circumstances, constrains current treatments.

The symptoms of trauma that bring children to the attention of mental health professionals are many and varied. They include both those listed in the DSM-V as

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posttraumatic stress disorder (PTSD) (American Psychiatric Association, 2013) and those included in the ICD-11 as complex posttraumatic stress disorder (CPTSD) (World Health Organization, 2018). In addition, there are many children showing various types of posttraumatic reactions who fail to meet criteria for either disorder but may benefit from trauma-focused treatments (Wamser-Nanney & Vandenberg, 2013). Whether a child develops PTSD, CPTSD, or suffers from traumatic symptoms that do not meet thresholds for either disorder depends on a number of factors: the number and nature of traumas experienced and numerous pre- and post-trauma circumstances of the child, family, and environment. Extant trauma factors influence the experience and severity of traumatic responses, while post-trauma factors impact a person's ability to cope and recover. Comprehensive treatments should depend upon assessing and incorporating interventions that address all elements.

The literature on trauma describes numerous facets that contribute to the severity, expression, and outcomes of trauma exposure, but clinical assessments and interventions do not sufficiently reflect that research. Clinicians often do not know how to integrate the intricacies of client's circumstances into a trauma-informed framework. To expand the scope and efficacy of treatments and guide clinicians in selecting appropriate interventions, this paper explores factors associated with pretreatment traumatic responses and proposes an integrative treatment model that includes the trauma experience, itself, combined with pre- and post-trauma factors (Fig. 1). While this model may be particularly helpful for treating children with numerous comorbidities and complexities, such as reflected in the CPTSD diagnosis, it also applies to children suffering from PTSD or whose traumatic reactions have been given other labels.

Symptoms Associated with Traumatic Experiences

Childhood traumas range from maltreatment experiences that include neglect and physical and/or sexual abuse, to witnessing the abuse of another, to experiencing racism, community wide violence, war, or natural disasters. Traumatic reactions have also been noted in those undergoing painful illness or medical procedures, hurt in automobile or other accidents, or suffering the traumatic loss of an attachment figure. Polyvictimization is also common. In one national sample, 64 percent of children exposed to one type of trauma endured at least one other, while 26 percent experienced four or more victimizations (Finkelhor et al., 2007). However, only a small minority of children who experience trauma develop PTSD symptoms, with meta-analysis showing an approximate rate of 16 percent (Alisic et al., 2014). Resiliency and recovery, without treatment, are the most normative responses.

Symptoms of PTSD (American Psychiatric Association, 2013) develop in a subset of children and include various

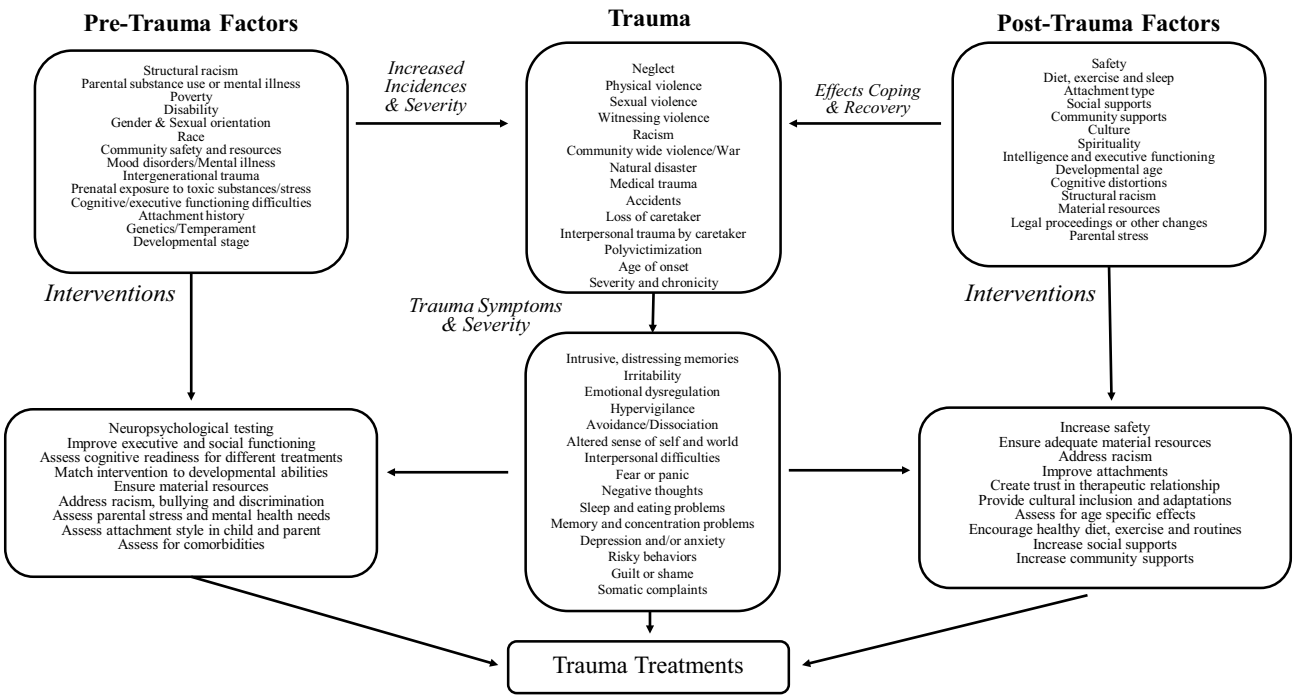

Fig. 1 An integrative model for trauma treatment

ways that children relive or attempt to forget the traumatic incident. Intrusive memories can occur in the form of nightmares, flashbacks, or repetitive posttraumatic play. Children may appear distracted, lack positive emotions, and experience intense fears or sadness, accompanied by hypervigilance towards possible threats. Children may also try to avoid reminders of the event and even deny or dissociate aspects of the experience. Sometime avoidance becomes widespread and leads to withdrawal from social relationships. When PTSD symptoms manifest, they generally reflect a child's inability to cope with and integrate stressful and overwhelming traumatic experiences.

Children who experience traumas that occur in the context of intimate relationships and/or include prolonged and multiple types of abuse, may additionally develop symptoms of CPTSD (Karatzias et al., 2019; World Health Organization, 2018). CPTSD includes symptoms of PTSD as well as three additional types of disturbances in self organization: affect dysregulation, negative self-concept, and relational disturbances. Only a few studies have evaluated the efficacy of CPTSD as a clinical category for children, but preliminary reports appear promising (Haselgruber et al., 2020; Sachser et al., 2017). As will be discussed, the difficulties children with CPTSD show regulating feelings and behavior and engaging in relationships emerges not just from feeling overwhelmed, but by the way organisms adapt to repeated and/or prolonged stress.

Symptoms According to Trauma Type

Some of the differences in children's responses, including whether they develop PTSD or CPTSD, occur according to trauma type. Particularly high rates of externalizing symptoms have been reported in children exposed to physical abuse and community violence (Augusti et al., 2018; Yearwood et al., 2019). In approximately 10 to 30 percent of sexually abused children, sexual behavior problems arise (Kisiel et al., 2014; Wamser-Nanney & Campbell, 2020). Sexual abuse victims may also be more susceptible to feelings of shame, guilt, and stigmatization than children suffering other types of abuse and show higher rates of suicidality, depression, and PTSD symptoms (Kisiel et al., 2014; Lewis et al., 2016). In subjects reporting emotional abuse, differences in the auditory cortex have been discovered, but those who experience sexual abuse or witness domestic violence instead exhibit alterations in visual pathways (Choi et al., 2012; Shimada et al., 2015; Teicher & Samson, 2016). While traumatized children often show an increased attentional bias towards threat, one study of 160 children aged 8 to 17 years found that severely maltreated children can also show a blunting of that response and shifting of attention away from stressful stimuli (Weissman et al., 2020). Sensory and emotional reactions that protect children from threat appear to be heightened when escape is possible and blunted when it is not, to diminish overwhelming feelings. Although small sample sizes and difficulties controlling for confounding variables limit the specificity of many research results, emerging evidence suggests that children's brains shape themselves according to type of traumatic experience, leading to different constellations of symptoms (Teicher & Samson, 2016).

Chronicity, Severity, and Age of Onset of Trauma

Reactions to traumatic experiences vary not just according to type, but also as a function of the age of onset, chronicity, and severity. Adults reporting higher numbers of childhood traumas tend to exhibit more symptom complexity than those whose trauma began later in life (Briere et al., 2008). Children exposed to interpersonal traumas, particularly by caregivers or other trusted figures, also show a greater severity and complexity of symptoms, with the earlier the onset, the higher the range of difficulties (Price et al., 2013; Wamser-Nanney & Vandenberg, 2013). The longer a child remains exposed to traumatic experiences, especially of a severe nature, the greater the impact. Contextual factors also mix in, complicating the assignment of causation. Children exposed to trauma may face additional other adversities such as poverty, poor schools, or difficult family circumstances of a non-traumatic nature that also impact learning, behavior, and socioemotional outcomes.

Childhood trauma or maltreatment that occurs repeatedly, especially early in life, can alter development and the growth and structure of the brain. Areas most effected are those developing in early childhood: the stress response system, limbic system (which coordinates emotion and memory), cortical areas (which regulate motor, sensory, visual, and intellectual functions) and cortical network connectivity (Marusak et al., 2015; Teicher & Samson, 2016). As cortisol, which is released to enable the body to react quickly to dangerous events, also regulates metabolism, energy, and sleep, trauma can disrupt those functions (O'Connor & Sefair, 2019). Lack of sleep, exercise, or a healthy diet, in turn, can complicate recovery and contribute to longer term physical and mental health problems. As a result of changes to their stress response, limbic, and cortical systems, children may exhibit emotional dysregulation, heightened stress responses (especially to reminders of the traumas), executive functioning deficits (memory, attention, inhibition), social difficulties, and alterations to threat and reward systems (Teicher & Samson, 2016). Guilt, shame, and somatic complaints have also been noted (Ford, 2009). Whether or not all of those symptoms result from trauma or other etiologies remains

unknown and probably differs from one individual to the next. In a recent evaluation of two large longitudinal cohorts, Danese et al. (2017) found that cognitive vulnerabilities, such as IQ, executive functions, and processing speed, and nonspecific effects of socioeconomic disadvantage occurring prior to victimization could largely account for posttraumatic cognitive and executive functioning difficulties.

Variability and Compounding of Symptoms

Children and adolescents with trauma exposures and complex histories may also show uneven development, simultaneously exhibiting areas of resilience and difficulty (Cicchetti, 2013). A child with adequate cognitive functioning, for instance, may show significant social-emotional difficulties. Children's symptoms can also change and compound over time, so that adolescents may show increased or delayed effects from earlier traumas. Maladaptive compensatory strategies that a child or adolescent employs to contend with stress and distress, particularly in social and regulatory domains, can intermix with earlier symptoms to produce secondary difficulties, such as depression, anxiety, or risky behaviors (Ford, 2009).

Pre-Trauma Factors Affecting Traumatic Responses

Traumas do not occur in a void; they are superimposed upon and interact with a person's pre-existing strengths and vulnerabilities. Some of those strengths and vulnerabilities reside in the environment, others derive from a person's circumstances, genetics, or prior experiences. Both individual and environmental factors can be considered risk and protective factors that affect children's experiences of trauma, often in combination. Trauma responses and outcomes may thus be considered epigenetic; they are genetic expressions resulting from experience.

Circumstances Increasing the Probability of Children Experiencing Trauma

The probability of a child experiencing traumas or maltreatment increases under a variety of different circumstances a child or family may face. Environmental factors such as racism, discrimination, structural inequities, and limited access to material resources and safe neighborhoods increase the likelihood of experiencing traumatic stressors in areas as diverse as child maltreatment, violent crime, hate crimes, natural disasters, and historical or intergenerational trauma (Comas-Diaz, 2016; Roberts et al., 2011). Higher incidences of maltreatment occur in families in which there is substance abuse (Austin et al., 2020; Walsh et al., 2003), mental illness (Kohl et al., 2011), or stresses associated with poverty (Johnson et al., 2016). Children with disabilities face maltreatment and bullying rates that are two to three times higher than those experienced by typically developing children (Blake et al., 2012). Individuals who do not identify as heterosexual also experience higher rates of trauma exposure (McGeough & Sterzing, 2018), as do nonwhites and those from non-majority ethnic groups, often due to racism and the effects of structural inequities (Roberts et al., 2011). In contrast, safe and cohesive neighborhoods, communities with parks, green spaces, healthy food, social services, and affordable housing promote well-being (Flouri et al., 2014; Maguire-Jack & Wang, 2016; Roubinov et al., 2018). Many other factors, such as family size, religiosity, and/or school quality could also contribute to risk and protective factors for trauma exposure and warrant evaluation.

Developmental Stage

A child's developmental stage, and its impact on social, emotional, and intellectual functioning, has a large effect on how trauma and adversity are experienced and influence what types of long-term sequalae may emerge. Children's brains and neural networks grow and mature sequentially (Perry, 2009), so that earlier negative experiences incur more widespread consequences. In the first few years of life, growth and synchronization occur most rapidly in children's stress response systems, limbic systems (responsible for the processing of emotions and coordination of self-regulation and memories), and cortical areas (affecting cognitive and executive functions). Traumas that occur early in life can interrupt the development and functioning of those areas as the organism prioritizes building neurological substrates, concerned with ensuring a quick response to threat, over cognitive functions and controls that are needed in non-traumatic environments (Marusak et al., 2015; Teicher & Samson, 2016). Pathways and brain regions tasked with regulating threat responses, which include the thalamus, visual cortex, prefrontal cortex, amygdala, and hippocampus, speed up nonconscious responses to danger and slow conscious components (Teicher & Samson, 2016). Sensory systems, such as visual and auditory stimuli associated with the traumatic experience, may become blunted in order to decrease distress (Shimada et al., 2015; Teicher & Samson, 2016). When stresses are severe or recurrent, the frequent or prolonged activation of the body's stress response system (hypothalamic–pituitary–adrenal axis, or HPA) consolidates brain changes, increasing emotional reactivity at the expense of cognitive controls.

The current state of research suggests that the timing of trauma exerts a differential impact on children's neural development. As the early adolescent period is a time of rapid brain restructuring and increased emotional volatility,

traumas occurring in that phase of development can create larger stress responsivity and increase the chance of adolescents engaging in risky behaviors. Studies suggest that bilateral hippocampal volume is most sensitive to maltreatment at three to five years of age and second most at 11–13 years, while right hippocampal volume appears most affected between 7 and 14 years of age, the right amygdala at 10–11 years of age, and prefrontal grey matter between 14 and 16 years of age (Teicher & Samson, 2016). Fujisawa et al. (2018) found a potential sensitive period of five to seven years of age for volume reduction in the left primary visual cortex. On the other hand, children experiencing traumas at older ages, whose development pre-trauma have been normative, will likely have developed better emotional regulation and coping abilities that grant them greater skills, cognitive understanding, and perhaps emotional supports to aid recovery. While changes in brain structures do not automatically translate into symptomatic responses, so that care must be given in extrapolating findings, it is likely that the nascent research on critical periods underestimates age-related effects and that other, yet undetected sensitive periods may exist (Zeanah et al., 2011).

Factors Influencing Children's Tolerance for Stress

Pre-existing neurocognitive and genetic factors similarly impact how a child responds to trauma exposures. Children with compromised stress response systems have a lower tolerance for stress and react more strongly when frightening experiences occur. While a compromised stress response system can be one of the outcomes of chronic or severe trauma, and is often viewed that way by clinicians, studies increasingly identify other etiologies that may precede a child's experience of trauma. Prior adversity, including that inflicted by poverty (Johnson et al., 2016), mood disorders and other mental illness (Kohl et al., 2011), or exposure to toxic substances or stresses in utero, including intergenerational trauma (Behnke et al., 2013; Mattson et al., 2019; Wilhoit et al., 2017) have each been associated with altered brain functioning and neural networks that increase a child's reactivity. Executive functioning and cognitive difficulties, such as seen in children with fetal alcohol syndromes, have been shown to increase the severity of trauma symptoms and render individuals more susceptible to PTSD (Emdad et al., 2005; Finzi-Dottan et al., 2006; Henry et al., 2007). In fact, any type of pre-existing impairment to the stress response and/or cortical systems limits resilience and increases the likelihood of children showing more severe traumatic responses.

A child's quality of attachment to a caregiver provides another mechanism for bolstering resilience and/or limiting or magnifying the effects of traumatic exposure. In the first years of life, attuned and sensitive attachment figures calibrate infants' nervous systems through soothing interactions, social affiliation, and micro-interactions that build important connections in brain regions associated with language, emotions, and physical regulation (Hart, 2011). Securely attached infants learn to cue accurately their feelings and needs, which helps others respond. As a result of multiple experiences in which a caregiver helps a child recognize and manage distress, the child gains abilities to tolerate and cope with hardships and emotions (Ford, 2009). As a consequence, infants with secure attachments display resiliency by the end of their first year of life (Gunnar & Quevedo, 2007; Hart, 2011). Social supports provided by peers, teachers, and other figures have also been shown to buffer children's exposure and reactions to many kinds of stress, including racism (Comas-Diaz, 2016; Maguire-Jack & Wang, 2016). On the other hand, children without secure attachments or social supports display more difficulty managing disturbing thoughts, feelings, and experiences, and accurately cuing their feelings and needs, which leaves them more vulnerable to mal-effects from trauma and stress (Ford, 2009).

Researchers studying epigenetics have found preliminary evidence that PTSD is partially heritable and that genes confer both susceptibility and resilience to environmental risks, including to the effects of maternal sensitivity (Somers & Luecken, 2021). A large genome-wide study on subjects of European and African ancestry found heritability ranged from 5–20 percent and that multiple genome-wide variants were associated with PTSD (Nievergelt et al., 2019), a finding consistent with other studies (Howie et al., 2019). Genetics also influences how a person responds to stress. In a study of Romanian Orphans adopted into families in England, children who were carriers of the short alleles of the 5HTTLPR gene, which affects the sensitivity of the threat response, showed the highest levels of emotional problems, even a decade or more after leaving the orphanages (Kumsta et al., 2015). Temperament, a partly inherited trait, further contributes to how a person reacts to various experiences. In a study of adult accident victims, emotionally reactive temperament predicted higher intensities of PTSD symptoms (Strelau & Zawadzki, 2005). Since genetic expression depends in part upon environmental influences, multiple interacting ingredients generally underly any traumatic reaction.

Epigenetic changes incurred by extreme traumas may also be transmitted intergenerationally from mothers to offspring. In a number of studies, the offspring of survivors who experienced trauma before their children were born showed changes in DNA methylation associated with trauma, PTSD, and susceptibility to stress (Youssef et al., 2018). While caution must be exercised in interpreting these studies due to small sample sizes, different populations studied, and the inability to control for all confounding factors, increasing

evidence points to the powerful role of pre-trauma factors in influencing who is most susceptible to the effects of stress and the development of PTSD.

Gender

Gender also affects the type and severity of response to trauma. Researchers find that girls are more likely than boys to meet PTSD diagnostic criteria, even though their overall rates of trauma exposure are not greater. In several studies, girls endorse more intrusive, fearful, and cognitive PTSD symptoms than boys, although it is not clear whether those differences are always due to sex differences or other moderating factors (Alisic et al., 2014; Ascienzo et al., 2021; Contractor et al., 2013). Biological differences may make females more susceptible to activation and dysregulation of their stress response systems. Symptoms could also result from girls experiencing more interpersonal types of trauma exposure, cultural factors in the way that PTSD is defined and diagnosed, or how females are socialized to express distress. Gender non-conforming youth are particularly at risk for developing trauma symptoms. In one study examining a longitudinal cohort of young adults, sexual minority and gender nonconforming youth showed higher prevalence of PTSD that could not completely be accounted for by increased rates of trauma exposures (Roberts et al., 2012). The researchers suggest that other associated stressors, such as bullying and/or rejection, may combine to worsen their conditions.

Post-trauma Factors Affecting Children's Reactions

After a child experiences trauma, the work of coping and making sense of the event begins. A child's ability to manage depends both on the youth's intrinsic abilities and environmental responses. The establishment of safety and stability are important to stopping the continuation of stressors associated with the trauma and allowing for recovery. Physical and emotional regulation are also enhanced through a healthy diet, exercise, and sleep, which can be disrupted by traumatic stress (Colvonen et al., 2019; Rijkers et al., 2019). Many other factors also impact children's abilities to cope and the risk that they will develop PTSD.

Social Supports

As children turn to their attachment figures in times of distress, the availability of sensitive and attuned social supports helps children recover from stressful events (Ford, 2009). Sensitive caregivers provide soothing, help with cognitive processing and understanding, and restore a sense of safety. Children and their caregivers can additionally benefit from community level supports such as schools, churches, friends, and psychotherapy that provide similar experiences of safety, support, and aid with coping. Children without secure attachments may not only lack access to supportive caregivers, but also find it harder to trust and use available relationships that might benefit them (Ford, 2009; Shapiro, 2020). Obstacles to seeking out and managing social supports also arise when families face multiple additional stresses, such as structural racism or financial or occupational insecurities, that limit their opportunities and overload them with too many obligations (Anandi et al., 2013).

Developmental Abilities

Children's developmental age informs the types of cognitive reactions they exhibit to a trauma and how they make sense of the experience (Salmon & Bryant, 2002). The ability to understand and integrate different aspects of an event changes and matures as children grow older. Traumas that occur before children develop language and symbolic representation are encoded implicitly and less available for later verbal recall. Making sense of what happened is hard for toddlers and preschool-aged children who tend to see the world egocentrically and lack prior knowledge upon which to organize memories and base understanding. They may blame themselves rather than a perpetrator for what happened. Children in preschool or middle childhood also tend to rely on concrete and simplistic interpretations of events that can lead to overgeneralized and distorted memories and understanding. Alternate explanations may be dismissed in favor of dysfunctional beliefs about themselves and others, which leaves them vulnerable to shame, guilt, and worries about their competence and worth. In adolescence, the advent of abstract thinking and increased ability to step back and control impulses enables youth to understand, remember, and cope with traumas more fully, but can also overwhelm them with thoughts, memories, and questions that disrupt pre-existing formulations about themselves, others, and the safety of the world.

High verbal skills, executive functioning, general intelligence, and self-regulatory abilities have been shown to increase resilience and decrease behavior problems after traumatic experiences (Goslin et al., 2013; Horn et al., 2018). Cognitive and regulatory skills aid children in understanding, formulating, and operationalizing responses to the event. They help children explain their experience and needs to others, thus increasing the odds that they will gain support and perspective. Children lacking the ability to comprehensively appraise, understand, and organize their memories find themselves disadvantaged. In a study of 10–18-year-olds with prior trauma exposure, maladaptive appraisals, disorganized memories, and recollections that were primarily

sensory in nature were associated with more severe PTSD symptomology and complexity (Hiller et al., 2021).

Additional Circumstances Affecting the Child and Family

The type of coping best suited to a child after a distressing event depends on the child's cultural and spiritual background. Culture and religion assign meaning to experiences, provide comfort, and offer structured methods of enduring. While western, psychotherapeutic methods often focus on how individuals manage and tolerate emotions, many cultures utilize communal strategies. Singing, prayer, praise, and the fellowship of other worshippers assume therapeutic functions in the Black church (Dempsey et al., 2016). Harmony and connection to the land and cosmology bestow resilience and comfort to the Inuit people of the Canadian Arctic (Kirmayer et al., 2011). Particularly when traumatic experiences occur in communal realms, such as in the case of racism or community violence, cultural solidarity, resistance, and collective struggle may provide especially powerful antidotes (French et al., 2020). Since emotion-regulation and coping strategies operate differently according to culture, a family's indigenous methods of healing provide important resources (Ford & Mauss, 2015).

Events that happen after the trauma, or sometimes as a result of the trauma, can create additional stresses. Legal proceedings, changes to family structure, residence, and relationships, and other associated shifts can offer safety and closure and/or create additional stress. These events can aid recovery or complicate it. Children may lose social supports or feel responsible for their changed circumstances. Parents may feel overwhelmed by their child's trauma and subsequent associated events, making it harder for them to attune to their child's needs. Structural racism, discrimination because of sexual orientation, or lack of material means may impede the availability of resources that could help children and their families. They may also add additional stressors that worsen or prolong symptoms. Understanding how trauma has affected the broader ecosystem in which a child functions is an important target for assessment.

Trauma Treatments

Evidence-based trauma treatments address some, but not all, of the factors that children experience as a result of trauma (Bryant, 2021; Cloitre, 2015). The major evidence-based treatments for trauma (i.e., TF-CBT, Cohen et al., 2016; EMDR, Shapiro, 2018; as well as others) primarily seek to decrease posttraumatic dysregulation and alter maladaptive cognitive appraisals. Interventions include psychoeducation, skill training in emotional regulation, repeated exposure to traumatic memories and triggers, and cognitive reframing of maladaptive thoughts. Caregiver training along the same lines is included in TF-CBT. Other treatments, such as Attachment, Regulation, and Competency (ARC, Blaustein & Kinniburgh, 2010) and CPP (Lieberman & Horn, 2008) and, to a lesser extent, TF-CBT, target caregivers as important attachment figures who can regulate and soothe post-traumatic distress. Far too often, however, published treatments neglect to address the many other contextual and environmental factors identified in this analysis.

While the dangers of clinicians overlooking and misdiagnosing trauma are real, the impact of missing other comorbid circumstances can also be large and degrade the efficacy and durability of trauma treatments. How trauma interacts with aspects of a children's lives and how central are those interactions to their symptoms and struggles, as well as their willingness and ability to engage in and benefit from various treatments, is important to understand. To make those determinations, clinicians must consider a broad range of pre- and post-trauma contributing factors. The model proposed in Fig. 1 is a starting point for threshing out the scope of assessments and interventions needed for comprehensive treatment.

Recommendations for Integrating a Wider Lens into Assessment and Treatment

Assessment

Evidence-based recommendations for assessment of trauma's effects include examining maladaptive cognitions, dissociation, flashbacks, traumatic triggers, avoidance, as well as social difficulties, anger, depression, and self-regulatory difficulties, including in severe forms such as suicidality, substance abuse, or psychosis (Cohen et al., 2016; Ford, 2009; Wherry, 2014). Assessment methods include standardized measures, as well as psychosocial interviews, observation, collateral sources of information, and neurocognitive testing as needed. While each of the symptoms mentioned above are important to consider, so are numerous other factors.

Since trauma affects children differently according to developmental age, clinicians should employ a developmental framework that focuses on understanding how the type, severity, age of onset, and chronicity of trauma have interrupted developmental tasks, how children understand and make sense of events, the impact on their relationships and relational schemas, and what developmental tools they possesses to help with processing and coping (Ford, 2009; Perry, 2009). Assessing children's attachment styles helps determine how well they can draw upon and use social supports, including those offered by the therapist (Holmes,

1997; Shapiro, 2020). Also important to understand is the role caregivers can take in supporting the child and reducing dysregulation and what further parenting skills bear developing.

As executive functioning difficulties and genetic or prenatal difficulties that sensitize individuals to stress can precede trauma and worsen its effects, as well as make coping, self-regulation, and understanding more difficult, assessment of executive functioning and cognitive factors is especially important (Emdad et al., 2005; Finzi-Dottan et al., 2006; Henry et al., 2007). Other comorbid conditions, such as ADHD or mood disorders, may also interfere with normative developmental skills and appraisals, rendering assessment of a child's general abilities and comorbidities necessary.

Recognition is also needed of the numerous adversities with which many traumatized children struggle. Children living in poverty, facing racism or other types of discrimination, or in families with parents suffering multiple stresses, substance abuse, and illnesses are more likely to experience traumas (Austin et al., 2020; Blake et al., 2012; Johnson et al., 2016; Roberts et al., 2011). Those factors also place additional stresses and demands on families that can increase the severity and complexity of symptoms. Mitigating risks for further traumatic exposure and crafting comprehensive interventions depends upon assessing which environmental stresses and circumstances increase and decrease both a child's symptoms and the chance of further traumas occurring. Carefully and thoroughly assessing stresses also gives a clearer picture of what obstacles children and families face that need addressing and that may create barriers to treatment engagement and success. Included in that appraisal is the family's involvement with child welfare, courts, school systems, and religious or other community institutions that may be creating additional demands or providing important sources of support.

In addition to understanding the multiple difficulties clients face, psychotherapists should also assess which strengths and assets can be utilized to aid recovery. Therapists should explore cultural beliefs and strategies with families to determine the most beneficial methods of managing stress, as well as the best ways to access and utilize those methods (Dempsey et al., 2016; Ennis et al., 2019; Kirmayer et al., 2011). Diet, exercise, and sleep, and their role in promoting or degrading the child's health should be explored (O'Connor & Sefair, 2019). Sources of social support and areas of competence should be probed to determine which protective factors exist or need to be promoted to aid recovery (Blaustein & Kinniburgh, 2010).

Developmental Considerations

A child's developmental stage and abilities influences the focus and types of interventions that can be offered. Children remember, make sense of the trauma, and regulate themselves differently at various ages, which must be accounted for in interventions (Salmon & Bryant, 2002). As discussed earlier, different types of cognitive explanations and distortions are more prevalent at certain ages and can clue the therapist about which cognitions to probe and, when needed, restructure. Treatments with a primarily cognitive focus may not be a good match for young children or those with memory, language, and executive functioning differences. Treatments that ask children to generalize or employ skills independently may also be harder for younger than older children, or for those with cognitive or impulse difficulties. Play and fantasy can be utilized more easily with preschool and younger school aged children than older ones.

A high number of children who have suffered trauma evidence neurocognitive and executive functioning difficulties (Danese et al., 2017; Henry et al., 2007), which are associated with increased trauma symptoms and decreased resilience (Goslin et al., 2013; Horn et al., 2018). Attention, cognition, and executive functioning also influence how children engage in treatment. Social cueing, memory, verbal skills, and impulse regulation determine how well children understand, retain, apply, and generalize interventions. They effect how children make sense of experiences and symptoms, as well as use social supports. Children with preexisting cognitive difficulties are likely to require basic skill-building interventions that are longer term with the pacing and explanations of interventions slowed and made more concrete, graphic, and repetitive than interventions offered to those whose genetics or early experiences make learning less effortful (Zilberstein, 2014). They will also need a greater combination of treatments. Trauma treatments may help to decrease dysregulation but are unlikely, on their own and without substantial modification, to redress difficulties that derive from non-traumatic circumstances. In a study of foster children with trauma histories and fetal alcohol disorders, Koponen et al. (2009) found that children whose diagnoses of fetal alcohol spectrum disorders (FASD) went unrecognized exhibited more problems than diagnosed children, perhaps because of a lack of appropriate interventions.

Interventions that target emerging skills during sensitive periods of development are also likely to show increased efficacy (Zeanah et al., 2011). During the first three years of life, children's brains grow rapidly, allowing them to learn and change more quickly. As infants and young children are particularly responsive to somatosensory and physically nurturing activities and are primed to form attachments and social relationships, interventions targeting those areas of development are likely to show success (Perry, 2009). Some researchers also consider adolescence a sensitive period, in which rapid brain growth and reorganization of cognitive, emotional, and social processes may increase the ability to benefit from interventions utilizing and enhancing those

skills (Blakemore & Mills, 2014). The advent of abstract reasoning in adolescence provides an opportunity for better top-down emotional regulations, the reappraisal of old beliefs, and the acquisition of new schemas of the self, others, relationships, and the world (Ford, 2009). While sensitive periods make new learning quicker and easier, children of all ages can benefit from interventions, if they are directed towards their developmental stage and abilities. Thus, physical nurturance is also helpful to older children, but must be matched to their cognitive and physical interests and capacities, rather than infantilizing them (Perry, 2009). Children or adolescents who show uneven developmental abilities will require interventions that consider and target their different levels of functioning.

The security of a child's attachment aids coping and co-regulation of distress. Strengthening attachment relationships for children lacking security, and helping caregivers provide safety and soothing, should be components of treatment (Blaustein & Kinniburgh, 2010; Ford, 2009). Young children are highly dependent on caregivers to help them regulate their reactions and understand events, making caregiver involvement in treatment necessary. Attachments remain important for wellbeing throughout life, but as youth mature, they acquire increased cognitive and regulatory proficiencies that help them make sense of experiences and form attachments to other adults or peers, rendering caregiver involvement in adolescence preferable but less crucial. Since youth tend to transfer working models of attachment onto other relationships, children with insecure or disorganized attachments may initially distrust therapy and the therapist and create poor working alliances (Shapiro, 2020; Yasinski et al., 2018). Developing and maintaining a positive therapeutic relationship often requires sustained work.

Culture and Discrimination

While the most common trauma treatments for children contain segments on regulation and skill building, cultural considerations are just beginning to be woven into protocols (Comas-Diaz, 2016; Ennis et al., 2019). Therapists must always be aware of cultural considerations, both in the ways in which clients express distress, but also in what helps them heal. Most of the recommended affect regulation skills in treatments such as Trauma-Focused Cognitive Behavioral Therapy (TF-CBT, Cohen et al., 2016) and Attachment, Regulation and Competency (ARC, Blaustein & Kinniburgh, 2010), include exercises such as focused breathing, muscle relaxation, and other skills that are designed to increase individual competence, even if cued by a caregiver. But individual oriented interventions may not be the best fit for all cultures. Prayer, activism, story-telling, and communal support are amongst the activities that have been shown to help survivors in communally focused societies (Dempsey et al., 2016; Kirmayer et al., 2011).

Youth who have experienced racism or discrimination due to sexual orientation or other stigmatized identities may have trouble trusting therapists, especially when humiliation or betrayal by a trusted public figure has previously occurred (Comas-Diaz, 2016). Therapists working with such clients will likely need to explore, understand, and validate issues associated with race, culture, sexual orientation, and trust throughout the treatment. Trust must be discussed and built through the therapist exhibiting reliability, empathy, attunement, validation, support, and the willingness to tolerate and explore the child or family's distrust (Comas-Diaz, 2016; Yasinski et al., 2018). Even after trust has formed, resurgences of distrust and attachment disturbances can be triggered by traumatic memories, misunderstandings between therapist and client, new experiences of discrimination, or vacations, terminations, or other disruptions to the treatment relationship that will need to be addressed (Comas-Diaz, 2016; Holmes, 1997).

The Importance of Advocacy and Support

Poverty, mental illness, disability, involvement with child welfare or court system, inadequate schooling, structural racism, stigma, discrimination, poor diet, exercise, or sleep, and other aspects of client's lives interact with trauma symptoms, increasing or decreasing their potency. Helping clients regulate and feel safe cannot occur without attending to and diminishing the negative circumstances that increase or decrease stress, security, and resilience. Advocacy and other interventions that help clients gain the material, environmental, social, and community supports they need, and that are likely to sustain them after treatment ends, are important components of treatment. Without understanding and addressing contextual factors, children may remain in situations that perpetuate the very types of toxic stress and dysregulation that interventions seek to assuage.

Advocacy includes making referrals, coordinating treatments, and helping other providers understand how trauma affects all aspects of the client's care. Effective advocacy occurs in partnership with a client's wishes and includes empathy and validation of the clients' struggles and objectives, exploration of existing opportunities and barriers, and helping clients obtain educational, instrumental, and relational support. When clinicians provide advocacy, it not only helps clients achieve goals, but strengthens the working relationship and furthers collaboration (Goodman et al., 2018). To advocate productively for clients, therapists must gain not just knowledge of existing resources, but also learn the culture, policies, language, jurisdictions, procedures, and constraints that govern each system with which they interact.

Understanding Complexity

The complexity of trauma symptoms emanates not just from the number of different pre- and post-factor adversities a child or family faces, but how they interact with each other and the traumatic event. For instance, the meaning a child makes of a trauma will be influenced by the event as well as the child's cognitive capacities, developmental age, input from others, previous experiences of adversity and lessons learned from them, and other circumstances that predispose the child to think one way or another. Emotional and behavioral reactions derive from the experience of stress, fear, and overwhelm combined with the child's capacities, sources of support, and compensatory coping strategies. When symptoms have multifaceted roots, addressing the symptoms that result from trauma, but not the other pieces, may not always be sufficient for sustained improvement.

Which intersecting components affect treatment success, and which do not, remains under researched. For instance, executive functioning difficulties have been shown to be a barrier to treatment completion and response (Colvonen et al., 2017), as well as ethnicity (Eslinger et al., 2014), while limited evidence exists on the differential effect of gender (Ascienzo et al., 2021) and many other variables discussed here. More study is needed to determine how different combinations of factors affect response to different treatments and dosings.

Addressing Multiple Treatment Goals

One of the key outstanding questions involves how multiple treatment goals can best be met. Phased treatment approaches that prioritize safety, skill building, and symptom reduction before helping clients process trauma have been recommended by some (Cloitre, 2015; Cohen et al., 2016), while others argue that instituting phase-based treatments could result in unnecessary delays in processing trauma, which also decreases emotional dysregulation (de Jongh et al., 2016). The model proposed here helps clinicians investigate and sort out when emotion dysregulation results from trauma and when it also derives from other factors, thus easing determination of when a stabilization phase prior to treatment would be helpful and when it not.

Trauma symptoms derive from and constantly interact with multiple elements in a child's life, which can either ease or complicate their effects. For children with few impeding pre-trauma or post-trauma factors, and who experienced a single incident trauma, directed, short-term, focused interventions will likely suffice. For others, short-term treatments are unlikely to be sufficient. When clients suffer from multiple complicating factors and adversities, long-term and multifaceted therapy is generally required, of which trauma treatment is just one component.

Karatzias and Cloitre (2019) have suggested a flexible modular approach to treatment for complex trauma, in which treatments could be prioritized according to need. The analysis offered here would support such an approach for children showing complicated symptoms and circumstances and further points to the different types of modules that could be constructed. In fact, a flexible modular approach may be an especially helpful framework for assessing and treating children. Since children mature and gain new skills throughout their development, which affect their understanding and ability to utilize different interventions, some children with complex needs and comorbidities would benefit from modules that could be updated and repeated as they mature and gain the ability to use skills and information in fuller ways.

Once clinicians gain a sense of how trauma interacts with other circumstances and comorbidities that impact the severity of symptoms and their relief, they can choose and utilize interventions or modules more effectively. Factors that interfere with the processing of trauma can be either prioritized prior to trauma treatment, addressed comorbidly, or taken into account in modifying treatments. For instance, when the processing of trauma is likely to overwhelm the child's ability to cope or understand components of the treatment, executive functioning and self-regulation difficulties may need to be addressed prior to the onset of trauma interventions. For children with advanced verbal understanding but deficits in other cognitive areas, executive functioning could be addressed simultaneously either by another provider or through intermixing trauma treatments with tools that help increase self-control. Families or children undergoing numerous other stressors, such as poverty, discrimination, or unsafe neighborhoods would also require interventions that help decrease those stressors and improve their safety, security, and social supports. For those who continue to live in unsafe circumstances, acknowledgement needs to be made that posttraumatic symptoms such as hypervigilance are adaptive and may continue to be necessary for survival. Many other iterations of the data presented in this model can also be used to generate a unique set of goals and interventions.

Creation of New Treatment Approaches

A better sense of who may be at risk for developing PTSD and the factors contributing to the severity of symptoms and ability to cope can also form the basis of new approaches to treatment. As research into pre-trauma vulnerabilities increases, so do opportunities to develop risk prediction tools and preventative interventions for those more likely to experience severe outcomes. Youth with pre-existing emotional and executive functioning difficulties, maladaptive cognitive appraisals, and fewer sources of support should be prioritized for monitoring and intervention (Goslin et al.,

2013; Hiller et al., 2021; Horn et al., 2018). The development of biomarkers for genetic and epigenetic precursors would also help clinicians identify underlying vulnerabilities and could lead to treatments that are matched to children's specific needs (Howie et al., 2019). Given that most children exposed to trauma recover spontaneously, current demand for psychotherapy exceeds supply, and early intervention can often prevent complications, knowing to whom and how to direct therapeutic resources is important (Alisic et al., 2014).

Research on biomarkers may also eventually be able to inform who might respond best to evidence-based therapies and who may require additional interventions. In a systematic review of studies that examined pretreatment biomarkers and PTSD psychotherapy outcomes, Colvonen et al. (2017) found preliminary evidence that brain activity and structures, as well as genetics, were linked with response to EMDR, CBT, and exposure therapies. While the reviewed studies were small in size, studied adult victims of varying types of traumas, and examined different brain structures and activities using different methodologies, which limits their generalizability to children, a few prominent findings emerged. Individuals with more pretreatment volume, density, and/or activity in brain areas that help with processing, learning, and inhibition (i.e., the anterior cingulate cortex, prefrontal cortex, parahippocampus, and left inferior parietal lobe) benefited more robustly from treatment. Those who showed higher pretreatment activation of the amygdala (which detects and processes fearful and threatening stimuli), neuroendocrine or genetic markers of HPA sensitivity, and smaller left hippocampal volume (which consolidates memory), responded less well to treatment. The findings suggest that those who begin treatment with better abilities to inhibit, exert emotional control, and encode new cognitive and emotional responses will perform better at therapies aimed at cognitive restructuring and the processing, interpretation, and extinction of emotional memories. Matching client's needs and vulnerabilities with interventions that take advantage of an individuals' pre-existing assets, strengthen areas of weakness, and dose interventions in accordance with a client's capacities could be one outcome of biomarker research.

Biomarkers, along with a solid assessment of individuals' pre- and post-trauma vulnerabilities and strengths lend themselves to a precision medicine approach in which not just symptoms, but capacities and resources are considered in crafting interventions. Bryant (2021) has called for such an approach:

> Trauma survivors with re-experiencing symptoms may be provided with emotional processing strategies (e.g., imaginal exposure), avoidance with in vivo exposure, depressive symptoms with behavioural activation, rumination with mindfulness, over-general memory with memory specificity training, and anhedonia with positive affect training. (p. 10)

In a precision medicine approach, interventions would be determined according to a person's specific symptoms, genes, environment, and lifestyle.

Limitations and Further Directions

Many different factors contribute to how children and families experience and recover from trauma, as well as the salience of each. While the model presented here begins to sort out those factors and their interactions, it cannot address every iteration or potential contributor. Many more factors likely exist than have been identified here or by current research studies. In addition, while this model can guide clinicians in conducting fuller assessments and selecting more comprehensive treatments, it cannot insure a perfect match between a child or family and a specific mix of interventions. There are simply too many factors that influence clients' responses to psychotherapy, and many of them have yet to be fully studied.

To better sort out the various factors, research on interventions should strive to look at a wider breadth of pre- and post-trauma factors and how they impact a child's symptoms and responses to treatment. Clinical research should explore how interweaving current trauma treatments with other interventions impact a child's symptoms and recovery and whether they improve upon current outcomes. Longitudinal studies that trace children with various comorbidities, how they react to different treatments and treatment lengths, and for how long they sustain gains would be important for informing clinical practices. Continued biomarker discovery could also help pinpoint who benefits most from different aspects of current treatments and spur the creation of new interventions that target areas not yet adequately covered.

Conclusion

In popular vernaculars, it is said that trauma-informed practices have switched the narrative from insinuating, "What's wrong with you?" to "What happened to you?" While the newer question rightly focuses on the validation and understanding of traumas, it may not be sufficient to forming a complete understanding of trauma's effects. The exposure to trauma, itself, may have less impact on a child's symptoms, reactions, and recovery than other pre- and post-trauma circumstances and factors affecting children, their families, and communities (Danese et al., 2017; Koponen et al., 2009). As such, the assessment and integration of more contextual factors into treatment protocols is essential. More attention

to pre- and post-trauma factors will not only improve the delivery of current treatments, but also help pinpoint what types of innovative additions or modifications are necessary and spur their creation. The model proposed here provides a framework for undertaking that work and suggests that the most important question for deeper and more comprehensive clinical work is not "What happened to you?" but "How did the trauma affect you, your family, and community?" To answer that question accurately, the role of pre- and post-trauma factors must be recognized and incorporated into research, assessment, and treatment.

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