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CASE STUDY

The Boy Who Was Hit in the Face: Somatic Regulation and Processing of Preverbal Complex Trauma

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Abstract Examination of novel treatment for complexly traumatized youth, in particular, those exposed to preverbal trauma, is necessary given challenges associated with effective intervention for this population. Therapies that facilitate somatic regulation have demonstrated benefit for some trauma survivors. The current article briefly reviews the emerging literature on symptoms of and treatments for complex and preverbal child trauma and describes Sensory Motor Arousal Regulation Therapy (SMART), an intervention for child and adolescent trauma with preliminary empirical support. SMART aims to enhance sensory motor engagement and promote affective, behavioral and physiological regulation using somatic regulation and sensory integration techniques. Utilizing case study methodology, the article illustrates application of SMART in treatment of a latency-aged child with history of exposure to complex and preverbal traumatic experiences. Case analysis suggests the potential contribution of enhanced somatic regulation in traumatized children toward increased relational engagement, behavioral and emotional regulation, and trauma processing.

Keywords Child traumatic stress · Treatment · Somatic regulation · Trauma processing · Preverbal trauma · Complex trauma · Evidence-based practice

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In line with research suggesting poor prognosis for young traumatized children receiving community mental health care, the current literature on best practices for the treatment of this population is limited (De Young et al. 2011; Scheeringa et al. 2005). Indeed, this population is particularly difficult to treat given the myriad difficulties associated with early and complex trauma. Whereas thorough overviews of the outcomes associated with complex childhood trauma have been provided elsewhere (c.f., Briere and Scott 2015; Cook et al. 2005 for detailed reviews), we will briefly outline common areas of impairment associated with complex trauma, with an emphasis on the ways in which complex trauma impact somatic systems of regulation. Subsequently, we will provide a concise review of literature on effective treatments for youth impacted by complex trauma, and describe a novel treatment for this population with preliminary empirical support (Sensory Motor Arousal Regulation Treatment; Warner et al. 2013, 2014).

A case study methodology is utilized to illustrate implementation of this model in treatment with a latency-aged youth with history of complex, preverbal trauma. Through detailed case analysis, we examine the utility of this intervention toward promotion of affective, behavioral and physiological regulation. Finally, on the basis of clinical outcomes observed in this case,representative of numerous other cases receiving treatment at our clinic and in other practice settings under our ongoing supervision, we raise questions about the potential for improved somatic regulation to have a direct or mediating effect on the capacity for and onset of trauma processing in previously treatment-resistant, complexly traumatized children, including those with histories of exposure to preverbal trauma.

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Effects of Complex Childhood Trauma

Early trauma experiences stemming from caregiver neglect, abuse and/or impairments in attachment frequently disrupt normal development of emotion and behavior regulation (Cloitre et al. 2009; Ehring and Quack 2010). Given the inability of very young children to modulate their own arousal, when caregivers cause distress, or neglect to modulate their children's reactions to stress, children become unable to organize their experiences in a coherent fashion (van der Kolk 2005). Poorly regulated affect is reflected in a number of commonly exhibited behaviors of maltreated children, including aggressiveness against oneself (e.g., self-mutilation, head banging) and others, distrust of others, dissociative behaviors, attention and concentration difficulties, mood swings, and impulsivity (Cullerton-Sen et al. 2008; De Sanctis et al. 2008; Glassman et al. 2007; Price et al. 2013). The absence of affect regulation by caregivers can result in the child's misunderstandings of internal states of the self and others, and subsequent difficulties in forming and sustaining relationship (Cotraccia 2015; Johnson et al. 2002).

Ineffective and problematic behaviors are frequently exhibited by children with early traumatic experiences (Cook et al. 2005; Van der Hart et al. 2005; van der Kolk 2005). Both under-controlled and over-controlled behaviors are characteristic responses (Cook et al. 2005). For instance, children may exhibit rigidly controlled behavior patterns such as inflexible rituals, compulsive compliance with requests from adults, and rigidly controlled eating habits (Johnson et al. 2002; Lochner et al. 2002; Spinazzola et al. 2005).

Children may also engage in behavioral reenactments of their traumatic experience through aggression (Cullerton-Sen et al. 2008), sexualized behaviors (Kendall-Tackett et al. 1993), self-injurious behaviors (Noll et al. 2003), and frozen avoidance reactions (e.g., dissociation; Macfie et al. 2001). Such re-experiencing acts can be understood as efforts to gain a sense of mastery, reactions to reminders, attempts to achieve acceptance and intimacy, and avoidance of intolerable levels of emotional arousal (Ehlers et al. 2004; Terr 1990). Reenactments are often exhibited by children traumatized during the preverbal stage of development and can indicate an effort to communicate experience without the tool of language. Moreover, reenactment behaviors can be extremely persistent and enduring, especially if the individual is unaware of its origins (Gaensbauer 2002).

Effects of Complex Trauma on Somatic and Biological Systems

Somatic distress is common in traumatized children and has been found to be associated with traumatic experiences as early as the first days of life (Gaensbauer 2002). Somatic dysregulation can manifest in a variety of common complaints such as headaches and stomachaches, chronic health problems (e.g., asthma, eczema), and difficulty recognizing somatic signals for basic functions such as thirst, hunger, the need to eliminate, or fatigue (Streeck-Fischer and van der Kolk 2000). Somatic difficulties are related to a number of factors including: the time at which the trauma(s) occurred (e.g., preverbal stage of development), the type of trauma experienced (e.g., physical, sexual abuse, witnessing domestic violence, neglect), or the nature of the individual's memory of the event (i.e., explicit or implict) (Gaensbauer 2002; Herman 1992; Van der Hart et al. 2005) Frequently, neglect of the basic needs of the infant and young child for co-regulation by the caregiver is a sufficient condition for later somatic dysregulation and symptoms (Tronick 2007).

Traumatic re-experiences are often somatosensory in nature and the dissociation between the body and mind that may occur in experiences of trauma may manifest itself in somatic problems. Current neuroscientific inquiry into early hippocampal development is beginning to detect evidence for this form of latent infantile memory encoding which influences later behavior and suggests that the so-called infantile amnesia (i.e., the loss of episodic memories from the early postnatal period) does not sufficiently reflect early memory processes (Travaglia et al. 2016). Children with such symptoms often fail to attribute their somatic distress to the traumatic experience (Chu et al. 1999; Macfie et al. 2001), however, verbal naming or narrative processing may come later in those cases. Somatic numbing and memories are also related to the intrusive and hyperaroused symptomology associated with post-trauma reactions (Herman 1992; van der Kolk et al. 1996). Research findings indicate that somatization symptoms are highly comorbid with posttraumatic symptoms (Andreski et al. 1998; Hoge et al. 2007; Van Ommeren et al. 2002) and complex posttraumatic symptoms (Spitzer et al. 2009).

Complex trauma can impede development to a great extent due to the effects it has on the developing brain and body (Nelson et al. 2011; Teicher and Samson 2016). In infancy, trauma-related distress is exhibited in sensorimotor disorganization and disruption of biological rhythms such as prolonged crying, muscular flailing, and unresponsiveness to soothing (Lieberman and Knorr 2007; Papousek and von Hofacker 1998). In toddlers and children, complex trauma can result in the failure to develop the brain capacities necessary for modulating stress responses, inhibiting impulses, and selective attention (Becker-Weidman 2009; Pine et al. 2005). In middle childhood and adolescence, the areas of the brain responsible for executive functioning (e.g., prefrontal cortex) are developing, and thus impediments to development impair areas of the brain associated with engagement with others, self-awareness, understanding of complex emotions, and

social and behavioral learning abilities (Hart and Rubia 2012; Nelson et al. 2011). The biological and neurological impairments associated with trauma vary, depending on the developmental stage of the victim, type of traumatic exposures, and the sensitive periods of particular brain structures (Khan et al. 2015). Finally, early trauma experiences are predictive of poor physical health later in life (Felitti et al. 1998; Springer et al. 2007).

Therapy for Complex Childhood Trauma

Emerging literature, based on treatment for complex trauma, provides empirical support for a variety of treatment modalities for this population (Cotraccia 2015). For instance, Attachment, Regulation and Competency (ARC) is an evidence-based treatment framework for the treatment of youth who have experienced complex trauma (Blaustein and Kinniburgh 2010). ARC addresses multiple domains of impairment associated with complex symptomatology. Specifically, ARC seeks to address three core components of complex trauma treatment for youth including 1) attachment systems (e.g., increasing caregiver attunement), 2) self-regulation (e.g., enhancing skills for affect regulation), and 3) competency building (e.g., improving executive functioning skills and self-identity). In addition, ARC involves trauma processing techniques to facilitate the integration of traumatic events with one's overall life narrative. Emerging empirical evidence suggests that ARC is effective in the reduction of PTSD symptoms, internalizing difficulties, and externalizing behaviors in youth in diverse treatment settings (e.g., residential, outpatient; Arvidson et al. 2011; Hodgdon et al. 2016, 2013; IFCMARCO 2010).

Like ARC, Child Parent Psychotherapy (CPP) emphasizes the importance of caregiver-child relationships in the context of complex trauma (Lieberman et al. 2005). The psychodynamically-based intervention seeks to 1) help parents and children create a narrative of what has happened, 2) increase regulation that was disrupted due to the trauma(s), 3) enhance parental responsiveness to foster nurturance and socialization, and 4) restore trust in the caregiving relationship (Lieberman and Van Horn 2009). CPP been shown to be effective for very young children, including infants in the child protective system (Cicchetti et al. 2006), anxiously attached toddlers of low income Latina mothers (Lieberman et al. 1991), maltreated preschoolers (Toth et al. 2002), and preschoolers exposed to domestic violence and other violence (Lieberman et al. 2005). Despite these robust findings, CPP has not been designed to help older children work through the effects of early and preverbal trauma.

Treatment modalities with preliminary empirical support for older traumatized children (e.g., adolescents) include group treatments such as Structured Psychotherapy for Adolescents Responding to Chronic Stress (SPARCS; DeRosa and Pelcovitz 2009; Habib et al. 2013) and Trauma Affect Regulation-Guide for Education and Therapy (TARGET; Ford and Hawke 2012; Ford et al. 2012). Individual treatments for youth survivors of complex trauma include multicomponent treatments such as the integrative treatment of complex trauma (ITCT), which has separate intervention packages for children and adolescents (Briere and Lanktree 2008), Real Life Heroes (RLH; Kagan 2009), and Trauma Systems Therapy (TST; Ellis et al. 2012). Finally, Trauma-focused Cognitive Behavioral Therapy (TF-CBT) is considered the most empirically supported treatment for childhood trauma experiences, and is the most widely implemented for the treatment of childhood posttraumatic stress disorder (PTSD) (De Young et al. 2011). Though it is designed to treat PTSD specifically, it has also been shown to be effective for complexly traumatized children (Cohen et al. 2012), child sexual abuse survivors (Deblinger et al. 2001), and children who have experienced a variety of both acute and chronic repeated traumas (Scheeringa et al. 2011).

Despite these promising results, it is important to note that TF-CBT may not be appropriate for children with limited expressive and receptive language skills given its reliance on verbal processing, as well as the linguistic and cognitive impairments related to early trauma exposure (Pears and Fisher 2005; Spratt et al. 2012). For traumatized youth who have developed sufficient language skills, it is possible that somatic dysregulation prevents them from accessing the cognitive skills necessary to engage in verbal treatment (Warner et al. 2013). As such, it may be that for some populations (e.g., trauma survivors with significant somatic difficulties), somatic regulation must be developed prior to the commencement of interventions involving verbal processing.

Play Therapy and Psychoanalytic Treatment Approaches for Preverbal Trauma

There is a small but significant literature base endorsing the use of play therapy for the treatment of sequelae associated with preverbal trauma (Gil 1991; Green et al. 2010). Existing research suggests that play therapy is advantageous for children with a wide variety of mental health difficulties (c.f., Bratton et al. 2005 for a meta-analytic review). However, very few studies have empirically examined the effectiveness of play therapy for traumatized children. One study indicated that maltreated preschoolers who completed time-limited play therapy did not significantly differ on any outcomes compared to the control group at 10-week follow up (Reams and Friedrich 1994). In contrast, a study of sexually abused girls indicated that psychoanalytic psychotherapy resulted in significant reductions in PTSD symptoms (Trowell et al. 2002), and improvements in child behaviors were found in a similar

study comparing psychodynamic therapy and behavioral reinforcement therapy in a sample of sexually abused children (Downing et al. 1988).

Despite the limited research base, experts in the field suggest that nonverbal and expressive therapies (e.g., play therapy) may be most beneficial for children with early trauma histories (Green et al. 2010). This assertion is partially based on research suggesting that preverbal traumas are encoded in the subcortical memory, and thus, may be stored in the right hemisphere (Kaplow et al. 2006). Nonverbal treatment is suggested to be advantageous given traumatized children's tendencies to reenact trauma experiences through behaviors (e.g., habitual and sporadic body movements; Norton et al. 2011). Proponents of play therapy for young traumatized children argue that it provides a safe environment in which children can re-experience and reenact trauma such that preverbal memory is translated to behavioral enactment, which will subsequently lead to emotional processing under the supervision and guidance of a play therapist (Green et al. 2010).

Norton et al. (2011) highlighted the various somatic triggers (e.g., sensory experiences) and reenactments (e.g., through behavior or in symbolic play) experienced by child trauma survivors and the tendency for re-experiencing to be obsessively repeated in therapy and other settings (e.g., home, school). Play therapy experts highlight the importance of careful monitoring of reenactment by the therapist, as well as the role of "soothing" and "attuned somatic reflections" (i.e., the use of somatic language) which are theorized to help the child regain control over their bodies after distressing reenactments (Norton et al. 2011; Schore 2010). However, specific interventions aimed at increasing somatic regulation are not provided in play therapy literature. In contrast, play therapists argue that children must reenact and re-experience trauma in a safe and therapeutic environment multiple times before they are able to integrate their experiences, which is hypothesized to coincide with a decrease in trauma symptoms (Norton et al. 2011). While these authors acknowledge that severely traumatized children may go through this process several times without relief (i.e., a looping pattern) before gaining ownership of their body, clinical observations by the current authors suggest that additional interventions are needed for some children (e.g., those who have experienced significant preverbal trauma) to interrupt the looping pattern.

The Role of Somatic Regulation in the Treatment of Preverbal Trauma

The multiple somatic problems experienced by traumatized children and adults, as well as the sensory nature of many triggers to flashbacks, re-experiencing, and reenactments, highlight the centrality of somatic regulation in posttraumatic sequelae and treatment. Van der Kolk (2014) emphasizes the importance of somatically oriented therapies, as feelings of safety and control are enhanced by developing a sense of mastery over one's body. By definition, a somatic intervention does not require verbal expression by the client, involves a movement-based activity, and may build interoception (i.e. awareness of internal bodily experience) through the use of improved self-regulation (Warner et al. 2014). For instance, anecdotal evidence and theoretical literature suggests that dance/movement therapies aid in healing from trauma in youth (Harris 2007; Pierce 2014).

Despite significant literature stating that somatic dysregulation is an outcome of preverbal traumatic experiences (Cook et al. 2005; Van der Hart et al. 1989, 2005), few treatments are designed to target somatic symptoms, and few studies have examined somatic symptoms as outcomes (c.f. exceptions including Langmuir et al. 2012; Price 2007). Recent research on treatment for adult survivors of trauma suggests that body-focused treatments such as yoga (Jindani et al. 2015; Johnston et al. 2015; van der Kolk et al. 2014), sports therapy (Ratey 2008), acupuncture (Hollifield et al. 2007; World Health Organization 2003), sensorimotor psychotherapy (Langmuir et al. 2012), and sensory integration (Kaiser et al. 2010) are effective for treating posttraumatic symptoms. Notably, however, very few studies examine the effectiveness of such treatment practices for youth, though some preliminary examinations exist (e.g., Spinazzola et al. 2011). Treatment experts have also endorsed the utility of somatic interventions for PTSD. For example, the ISTSS treatment guidelines for adults with PTSD highlight the potential contribution of non-verbal treatment techniques (e.g., art therapy), despite the lack of empirical examination of such interventions (Foa et al. 2008).

Sensory Motor Arousal Regulation Treatment (SMART)

Within the corpus of trauma treatment literature, significant contributions have been made for treating somatic dysregulation, in particular as it relates to reworking and resolution of traumatic re-experiencing and reenactments in adults. Treatment methods such as Sensorimotor Psychotherapy (Ogden et al. 2006) and Somatic Experiencing (Levine 2010) have been developed and applied primarily to adult psychotherapy clients to address and transform, for example, the repetition of helpless response patterns emanating from the traumatic experience. Sensory Motor Arousal Regulation Treatment (SMART; Warner et al. 2013) aligns with these adult somatically based treatments, although it was designed for children and youth, with histories of multiple traumas in the context of caregiver relationships.

The primary mechanism of action in SMART is the improvement of somatic regulation through full engagement of the body, known as "embodied play". With facilitation of a trained therapist, and the opportunity for engagement at the level of the whole body, somatic regulation is more readily

achieved. Frequently, with this improved regulation, the child spontaneously engages in trauma processing in the form of new action patterns, games or dramatic play with the therapist. This trauma processing play is characterized by engagement of the whole self of the child and the therapist - body and mind, hence, the terminology, embodied play and embodied dramatic play. When such actions, games or dramatic play are reviewed by practitioners (using videotape), representations of the preverbal trauma are evident to viewers, as the case study will illustrate.

SMART's initial aim is to help traumatized children and youth regulate arousal, improve their body awareness, and ultimately, 'befriend' their body. The treatment accomplishes these goals by permitting full sensory motor engagement through play with equipment such as crash pads, mini-trampolines, tunnels, and weighted blankets. This approach was adapted from Sensory Integration, an occupational therapy approach that specializes in understanding and working with sensory-seeking and sensory-avoiding behavior in children with Sensory Processing Disorders (Ayres and Robbins 2005; Ayres 1972; Koomar and Bundy 2002; Miller and Summers 2001). SMART focuses on the movement senses (i.e., vestibular, proprioceptive, and/or tactile systems) in order to engage the whole body and achieve arousal, i.e. physiological, regulation.

Traumatized children can be observed seeking various kinds of sensory motor inputs to the movement senses. When working well together, these sensory systems, along with the visual system, organize the body and mind to provide information about orientation in time and space. When these systems do not work well together, a sense of disorientation, dissociation of bodily experience, or fragmentation of experience can occur (Ionta et al. 2011, 2013; Lenggenhager et al. 2006). When the therapist attunes to and supports this sensory seeking behavior, children may reach "sensory satiation." Koomar said that *sensory satiation* occurs when a child can access sufficient sensory experiences in intensity, duration, and/or frequency to meet neurological needs, which results in more flexible emotional, cognitive, and motoric responses (Warner et al. 2010).

As a result of sensory satiation and ensuing behavioral regulation and organization, the preverbal traumatic experience often emerges in a variety of organized and more accessible forms, including non-verbal client-initiated actions, games and/or dramatic play. The trauma games such as exemplified in this case are also fully embodied, meaning that the child's entire body is engaged in the play. In addition, when the child is physiologically regulated, the play also includes more engagement with the therapist, and often shows increased language and cognitive content. Embodied games may be familiar, such as Hide-and-seek, Monkey-in-the-middle, or dodgeball. They may also be unique to the client, as illustrated in this case illustration.. Verbal expression of a narrative may emerge from the play with the therapist, but processing first occurs at a non-verbal, embodied level (i.e. through full participation in the play).

SMART also aims to improve attachment security through the involvement of caregivers. Child and adolescent clients often request caregiver participation when they are fully engaged in satisfying sensory motor regulation play.. The invitations to caregiver(s) can be interpreted as the child wanting the caregiver to develop a non-verbal understanding of the child's traumatic experiences. Once the therapist understands the nature of the embodied play, she can support the caregiver(s) in successful engagement with the child's play. The current case study illustrates the nature of embodied trauma processing resulting from SMART methods, as well as the involvement of caregivers in a game which promotes both relational engagement and the apparent processing of their son's preverbal trauma through physical interaction and cooperative movement.

There is growing empirical support for the utility of SMART for traumatized youth. For instance, a quasi-experimental study provided initial support for SMART as a potentially effective treatment for the reduction of internalizing and somatic symptoms, as well as anxious/depressed symptoms, in adolescents with complex trauma histories in residential treatment (Warner et al. 2014). SMART was added to the National Registry of Evidence-Based and Promising Practices (SAMSHA-NREPP 2016) (http://nrepp.samhsa.gov/ProgramProfile.aspx?id=133#show3) as a program with promising outcomes.

The following case study is based on an actual client, treated in a trauma-specialty, outpatient clinic located in a Northeastern metropolitan area within the United States. As this is not a composite case description, the identifying characteristics of the client were modified to protect confidentiality. Parental consent was obtained and all agency Institutional Review Board procedures were followed. While the particular trauma experiences of the client in the current case study are unique, this case was selected as it is determined to be a representative example of the type of trauma history, presenting problems, and subsequent treatment responses observed in numerous children with histories of complex trauma at the clinic. This case is also consistent with those discussed in the agency's supervisory and consultation practices with providers utilizing this model in community practice, school-based treatment, and residential settings throughout the United States.

Case Study

Eliot's Story

Eliot was seven years old when his adoptive parents sought treatment for him at the outpatient clinic to address chronic

emotional and behavioral dysregulation exhibited since he was first placed in their home at age three. Eliot's parents reported that he would "rage and tantrum" for hours at a time, was unable to verbalize his needs, and responded to soothing or problem solving by yelling, biting, hitting, and scratching. He became particularly reactive and aggressive prior to having a bowel movement, or when his face or head were touched. Eliot was triggered by direct eye contact, and was fearful of pictures of faces hanging on the walls, which he said were "looking at" him. As such, his parents had to remove portraits and photographs from the walls of their home.

Conversations with Eliot's parents and a review of case records from the state department of child protective services indicated a complex history of traumatic experiences from birth to age three, including exposure to domestic violence, chronic neglect, physical abuse and repeated removals from primary caregivers at three months, twenty-two months and three years of age. Notably, Eliot experienced several physical traumas to his head and face throughout the course of his early development. His birth was significant for "facial bruising" sustained during delivery. Eliot's father reportedly rubbed soiled diapers in his face during toilet training, and at age three, his father's partner struck Eliot in the face while in a public setting. This final incident resulted in Eliot's permanent removal and subsequent adoption.

Treatment Begins

Upon transition to his adoptive home, Eliot's parents sought outpatient treatment services to address behavioral dysregulation and attachment concerns. The family tried several treatment modalities including a behavioral "time out" program, holding therapy, traditional child-directed play therapy, and cognitive-behavioral interventions. According to Eliot's parents, use of time out and holding interventions exacerbated Eliot's aggressive behaviors, while play therapy and cognitive behavioral strategies failed to help him effectively regulate aggressive behaviors outside of the therapy office. By the time Eliot was seven years old, his parents expressed feeling fearful for his and their safety, and voiced concern that Eliot might require institutional care.

Eliot's parent contacted our trauma specialty clinic with the hope that addressing his early traumatic exposures would decrease Eliot's level of aggression and improve family life. Treatment was scheduled on a weekly basis and incorporated a combination of individual therapy, family therapy, and parent consultation utilizing the ARC Framework (Blaustein and Kinniburgh 2010). For the first two and a half months of treatment, Eliot and his family met in a traditional child therapy office within the clinic. Eliot typically engaged in treatment by using symbolic play with repetitive narratives in which stuffed animals were physically or emotionally hurt, sought affection (e.g., hugs), and reacted to affection with aggression. During this play, Eliot was unresponsive to therapeutic intervention (e.g., the therapist using "a helper animal" to provide validation, support, safety, or containment) and resisted engagement or support.

During family sessions, Eliot and his adoptive parents were able to engage in work focused on affect identification and regulation (e.g., using body mapping, feelings thermometers, coping and relaxation skills). At home, however, Eliot continued to exhibit high levels of aggression in response to basic limits and routines, occasionally leaving bite marks and bruising on his parents' arms. It was clear that these incidents had a strong negative impact on Eliot's sense of self, as he began drawing pictures of himself crying with captions such as "Stay away from me, I hurt my [parents]!" and expressing that he "wanted to die." After nine weeks utilizing symbolic play and cognitively focused techniques as the primary focus of treatment, the therapist determined that the family required an alternative approach.

Introduction to SMART

The SMART treatment model was introduced to the family on the tenth session with the goal of increasing Eliot's capacity for regulation through a focus on his body and present moment experiences. The therapist hypothesized that, given Eliot's age at the time of traumatic exposure, his brain had primarily encoded information through sensory and attachment experiences, rather than through symbolic meaning-making or higher order cognitive thought processes. SMART was chosen as an intervention because the method focuses on supporting regulation through movement, does not rely on language as an entry point, and allows for the integration of affect and behavior through fully embodied play. The following case study example represents Eliot's sixth session in the SMART room, and illustrates the interplay between embodied regulation work and trauma processing.

Eliot's presentation upon entering the SMART room was notable for a lack of vitality and agency. He shuffled slowly into the room, passively fell against an inflatable cushion, and allowed his face and torso to hit rhythmically into the cushion, while his arms hung limply at his sides. His affect was flat, and when asked how he was feeling, he replied "good" in a monotone voice. Eliot became more engaged when the therapist inquired about a bag containing stuffed animals he had brought from home. Using cushions and mats available in the room, Eliot built a soft play space and then began symbolic play with his stuffed animal "family." Themes of aggression spontaneously emerged as Eliot made one animal punch the other's face. He said that this family had "lost their mom and dad" and his symbolic play communicated themes of threat, deprivation, and a need to fight and steal to survive. As observed in the traditional therapy office, Eliot became increasingly unresponsive to the therapist's words as he shared this

trauma narrative through this displaced, but repetitive symbolic play that lacked resolution.

A Body Based Approach to Regulation

In an effort to help Eliot move out of this dysregulated state, the therapist initiated a somatic intervention focused on working with sensory motor inputs and postural shifts. To interrupt the repetitive cycle of the play, the therapist stood up and suggested that they "do something to help the animals with their hurt feelings." This intervention created a sudden shift in Eliot's attentional state, evident when he stopped the play, stood up, and followed the therapist across the room. With curiosity, Eliot noticed a trampoline in the room and spontaneously made his stuffed animals bounce and dance on the trampoline. Observing that Eliot's play now appeared slightly more organized, the therapist followed Eliot's lead and mirrored the animals' movements in an embodied way (i.e. by physically joining the dance). Hypothesizing that the animals' dance on the trampoline may be an indicator of Eliot's own need for regulation, the therapist invited him to join his animals, and he immediately responded by jumping with vitality. The goal of this intervention was to facilitate somatic regulation and increase Eliot's tolerance for co-regulation through engagement with an adult caregiver.

After several minutes of jumping, Eliot showed signs of seeking a new sensory input. He began throwing his animals into large cushions, and followed the action by jumping into the cushions himself. Eliot came to rest on the ground and pulled a large cushion on top of his body. The therapist observed that his body might be seeking deep pressure (i.e., tactile input), which often calms arousal. The therapist asked if Eliot would like additional pillows piled on top of his body, and he enthusiastically consented: "Start piling!" To support collaboration and attunement, the therapist verbally narrated and checked in prior to increasing deep pressure input (adding cushions or mats). The therapist also invited Eliot to check in with his body after each new item was added (e.g., "I am adding another mat. Is this enough or do you want more?") in order to build his capacity to attune to his own experience, express his needs to another, and to experience his needs being accurately met. Eliot responded to each invitation to check in with his body by calling out for "more!" or "a lot more!" tactile pressure.

After receiving his desired intensity of pressure, Eliot announced, "I'm going to try and break out." Using his arms and legs, Eliot squeezed his way out from between the cushions and mats, and then "rescued" his stuffed animals. After fully completing this action, Eliot let out a deep sigh and said that his body felt "awesome," suggesting that sensory satiation had been achieved.

After this intervention, Eliot began to move about the room with more agency. As he threw a ball at a target in the room, he successfully modulated the speed and force to ensure greater accuracy. His body appeared better coordinated and well integrated. As his level of behavioral regulation increased, he began verbally describing arguments he had at home with his parents stating, "They don't believe me." He also identified affect, saying he felt "sad" following these arguments. Eliot exhibited more social engagement and verbalization of experience as he worked with the therapist to repair a broken object in the room and discuss family arguments that had been occurring at home.

The Spiral of Regulation and Embodied Trauma Processing

Following this discussion, the therapist observed Eliot struggle to consistently hit a small ball into the air with his hands, and invited him to try the same movement with a larger ball in the room. He energetically agreed, and while the therapist held the ball in the air, Eliot spontaneously hit his face into the ball, fell to the floor, and stated, "Go!" He then directed the therapist to, "Throw the ball at my face." The therapist paused, knowing that his face was a particularly sensitive area and asked, "Do you mean a head butt?" Eliot answered affirmatively and physically demonstrated a plan to sit up and head butt the ball away. Eliot's eye contact communicated an eagerness and determination to try this action, and the therapist decided to follow his lead. When the therapist released the ball, Eliot lifted his head slightly and allowed the ball to hit him squarely on the face. The therapist checked to determine if Eliot was okay, to which he responded, "That was fun!"

Eliot promptly lied back down and asked the therapist to repeat the action. Although hesitant, the therapist assessed that Eliot was smiling, making good eye contact, and appeared to want the therapist to collaborate in this exploratory process. Deciding to follow Eliot's lead, the therapist tossed the ball a second time, and Eliot allowed the ball to hit him directly in the face once again, but quickly returned the ball to repeat the sequence. The therapist observed that Eliot's present social engagement, playfulness and curiosity were markedly different than the disconnected and dissociative presentation during the displaced symbolic (stuffed animal) play of his trauma narrative. However, the therapist made an internal choice to end the activity if Eliot did not make any effort to protect his face with the next toss of the ball.

On the third toss, Eliot used his hands to successfully push the ball away from his face, hitting it in the air several times and laughing. He asked the therapist to repeat this action several more times, and he experimented with different responses to each ball toss: catching the ball, punching the ball away, kicking the ball away, and rolling on the ground in several different directions to dodge the ball. It became clear to the therapist that Eliot was exploring a variety of defensive and

self-protective responses that had not been possible when he was hit in the face as a toddler.

As Eliot mastered each action, he spontaneously increased the level of challenge, directing the therapist to "throw two balls at me." With a huge smile on his face, Eliot skillfully dodged both balls, jumped to his feet and vigorously bounced the ball until it reached a height where he could independently head butt it back to the therapist. He also embodied a powerful, balanced "boxer" position and explored using his head, arms and chest to punch, head butt, and push away each ball toss with greater vitality, attention and mastery. The therapist perceived Eliot's embodied play to progress from the state of a vulnerable infant without methods of self-protection, to a young child mastering and protecting his body, and finally, to a strong, well-coordinated and empowered seven-year-old boy effectively taking action in his world.

Deepening Embodied Trauma Processing through Inclusion of the Caregiver

After achieving a well-regulated and capable self-state, the therapist asked Eliot if he would like his parents to join for the final fifteen minutes of session to share what he had been working on. Eliot enthusiastically agreed, and responded to his parents' inquiries about the session by stating, "We are throwing the ball at my face!" Eliot's parents initially expressed surprise and hesitation in response to their son's description, but were reassured by the therapist explanation that Eliot had been exploring a variety of ways he could protect his face from the ball. With this understanding, Eliot's parents agreed to follow their son's lead and joined in the game. Eliot resumed a prone position, lying on his back, and directed each parent to "take turns throwing the ball at me." Eliot demonstrated with each parent his ability to effectively dodge, hit and kick the ball away from his body. His parents clearly took pleasure from interacting with their son in this manner, and cheered Eliot on as he demonstrated increased mastery and creativity in his self-protective actions.

Through this embodied game, Eliot and his parents were able to safely explore the strength and power of Eliot's body, and practice survival-based protective responses in a playful manner. He modulated his actions more effectively within the session. For example, Eliot readily modified the power of his kick after observing the impact of the ball crashing hard into the ceiling. Within this active context, Eliot demonstrated an increased acceptance of support and help from his parents. He integrated suggestions from parents into his play to expand his possible responses (e.g. various ways of dodging the ball). Eliot's willingness to accept support and guidance without physical or verbal aggression, and to change his behavior without shame, was a welcome new experience for his family.

While engaging with his parents in embodied play, the nature of Eliot's actions evolved beyond primary survival response patterns to a focus on relational engagement and connection with his parents. For example, Eliot's attention shifted from protecting himself from the ball, to establishing a pattern of "turn taking" with his parents with the goal of creating a rhythmic, cooperative, three-way game of catch as a family. As the session came to a close, Eliot expressed interest in using this game with his parents at home, and he reported it helped him feel more "calm." With input from the therapist, the family discussed ways to safely implement this game within the home and community settings.

The family continued to engage in weekly treatment in the SMART room with a focus on developing Eliot's capacity to effectively regulate internal arousal states, and increase a felt sense of security in his attachment with his parents. Eliot regularly reintroduced this embodied game into family sessions, often after an experience that generated anxiety (e.g. after experiencing a hurricane). Typically, in this play, Eliot began on his knees and used childlike vocalizations to throw the ball. As play progressed, he would steadily direct his parents to increase the complexity and intensity of their throws until he was standing and vigorously hitting the ball back toward his parents at a rapid and rhythmic pace. Repeating this embodied game with his parents in session seemed to help Eliot to regulate internal distress, maintain connection with his parents during periods of stress, and build mastery over anxiety-provoking experiences.

Over the course of the next six months of weekly SMART therapy, Eliot's parents reported that he had stopped exhibiting physically aggressive behaviors towards them, showed greater frustration tolerance, and began to verbally communicate to them when he was feeling "sad" or "angry." They also noted that Eliot was allowing them to assist with face washing and hair care, and was less reactive to being "looked at". The family, once again, could display portraits and photographs in their home. Eliot and his parents continued to play variations of the game, both in session and at home throughout the course of his treatment. This playful practice helped Eliot increase his capacity to self-regulate and to experience positive connection with his parents. During this time period, his parents described feeling safer at home, more positive in their relationships with him, and expressed a desire to continue treatment to further develop communication as a family.

Discussion

The current case study exemplifies how traumatized children can more readily regulate their bodies, become more behaviorally organized and socially engaged with others when participating in embodied play with an attuned

therapist. Analyses of this and similar cases with treatment-resistant, complexly traumatized youth in our clinical and supervisory practices, as well as in consultation to practitioners utilizing SMART within community treatment, are suggestive of the potential benefit of this model in assisting children and adolescents to create new response patterns that are more effective, flexible, and growth enhancing, rather than repetitive and fear-based. This case study and similar cases raise intriguing questions about whether the attainment of improved somatic regulation, particularly when coupled with improved dyadic/relational engagement (with therapist and/or caregivers) within a contained, therapeutic context, can serve to mobilize or otherwise enable previously treatment-resistant, complexly traumatized youth to initiate a form of symbolic play in embodied dramatic play, or create new fully embodied actions or games with their therapist or caregiver that help them to rework their traumatic experiences..

In our intensive work and routine post-session review of session videotapes with Eliot, it would appear that the opportunity to regulate his arousal on a sensory motor level in the SMART room, played a causal role, be it direct or mediating, in his capacity to naturally connect to, and ultimately process preverbal experiences of physical abuse as a toddler through embodied action. The self-generated game described above allowed Eliot to have repeated experiences of effectively protecting himself from being hit in the face, a strategy that was not possible when he was a toddler. As Eliot gained an embodied sense of mastery over this experience, he wanted his parents to join him in the work. When Eliot's parents demonstrated their capacity to witness, tolerate and support him by fully engaging in the embodied reworking of his preverbal trauma, Eliot seemingly behaved as if he felt less threatened by his parents and safe enough to accept their support. In what we purport to be the direct result of this work, the focus of treatment shifted over time from developing a basic sense of physical, relational and emotional safety via regulation within the family, to developing increased trust, security, and positive connection within the attachment between Eliot and his parents.

Limitations

While attempts were made to choose a case representative of what we have seen with other cases in which SMART was utilized, the selection bias inherent in such a choice limits the generalizability from an empirical standpoint. It is only possible to document the sequence of action within the session, and not to make causal claims regarding the mechanism of action with the case study format. Nor can claims be made about the generalizability to other forms of complex trauma (e.g. sexual abuse versus physical abuse).

Implications and Future Directions

SMART was designed to provide new strategies to address somatic regulation for children and adolescents with complex trauma. Analysis of the current case study suggests that somatic regulation may have been the catalyst for trauma processing, i.e. transforming reenactment into reworking. More generally, it raises the question for further study: is fully embodied play a reliable method of improving somatic regulation and accelerating trauma processing? Given additional clinical evidence supporting this hypothesis (e.g., Gaensbauer 2002; Terr 1990) and growing evidence supporting body-oriented therapies for adult trauma survivors (Metcalf et al. 2016; van der Kolk et al. 2014), it is vital that future research test this phenomenon empirically. Such research may be enhanced through the systematic review of videotape of clinical work using a reliable behavioral coding system, the examination of posttraumatic stress symptom change, and treatment outcome studies of large samples of youth randomized to both body-oriented and traditional (e.g., cognitive behavioral therapies) techniques.

Compliance with Ethical Standards

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

Disclosure of Interest The authors report they have nothing to disclose.

Ethical Standards and Informed Consent Procedures in writing the case study were performed in accordance with the ethical standards of the Justice Resource Institute Institutional Review Board and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Parental consent was obtained and identifying characteristics of the client were modified to protect confidentiality.

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