

A Trust-Based Intervention for Complex Developmental Trauma: A Case Study from a Residential Treatment Center

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Abstract This case study, conducted in a Midwest residential treatment center, reports results from an attachment-based intervention that addressed the needs of a 16-year-old female, Rachel. Rachel had a long and documented history of severe abuse and neglect before her adoption from a Bulgarian orphanage at age 12 and numerous psychiatric hospitalizations in the years subsequent. Upon entering this residential treatment center, Rachel did not respond to traditional residential treatment modalities and was considered one of the most difficult children the facility had ever attempted to help. After the intensive attachment-based intervention for Rachel, her adoptive parents, and facility staff, dramatic increases in pro-social and attachment behaviors were noted, as well as a significant decrease in violent and self-injurious behaviors. The intervention consisted of three phases of differing levels of intensity and was designed to address the attachment system and related sub-systems in order to facilitate the development of healthy attachments.

Keywords Trust-based relational intervention · Complex developmental trauma · International adoption · Institutional care · Residential treatment · Attachment

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Children who have suffered abuse, neglect, deprivation and/or other forms of developmental trauma often suffer long term effects from these experiences, especially if chronically exposed to such maltreatment (van der Kolk 2005). Such complex developmental trauma (CDT) can result in multifaceted deficits across multiple domains, such as attachment, sensory/physiological, affect/self-regulation, dissociation, behavioral regulation, cognition, and self-concept (Cook et al. 2005). These deficits can endure across the lifespan and manifest as alterations in brain structure and functioning (Coates 2010), increased risk for depression (Danese et al. 2008), autoimmune disorders (Dube et al. 2009), compromised physical and mental health (Draper et al. 2008), and even premature death (Brown et al. 2009). A multitude of research indicates that children who suffered CDT have a much greater probability of developing an *insecure* or *disorganized* attachment classification, classifications that are associated with greater mental health problems (Bohlin et al. 2012; O'Connor et al. 2011).

Attachment theory (Bowlby 1969/1982, 1973, 1980) posits that instinctual and adaptive programming allows for the formation of bonds between infant and caregiver. This bond is a product of the infant's mental representations of the caregiver. The infant forms these representations via experiential learning through repeated interactions with the caregiver. When a caregiver provides a safe, stable, and nurturing environment, the infant is able to form healthy mental representations of the caregiver and that relationship. A safe and responsive environment created by the caregiver is believed to be crucial to the development of a *secure* attachment (Bowlby; Simpson 1999). When an infant experiences neglect, inconsistent care, abuse and/or frightening behavior from the caregiver, the mental representations developed by the infant will reflect these experiences. It is by these negative representations that *insecure* or *disorganized* attachments are often believed to be formed. Given the links between CDT and insecure and/or disorganized attachment (e.g., Bohlin et al. 2012; van der Kolk 2005), and because secure attachment is known to buffer against social and environmental stress (e.g., Sroufe et al. 1990), attachment-based interventions are important for children suffering from CDT (e.g., Aideuis 2007; Cook et al. 2005; van der Kolk and Courtois 2005).

There is a particular need for CDT interventions within residential treatment centers (RTC), as a high number of children placed in residential treatment have histories of trauma and children in residential treatment are at risk of further trauma from their placement (Hummer et al. 2010). Grounded in the idea that residential treatment programs must acknowledge and address the needs of children with histories of trauma, trauma-informed intervention frameworks such as the Sanctuary Model (Abramovitz and Bloom 2003; Bloom and Sreedhar 2008) use trauma-specific treatments that are sensitive to the fundamental impact trauma has in individual lives and in large systems. In general, trauma-informed interventions share emphasis on facilitating safety, connection, and emotion regulation (Bath 2008). These models are vast improvements over traditional models for residential treatment, but Bath warns that a risk of trauma-informed research is that it gives the impression that treatment of complex trauma is limited to a clinical setting by professionals with an advance understanding of complex trauma. Instead, Bath suggests that any adult who has a role in caring for a traumatized child can

participate in creating a healing environment by putting into place the principles of safety, connection, and regulation.

Trust-Based Relational Intervention[®] (TBRI[®]) is an attachment-based intervention for *children from hard places* that shares with trauma-informed interventions an emphasis on safety, connection, and regulation. However, because TBRI[®] is a caregiving model rather than a clinical model, it can be applied in a range of settings, including homes, schools, camps, and caregiving organizations, and by a range of trained adults, including parents, teachers, and professionals. In the current study, we suggest that TBRI[®] has efficacy in RTC as well. The following case study describes how this attachment-based intervention was put into place to address the needs of a post-pubescent female adolescent who had failed to respond to traditional residential treatment modalities.

Intervention Description

The practices and principles of TBRI[®] are intended to address the various sub-systems (e.g., sensory, language, physical, attachment) that allow a child to successfully navigate his or her environment. TBRI[®] is composed of three sets of principles: Empowering Principles, Connecting Principles, and Correcting Principles. A brief description of each of the three principles is provided below. More detailed descriptions of the components of TBRI[®] have been reported in other publications (Purvis et al. 2007, 2009, 2011b).

The Empowering Principles prepare children and youth for success by meeting physical and environmental needs and promoting feelings of safety. This is accomplished through *ecological and physiological strategies*. *Ecological strategies*, such as predictability and transitions, create calm, positive environments in which children know what to expect and can manage changes in their environment. These strategies are essential for children whose histories have left them fear-driven, distrusting of change or novel activities, and unable to self-regulate. *Physiological strategies* address physical needs such as maintaining hydration, blood sugar levels, and nutrition and providing regular physical and sensory activities. These strategies are important for stabilizing moods and behavior and optimizing cognition and self-regulation.

The Connecting Principles build trusting relationships that help children and youth feel valued, cared for, safe, and connected. The Connecting Principles consist of *mindfulness and engagement strategies*. Encouraging *mindfulness* in adults who are trying to build relationships with children from hard places allows for flexible responding based on the needs of the child and awareness of self, others, and environment. *Engagement strategies* include practices that engage children to build trust, disarm fear, and facilitate attachment, such as eye contact, giving voice, and playful interaction.

The Correcting Principles teach children and youth appropriate strategies for getting their needs met while navigating social interactions and responding to challenging situations. The Correcting Principles consist of *proactive strategies*, which teach skills during calm, alert times, and *responsive strategies*, which are

tools for responding to challenging behaviors. *Proactive strategies* include practice of life skills and scripts such as role-playing the life value of “gentle and kind.” *Responsive strategies* include responding to challenging behavior in a way that is immediate, direct, efficient (only using the minimum level of response necessary to address the challenge), action-based, and leveled at the behavior, not the child (for a more detailed description of this IDEAL Response[®], see Purvis et al. 2013a). One of the most important aspects of the Correcting Principles is that only the behaviors are targeted, never the child. The behaviors exhibited may be undesirable, but the child is never to be considered or treated as undesirable. Once the behavioral episode has passed, there is an immediate return to engaging the child on a deep emotional level; correction is never to last past the resolution of the behavioral episode. These practices and principles, when used as a dynamic system, allow for the amelioration of anxiety and fear, while allowing the child to learn behaviors that would have been gained in early childhood.

TBRI[®] has been used in a variety of settings and with a range of ages, including groups of children age 3–9 and 10–13 in summer camps (Purvis et al. 2007a, 2013b), intensive home programs with individual children (Purvis et al. 2013c), in elementary schools with high-risk student populations (Parris et al. in press) and within caregiving organizations serving children and adolescents (Purvis et al. 2012). The language and activities of TBRI[®] can be adapted to be appropriate to the particular age group (for example, one organization that serves adolescents adapted TBRI[®] verbal scripts to be more appropriate to an older age group), but the overall principles of empowering, connecting, and correcting remain the same.

Principles of TBRI[®] can be applied to children from hard places in many settings and with children exhibiting a range of risk factors. Because of the extreme nature of the case study that follows, a particularly intensive program was necessary. This program mirrored the development of the caregiver/infant attachment relationship while employing the Empowering, Connecting, and Correcting Principles. Specific guidelines detailed in the intervention protocol below, such as maintaining a close proximity between caregiver and child, minimizing interference in the environment, and providing for all day-to-day needs (e.g. nutrition, sensory stimulation, and regulation) taught the child what she should have learned early in development: that safe adults will meet her needs and that she is worthy of care. Over time, just as a growing child learns to negotiate her needs in the context of a secure attachment relationship, the child learns to co-regulate with a caregiver and ultimately, to self-regulate and gain autonomy.

Case Study

Background

After being abandoned by her birth parents, Rachel (a pseudonym) lived in four different Bulgarian orphanages for the first 12 years of her life. During this period, a long history of extreme abuse (i.e., emotional, physical, and sexual), neglect, and deprivation were documented. Rachel was labeled as a *gypsy* by the Bulgarian

staff, and as gypsies were considered to be inferior and despised by many Bulgarians (Miller et al. 2001, p. 178), Rachel was treated as an object rather than a child by both staff and other children. Food was reported to be nutritionally inadequate and often withheld, hot water was available only 1 day a week, Rachel was rarely given a blanket to sleep under, and she reported being beaten with a stick by staff and older children. Additionally, she was exposed to numerous violent incidents while in orphanage care and did not receive medical or educational services.

Rachel was adopted at age 12 by an American family consisting of a mother, father, older sister, and two younger brothers. For the first 6 months after adoption, Rachel displayed a *honeymoon period* during which she was able to interact appropriately with her new family. After that period, she became increasingly violent (e.g., destroying property and assaulting family members and the family pet), engaged in self-injury, and became obsessive with her mother's time and attention. For example, Rachel would lock herself and her mother in the bathroom and become physically violent when her mother attempted to open the door. Therapeutic interventions for these behaviors failed and Rachel was admitted to psychiatric hospitals on four different occasions within a 1-year period. Even with this intensive course of hospitalizations and the subsequent prescription of psychotropic medications, Rachel's violent and aggressive behaviors continued to escalate. At age 14, when Rachel put a butcher's knife to her mother's throat and threatened to harm her, she was placed in a long-term RTC.

At the RTC, Rachel's behavior not only continued but also escalated in frequency and intensity. Documented behaviors included, but were not limited to: running away, obsessive demand for attention from female staff, fear of male staff, physical aggression towards peers and staff (e.g., holding a pair of scissors to a staff's throat and threatening to cause harm), destruction of property, breaking plexiglass windows and using the shards as a weapon, running into traffic and laying down in front of moving vehicles, and serious self-abuse. Staff reports of Rachel's behavioral precursors to these episodes included "glossy or glazed eyes," an inability to look at staff but rather "looking through" them, selective hearing, a notable change in her voice quality and tone, clenched fists and rocking motions, jaw hanging open, pacing, and swallowing items such as paperclips, earrings, and even a piece of broken plexiglass. While at the RTC, Rachel was admitted to the hospital emergency room on four occasions for swallowing objects and admitted to psychiatric hospitals on four separate occasions for a total of eight psychiatric hospitalizations in approximately 2 years. During this time period, Rachel was taking nine different medications, four of which were psychotropics: Lithium, Seroquel, Trazodone, and Abilify. Staff reported that Rachel's case was possibly the most difficult case this RTC had ever experienced. The patterns of behavior exhibited by Rachel were what would be expected from a child/adolescent who experienced extreme CDT and subsequently could be classified with disorganized attachment. After it was evident that Rachel was immune and even reactive to the traditional methods of intervention practiced by the RTC, in an effort to better help Rachel, the RTC contacted the first author for a consultation in Rachel's case.

Indicators of Functioning

Prior to traveling to the RTC, the author requested thorough background information, RTC documentation of behavioral incidents, and staff notes for Rachel. Before agreeing to the intervention, the author took steps to assure that the child, family, and facility were an appropriate fit for the program and that the family was informed of possible risks. In general, children for whom the intervention is most effective have caregivers (parents and/or staff) who are nurturing and willing to examine their own histories and caregiving strategies. Parents or staff who are controlling or angry, who utilize a punitive system, or who are not on a personal journey to understand their own attachment histories and behavior will have difficulty building the connection necessary to successfully implement TBRI[®]. For example, a main goal of the intervention is to replace maladaptive strategies (e.g. physical aggression) with more adaptive strategies (e.g. using words). However, these maladaptive strategies are learned strategies that were necessary for survival in children suffering from complex trauma. Thus, one possible risk of intervention is that an adult takes away the child's survival strategies without giving voice to the child to replace those strategies. The facility in this case study was highly nurturing and was already engaging in attachment-based therapy, the parents were nurturing and willing to examine their own histories, and the child was free of impairments that could render treatment harmful, including active seizure disorders, severe cognitive impairment, or a heart anomaly. Overall, TBRI[®] appeared to be an appropriate intervention to address the devastating effects of 12 years of abuse, neglect, and deprivation.

Before beginning the intervention, the author requested the collection of a urine assay to assess Rachel's baseline neurochemical functioning (Table 1). Subsequent urine assays were collected over the next year and analyzed by an independent laboratory (Neuroscience, Inc.). Neurochemical profiles derived from urine assays have been utilized in child custody proceedings (Purvis et al. 2010), associated with children's behavioral profiles (Purvis et al. 2011a), and used with targeted-amino-acid-therapy, resulting in an increase in serotonin and GABA levels and a decrease of parent-reports of problem behaviors (Cross et al. 2011).

Of note, the pre-intervention baseline urine assay indicated that Rachel had very low levels of serotonin and elevated levels of glutamate, levels that have been associated with severe behavioral problems in children (Cross et al. 2011). Additionally, low levels of serotonin have been associated with depression, insomnia, and excessive stress, while elevated levels of glutamate have been associated with aggression, violence, seizure activity, obsessive tendencies, associations that coincide with Rachel's behavioral difficulties. It was reported that in the 10 months prior to the intervention, Rachel had 63 restraints (physical holds) and 60 seclusions (removal to a locked room for her safety and the safety of peers and staff).

While working with Rachel at the RTC, the author asked her to make *family-* and *self-drawings* at different times over the first 5 days of the intervention. Family- and self-drawings, as projective assessment tools, have been used in a variety of contexts to assess children's attachment representations (e.g., Pianta et al. 1999;

Table 1 Neurochemical markers of functioning for Rachel with (optimal ranges) across 1 year

NT	Baseline	5 months (a)	5 months (b)	6 months	9 months	11 months	1 year
Epi (8–12)	11.8 ^a	5.5	6.6	5.6	3.0	6.6	6.7
NE (35–60)	29.2	24.0	37.9 ^a	39.7 ^a	76.7	56.3 ^a	60.0 ^a
DA (110–175)	177.7	138.7 ^a	108.4	80.0	168.3 ^a	210.0	139.3 ^a
5-HT (150–200)	61.6	52.2	57.6	51.4	647.2	572.1	421.6
GABA (1.5–4.0)	4.9	4.1	7.2	2.9 ^a	6.7	6.8	6.8
Glut (10–25)	33.7	52.4	71.0	65.8	54.9	49.3	69.2
Hist (10–20)	19.1	13.0	11.0	23.3	29.9	16.6	44.1
PEA (175–450)	234.0 ^a	266.7 ^a	296.2 ^a	309.5 ^a	377.2 ^a	460.5	1483.4

The urine sample at 1-year was collected after Rachel had been removed from school for extreme behaviors, injured herself, and refused to eat

Epi epinephrine, NE norepinephrine, DA dopamine, 5-HT serotonin, GABA γ -aminobutyric acid, Glut glutamate, Hist histamine, PEA phenylethylamine

^a Within optimal range

Shiakou, 2012). In the initial drawings, Rachel drew her family but did not include herself anywhere in the picture, an indication that she did not feel a part of her adoptive family. Additionally, her self-drawing contained erratic marking patterns and unusual mechanics (e.g., rather than drawing a circle for her face, Rachel turned the entire page while holding the crayon in place). These early drawings not only indicated that Rachel was not connected to her adoptive family (i.e., insecurely attached), but that Rachel possibly suffered from dissociative thought patterns and had great difficulty processing even minor tasks such as drawing a self-portrait. This theory of a possible *dissociation of thought* was commensurate with the RTC observations of “glossy or glazed eyes,” selective hearing, and “looking through” them when even small cognitive demands were experienced by Rachel. With these possible difficulties in mind, an intensive intervention was tailored to address Rachel’s perceived needs.

Intervention Protocol

Upon arrival at the RTC, the author consulted with staff and then spent 5 days with Rachel, implementing the practices and principles of TBRI[®] (for a complete review of TBRI[®] see Purvis et al. 2009, 2011b, 2013a), occupying almost all of Rachel’s waking hours. The intensive intervention was broadcast via closed-circuit-television (CCTV) to locations within the RTC where staff and Rachel’s adoptive parents were invited to watch. The broadcast on CCTV was intended to allow staff an opportunity to learn these techniques and effect organizational change with regard to how staff addressed the needs of Rachel and other children from hard places.

The specific intervention for Rachel was designed to have three phases. The primary purpose of Phase 1 was to allow Rachel to focus solely on building the skills necessary to engage in healthy relationships. This started with the intensive

5-day intervention conducted by the author and was continued by Rachel's adoptive parents and the RTC staff. Phase 2, as a continuation of Phase One and implemented solely by RTC staff, was intended to empower Rachel in achieving small goals while demonstrating an improved ability to self-regulate, while increasing autonomy in regard to daily activities and choices. Phase Three would signify a return to the RTC's more traditional program of treatment, while still incorporating the practices and principles of TBRI[®]. As the core of the intervention is similar throughout, only Phase 1 will be described in detail.

TBRI[®] principles of Empowering, Connecting, and Correcting shaped the intervention protocol. As the attachment relationship is central to the intervention, strategies are always based on connection. Thus, strategies that are empowering or correcting are always connecting as well. For example, providing snacks meets physical needs (empowering), but also teaches children from hard places that safe adults can be trusted to provide care (connecting). In describing the intervention protocol below, it is important to keep in mind that although specific practices are empowering or correcting, all are embedded in connection stemming from the attachment relationship.

Creating an Attachment-Rich Environment

In keeping with the overarching goal of empowering Rachel to form healthy attachment relationships with caregivers, Phase 1 mirrored the early attachment relationship between a caregiver and infant. Similar to early life experiences in a secure attachment dyad, an important aspect of the intervention is that children are cared for, rather than needing to care for themselves. Ideally, early in life, these experiences signal to an infant that the caregiver can be trusted to meet her needs and that the infant is worthy of care. When these experiences are absent, it is important to replicate them, even for older children. Thus, specific guidelines for Phase One of the intervention, including close proximity between the child and caregiver, minimizing interference from the environment and/or too many adults, and instructing caregivers to provide for day-to-day needs such as nutrition and physical activity were meant to mirror the early attachment relationship and facilitate trust, connection, and learning.

During Phase 1 of the intervention, Rachel was assigned one specific staff member to be with her at all waking hours during the day, with approximately 36 inches or less to separate them. When Rachel's mother was present, she assumed the 36-inch-role, with a staff member remaining in close proximity. Proximity between the child and caregiver is important. The rationale for maintaining this close proximity is two-fold. First, proximity is important from an attachment perspective. In line with attachment literature that suggests that the proximity between a caregiver and infant in a secure attachment relationship is important for maternal responsiveness (Bell and Ainsworth 1972), bringing Rachel's caregiver closer allowed the caregiver to be aware of Rachel's needs and meet them quickly so that Rachel could learn to trust the adult and build connection. Second, proximity is necessary for a temporally loaded response and is important to support learning, as demonstrated by research

suggesting specific relationships between mothers' responsiveness to their infants and the infants' cognitive development (Bornstein and Tamis-LeMonda 1997).

Rachel's intensive program was also designed to minimize interference as much as possible to allow the focus to be on building relationships. This interference could take the form of too many caretakers, noisy/distracting environments, or staff members not interacting with Rachel with a singular *voice*. In order to minimize interference from other people, Rachel only interacted with her adoptive mother, the author, or a few designated staff early in the intervention and always away from distracting stimuli (e.g., other children, noisy rooms, television). In order to minimize interference and distractions in the environment, Rachel's room was kept free of decorations or unnecessary clutter. Just as a sensitive caregiver protects their infant from overwhelming sensory stimuli (e.g. television), minimizing interferences has the additional benefit of preventing sensory overload and teaching self-regulation (especially important for a child with a known history of dissociation when overwhelmed). Minimizing interference has important long-term benefits: only when sensory and other subsystems are calm are children able to employ new strategies (Purvis et al. 2013b).

Given Rachel's history of maltreatment and malnutrition, it was important to make sure her physical needs were met at all times. Thus, in the context of an attachment-rich environment, empowering strategies were put into place to prepare Rachel for success. To create predictability and make sure that Rachel was well rested, Rachel rose from bed at 7:45 a.m. and went to sleep at 8:00 p.m. each night. Rachel was kept hydrated and was given a snack every 2 h to maintain proper blood sugar levels and empower her system to deal with the physical and cognitive load of the therapy sessions; snacks were designed to be stimulating to her senses and rich in nutrition (e.g., protein rich). In addition, making sure Rachel was kept hydrated and had regular snacks to regulate blood sugar were ways to reinforce that safe adults give care and will meet a child's needs. Because Rachel was particularly sensitive to sensory stimulation and had a history of dissociation and aggression, she was engaged in a sensory activity every 2 h in order to elevate her sensory stimulation and allow her to practice self-regulation with assistance. Teaching Rachel proactive self-regulation techniques such as calming, breathing, and using words allowed Rachel to adjust to her surroundings without dissociating or becoming aggressive.

In mirroring the development of the infant-caregiver attachment relationship, Rachel was not given choices that pertained to her daily routine (e.g., what to eat or wear), but rather those choices were made for her. During the program, choices were presented in a compassionate and kind tone, often utilizing a playful voice to neutralize any negative affect on her part. Again, this transference of choices from Rachel to staff was intended to simulate early life experiences where a child is *cared for*, rather than needing to care for herself. There was the potential for compromises if Rachel's reaction to a caregiver's choice was too disagreeable.

Therapeutic Sessions

Intervention sessions were conducted for 5 days by the author and with Rachel's assigned staff member and her adoptive mother when possible. Few staff were

allowed to be present in order to minimize interference and negative affect (e.g., shame) on Rachel's part. Intensive therapeutic sessions included role playing appropriate and inappropriate behaviors (e.g., "respect" versus "no respect"), role reversing to allow Rachel to play the part of the parent, practicing scripts (e.g., "when I am angry, I will..."), using sensory aids (e.g., weighted blanket) to calm herself, coaching to help her identify emotional, physical, and sensory states (e.g., identifying feelings on a feeling chart), and coaching to empower her to use words rather than behavior to express her needs and feelings. After each day, the author processed the day with Rachel's parents and staff, explaining the implications of what was observed during the day and making suggestions for improvements for the next day's sessions. Also, her parents and staff were warned that by engaging Rachel in this intervention and disrupting her normal range of functioning, there could be a significant rise in her negative behaviors and resistance until her system adjusted to these new stimuli and expanded range of functioning.

If Rachel's behavior escalated at any point, the author, staff, and Rachel's parents would help her to calm down and engage Rachel to help her self-regulate, utilizing scripts (e.g., "use your voice to let me know what you need"), nutrition, hydration, and compassionate understanding of how Rachel was feeling. During Phase 1, Rachel's behavior never escalated to a point of an active threat of danger and of physical harm to herself, other people, or property. However, because of Rachel's history of containments for violent behavior, RTC staff certified in the use of non-violent physical containment procedures were given guidelines for performing appropriate containments if necessary in the future. No containments were to be performed by the staff assigned to Rachel. Additionally, during any physical containment, all staff were instructed to avoid standing in front of Rachel or looking her directly in the eyes, as this could potentially create shame for Rachel (as was common in her history). Containments were only to be performed when necessary for safety and after lower level behavioral interventions had failed, never as punishment or to control or coerce Rachel.

Upon completion of the five-day intervention, RTC staff (and Rachel's mother when possible) continued the Phase 1 protocol for approximately seven more weeks. Staff were instructed to continue the Phase 1 protocol (e.g., bedtimes, no distractions) until Rachel displayed pro-social behavior and positive-attachment behaviors, at which time she was moved into Phase 2. Rachel remained in Phase 1 for approximately two months, Phase 2 for approximately 2 months, where she practiced making appropriate choices in her daily activities, and then moved into Phase Three and the more traditional treatment services offered by the RTC.

Outcomes

In the 10 months before TBRI[®], Rachel had 63 restraints and 60 seclusions (6.3 restraints and 6.0 seclusions per month). In the 6 months following the intervention these number dropped to 15 restraints and 13 seclusions (2.5 restraints and 2.2 seclusions per month). Although Rachel's neurochemical levels showed dramatic changes over a 1-year period, levels for most neurotransmitters remained outside the optimal ranges (Table 1). These changes in her neurochemistry may be the

physiological complement to the changes witnessed in her behavioral repertoire. Rachel's behaviors showed dramatic positive change, but there continued to be challenging episodes for a long period of time after intervention as her system continued to adjust to new areas of operation. For a child who had suffered extreme abuse/neglect for an extended period, it was a reasonable expectation that the road to recovery would be long and have numerous vicissitudes. Of note was her dramatic increase in serotonin. Rachel's neurotransmitter levels were pendulum-like, with her neurochemical system swinging in wide arcs as it accommodated a new area of operation. As can be seen in Table 1, at 1 year post-intervention, Rachel had a serious behavioral episode with large spikes in glutamate, histamine, and phenylethylalanine (PEA), excessive levels of which have been associated with aggression, violence, seizure activity, obsessive tendencies, hyper-excitability, mood disorders, and attention-deficit/hyperactivity disorder. It would be desirable for these numbers to modulate and stay closer to the optimal ranges, but the perturbation to Rachel's various subsystems (neurochemical included) would be expected to take an extended period of time to adjust to a completely new way of processing her environment (e.g., interpersonal, sensory, etc.), especially after the severe abuse and neglect she suffered for 12 years of her life.

Rachel continued to live at the RTC for 6 months, showing improvement across multiple behavioral, social, and emotional indicators. Rachel transitioned to a much less restrictive environment (i.e., transitional housing). In the subsequent months, she began overnight and extended visits home in the hopes of eventually fully transitioning back to her adoptive parents' care.

Discussion

This case study illustrates the utility of multimodal interventions when addressing the needs of children who have experienced CDT. Traditional RTC methods (e.g., levels systems), talk therapy (e.g., cognitive behavioral therapy), and other interventions that require higher level cognitive functioning may not be appropriate for the most seriously harmed of these children. Many of these children are in such a constant state of fear, anxiety, hyper-vigilance, and overstimulation that they are not able to cognitively process the demands that these treatment modalities require to be successful. Decreases in aggressive behavior and increases in pro-social and attachment behavior suggest that an intensive, attachment-based intervention can be effective for children suffering from CDT.

Although promising, this study has limitations. The intervention employs some innovative techniques (e.g. caregiver-child proximity, limiting interference) that some may view as controversial. Emerging evidence suggest these protocol are effective (Purvis et al. 2013c), but further research is needed. As this is a case study of an intense treatment program with a child exhibiting extreme behaviors, there is the potential that findings might not generalize. However, positive findings have been documented in larger-scale interventions as well (Parris et al. in press; Purvis et al. 2012). Of note, TBRI® appears to be most effective in families and organizations that exhibit an openness to building trust and connection and a

readiness to change long-standing practices. At present, professionals, parents, and students are trained to use TBRI[®] in a number of different venues, including intensive week-long workshops for parents and professionals, an upper level college course for child development students, parent meetings for families participating in summer camp, and regularly-held training sessions and site visits with organizations implementing TBRI[®]. As a new and promising practice with emerging evidence, future research is necessary to assess fidelity of the program to assure that findings can be replicated in larger samples. To this end, standardized TBRI[®] training materials are being implemented, trainee progress is tracked with short quizzes and written feedback, and regular follow-ups and assessments are conducted with partnering organizations.

The use of TBRI[®] has been shown to be efficacious in home-based interventions (Purvis et al. 2013c), camp settings (Purvis et al. 2007, 2013a), educational settings (Parris et al. in press), and now within residential treatment settings. It is the authors' belief that by addressing the various sub-systems of the greater attachment system, significant decreases in maladaptive behaviors and subsequent increases in quality of life can be achieved for even the most wounded of children from hard places.

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