Spring 2011

Evaluating a Sensorimotor Intervention in Children who have Experienced Complex Trauma: A Pilot Study

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Abstract

The purpose of the present study was to evaluate the effectiveness of a sensorimotor intervention with children who have experienced complex trauma. In the United States, millions of children are exposed to traumatic events each year, and thousands develop subsequent psychological disorders (U.S. Department of Health and Human Services, 2008). Researchers and clinicians are now categorizing these disorders as traumatic stress-related disorders or Developmental Trauma Disorder (Courtois & Ford, 2009), particularly when there is an interpersonal component (e.g. abuse or neglect by caregivers). Unfortunately, there is a dearth of evidence-based information available on effective treatment for complex trauma in children (Malchiodi, 2008). This study focused on incorporating principles from the Neurosequential Model of Therapeutics (Perry, 2009, 2006) as well as a sensory integration intervention into an effective treatment for children. Both interventions focused on increasing attunement to the self and to others while providing the brain with the stimulation that it needs to develop. The intervention took place at the Residential Treatment Center (RTC) at The Baby Fold in Normal, Illinois. The RTC is an inpatient treatment center for children with severe emotional and behavioral problems, which are typically related to early, chronic traumatic experiences. The intervention took place in the form of specialized activity groups. We hypothesized a decrease in the frequency of problematic behaviors and an increase in positive, pro-social behaviors for children receiving the treatment compared to a control group that did not receive the specialized activity groups. As predicted, our results indicated a significant decrease in some problematic behaviors in the treatment group, but there was no change in positive behaviors.

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Introduction

Millions of American children are exposed to traumatic events each year, whether in the form of sexual abuse from their caretaker, witnessing the shooting of a loved one, or being left alone in the crib for hours at a time during the first year of their life (Courtois & Ford, 2009; U.S. Department of Health and Human Services, 2008). It has been estimated that approximately 5.2 million reports of child abuse are made each year in the United States involving over 3.2 million children (U.S. Department of Health and Human Services, 2008). This disturbing statistic is even more onerous due to the lack of public knowledge regarding the harmful effects of trauma on children. Although more and more attention has been paid to the field of childhood trauma in the last few decades (Illinois Department of Child and Family Services, 2008; Perry & Szalavitz, 2006; Perry & Pollard, 1998; Schwarz & Perry, 1994) much of society is ignorant of the harmful impact of trauma on children, as well as the effects that may last well into adulthood. Only recently have psychologists delved deeply into the study of childhood trauma, so there is not a wealth of evidence-based support for treatment. Therefore, the present research evaluated one of the proposed theories that lacks research support. It is important to evaluate these theories using controlled research in order to determine if "non-traditional" treatment implications truly lead to client improvement.

One of the newer theories focuses on the impact of trauma on the development of the brain. Bruce Perry (2009, 2008, 2006, 2002) has proposed a theory called the Neurosequential Model of Therapeutics (NMT). Within this model, Perry describes the development of the brain and what occurs when traumatic events disrupt, and possibly halt, the normal progression of brain growth. According to the NMT, in order for an intervention to be effective, it must target and stimulate the region of the brain that experienced the disruption. By targeting specific regions of the brain, the brain can continue to develop from where it was "arrested." The NMT

suggests sensory integration (or sensorimotor) interventions, ideally ones including attunement with a caretaker, in order to target the specific brain regions. Another theory of effective interventions for complex trauma involves sensorimotor interventions. The purpose of sensorimotor interventions is to increase bodily awareness so that children learn to be more mindful of what their body is experiencing. It also serves to increase attunement to others (Malchiodi, 2008).

The purpose of this study was to examine the effectiveness of sensorimotor interventions with children who have experienced complex trauma. Current theories suggest that bilateral stimulation, as well as increased attunement, promote better psychological and physiological outcomes in children suffering from trauma-related disorders (Courtois & Ford, 2009; Ogden, Minton, & Pain, 2006); however, these theories lack substantial evidence. Therefore, this study served as a pilot study because, as of the present date, there have not been any studies on treatments for children that combine bilateral stimulation and sensorimotor principles. It is important to evaluate these theories to determine whether they are empirically supported. We hypothesized that the treatment group (group receiving the treatment) would demonstrate fewer problematic behaviors that are symptoms of complex trauma, such as aggression and sexualized behaviors, compared to the control group following the intervention. We also hypothesized that the treatment group would show more positive, pro-social behaviors compared to the control group following the intervention. The following literature review includes an overview of the main findings of the childhood trauma literature, the difference between "single-event" trauma and complex trauma, behaviors and physiological reactions associated with complex trauma, and the present treatment theories. Each of these areas offers important insight into the nature and purpose of our present study.

Childhood Trauma

Traumatic experiences during childhood can occur in many forms, and the most common type is child abuse (in the form of neglect) (U.S. Department of Health and Human Services, 2008). Child abuse and neglect are defined by federal and state laws. According to the Federal Child Abuse Protection and Treatment Act (CAPTA), child abuse and neglect are "any recent act or failure to act on the part of a parent or caretaker, which results in death, serious physical or emotional harm, sexual abuse, or exploitation, or an act or failure to act which presents an imminent risk of serious harm" (U.S. Department of Health & Human Services, 2008, p. 21).

Child abuse is broken down into four categories- physical abuse, sexual abuse, emotional abuse, and neglect. Physical abuse is defined as non-accidental physical injury to the child that may result in breaks, bruises, fractures, or other abrasions, which pose threats to the wellbeing of the child. Examples include kicking, hitting, biting, or burning the child. CAPTA defines sexual abuse as enticing, forcing, persuading, or employing the child into any sexually explicit act. Examples include incest, statutory rape, molestation, prostitution, and sexual exploitation (U.S. Department of Health and Human Services, 2008).

Emotional abuse is typically defined as injury to the psychological capacity or emotional wellbeing of the child as evidenced by an observable change in behavior, emotional response, or cognitive abilities (Bensimon, Amir, Wolf, 2008; Orth, Doorschodt, Verburgt & Drozeth, 2004). Emotional abuse may occur in the form of constant derisions, insults or derogatory statements purposefully spoken with the intent to destroy the psychological wellbeing of the child. Unfortunately, this type of abuse is the hardest to prove due to the problem of hearsay and lack of tangible evidence (Perry, 2006). As a result, many states do not consider emotional abuse as a distinct category of their laws.

Finally, neglect occurs upon failure of the caretaker to meet the minimum requirements necessary for the development of the child, including emotional and physical support and

nourishment (Courtois & Ford, 2009; Malchiodi, 2008; Perry, 2006). Neglect occurs when the child is deprived of the required stimulation and needs that are necessary for proper development. Examples of neglect may include the caretaker leaving the child in a situation in which the child suffers harm, or the child being left alone in the dark for a substantial period of time. Nearly 60% of all reports of child abuse in the U.S. are cases of neglect (U.S. Department of Health and Human Services, 2008).

Single-Event Trauma vs. Complex Trauma. This study focused on treating children who had been exposed to complex trauma, as opposed to single-event trauma. It is important to note the differences between these two types. Courtois and Ford (2009) define complex psychological trauma as "resulting from exposure to severe stressors that (1) are repetitive or prolonged, (2) involve harm and abandonment by caregivers or other ostensibly responsible adults, and (3) occur at developmentally vulnerable times in the victim's life, such as early childhood or adolescence (when critical periods of brain development are rapidly occurring or being consolidated)" (p. 13). Complex trauma goes beyond the classical clinical definition of trauma, which typically only includes the diagnosis of Posttraumatic Stress Disorder (PTSD) and may arise due to one isolated traumatic event. Complex traumatic stress disorders often include a combination of characteristics of the following disorders from the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, Text Revision (DSM-IV-TR); American Psychiatric Association (APA, 2000): Axis I (more "acute" disorders); Axis II (Personality Disorders) diagnoses; and Axis III (physical health problems). Complex traumatic stress disorders are much more multifaceted than the "classic" definition of trauma because they include symptoms of a multitude of disorders, which can, therefore, be much more difficult to treat effectively.

Impact of Childhood Trauma

Behaviors and Development. Prior to the last few decades, the school of thought regarding childhood development and trauma was that children were not significantly affected by traumatic experiences (Courtois & Ford, 2009; Perry, 2008, 2006, 2002; U.S. Department of Health and Human Services, 2008; Ogden et al., 2006). Because of their young age, the previous belief was that the children lacked the cognitive ability to understand the traumatic situation, so they could not interpret it in a way that would negatively impact them. It was also believed that children were resilient and could bounce back from traumatic experiences (Courtois & Ford, 2009; Perry & Szalavitz, 2006). This belief was due largely in part to the fact that children rarely verbalize their feelings regarding the experiences. After a traumatic event, most children internalize their reactions, so caretakers interpret this as resilience (Malchiodi, 2008). When the children develop behavioral problems later in development, caretakers fail to make a connection to earlier traumatic experiences.

In reality, traumatic experiences that occur during development can have profound, lasting impacts on the child. According to Perry and Szalavitz (2006), approximately one third of all children who are abused or exposed to traumatic events will develop psychological problems as a result (frequently in combination with physical problems). However, it is important to note that roughly two thirds of these children are able to recover from the experiences without showing signs of significant impact (U.S. Department of Health and Human Services, 2008). The development of trauma-related disorders depends largely on the age at which the trauma occurred, the support system available to the child, and the condition of the environment (trauma-free vs. ongoing trauma). After a traumatic experience, a child placed in a safe environment surrounded by loving caretakers is much more likely to recover than a child who continues to live in an unsafe environment with little to no support from caretakers (Perry & Szalavitz, 2006).

The effects of trauma look different during each stage of child development. Any traumatic event that severely affects the caretaker's ability to care for the child may interfere with the infant's ability to develop properly (Perry & Szalavitz, 2006; Perry, 2001; Schwarz & Perry, 1994). Crucial processes develop during the early years of life, including attachment (Perry, 2001; Bowlby, 1978), formation of trust and self-structure (Courtois & Ford, 2009; Perry, 2001) and state and affect regulation (Perry, 2008, 2006). A disruption in these stages of growth may cause the infant to respond with a variety of disturbances: global functioning problems, attachment problems, excessive crying, eating problems, sleeping difficulties, over-stimulated mental and physical states, apathy, or failure to thrive (in which the infant fails to reach physical developmental milestones) (Perry & Szalavitz, 2006). The problems created with attachment will be discussed further at a later point in this paper (see the "Relationships" section that follows).

The impacts of trauma on toddlers and young school-aged children look much different than in infants due in part to the development of self-autonomy. Self-autonomy is the ability to self-regulate, including maintaining control over all parts of body and the internal bodily processes, such as hunger and the excretion of waste (Perry, 2002). Given that infants lack the ability to self-regulate, the effects of traumatic experiences are expressed differently in comparison to older children. Once self-autonomy develops in toddlers, young children may exhibit sleep problems, aggression, hyperarousal, avoidance, excessive fears, dissociative states, clinginess, and guilt and shame over their actions (Perry & Szalavitz, 2006; Perry, 2001; Schwarz & Perry, 1994). In addition to these behaviors, they may also show signs of cognitive delays, including language development and other speech problems. Often, the aggression exhibited by the children may be incorrectly labeled as a behavior disorder, when it is actually due to trauma (Courtois & Ford, 2009).

As the child develops into an adolescent, they may begin displaying additional symptoms such as increased anxiety, depression, hypervigilance, loss of interests, and problems concentrating (Perry, & Szalavitz, 2006; Perry, 2001; Schwarz & Perry, 1994). In addition to the possible behavior disorders diagnoses, adolescents may be diagnosed with identity, eating, and personality disorders. Other problem behaviors such as substance abuse, suicidality, delinquency, and sexual promiscuity arise during this time. It is also common for adolescents to turn to self-harm behaviors, such as cutting, to relieve their emotional stress and to provide temporary means of escaping their pain.

Not only do symptoms change over time, but different symptoms are exhibited between genders (Courtois & Ford, 2009; Perry, 2009, 2008, 2006). Boys with a history of trauma are more likely to *externalize* their symptoms, such as explosive behaviors (e.g. tantrums), aggressions, and swearing. These problems are easily noticed by caretakers. Girls with a history of trauma are more likely to *internalize* their symptoms. These girls are more inclined to be withdrawn, depressed, and may be prone to dissociating (which occurs when the child temporarily loses touch with reality and/or consciousness) (Perry & Szalavitz, 2006). These symptoms are much less noticeable in comparison to the explosive behaviors exhibited by young boys. Therefore, boys with a history of trauma are more frequently placed in treatment than girls.

Many of the symptoms exhibited by children with a history of trauma, such as hyperarousal and depression, are very similar to symptoms of Posttraumatic Stress Disorder. Therefore, some children exposed to trauma are often labeled with PTSD (Courtois & Ford, 2009; American Psychiatric Association (APA), 2000). The symptoms of PTSD fall into three categories: 1) re-enactment of the traumatic event; 2) avoidance of cues or scenarios that remind the person of the event; and 3) physiological hyperarousal that results in hypervigilance, sleep disturbances, anxiety, and increased cardiovascular reactivity (APA, 2000; Perry & Azad, 1999).

Many children exhibit the symptoms of PTSD, but few children are given this diagnosis because it was previously thought to be a disorder that does not develop until adulthood (Courtois & Ford, 2009).

Unfortunately, PTSD does not fully encompass all of the symptoms associated with complex trauma-related symptoms. Therefore, the clinicians often label children with a host of other disorders in order to incorporate all of the exhibited symptoms. Too often, children are misdiagnosed with disorders, such as Conduct Disorder, Bipolar Disorder, or Attention-Deficit/ Hyperactive Disorder, based on their symptoms (Courtois & Ford, 2009). The clinicians fail to make a connection between the events during the child's early life and their current behaviors, so the child continues to exhibit complex trauma-related symptoms. Instead of treating the underlying traumatic stress, clinicians struggle to choose which symptoms and diagnoses to treat. Therefore, the traumatic experiences are continually ignored and the problems can persist well into adulthood (Courtois & Ford, 2009; Anda, et al., 2006; Schwarz & Perry, 1994).

Relationships. Child abuse and other forms of traumatic experiences can have a lasting negative impact on the development of attachment, which in turn forms the basis of all types of future relationships (Kirschner & Tomasello, 2009; Bensimon, Amir, & Wolf, 2008; Perry, 2001; Bowlby, 1978). Early experiences are critical in shaping the ability to form intimate and emotionally healthy relationships, which serve as a template for future relationships. According to Perry, attachment is a "special enduring form of emotional relationship with a specific person, which involves soothing, comfort and pleasure," and "the loss or potential of loss evokes distress," (Perry, 2001, p.2). Attachment most commonly develops between a mother and infant, and this bond shapes all future relationships. Healthy attachment between the infant and mother is built by repetitive healthy bonding experiences, which provide a positive foundation for future relationships.

Attachment is formed during critical periods of development. Infants are defenseless against harm, and are therefore dependent upon the mother and other caretakers to provide support and other needs for survival (Kirschner & Tomasello, 2009; Harris, 2007; Perry, 2001.). For example, if the infant is hungry and cries out for the mother, and she responds with nourishment, the infant will learn that the mother is someone on whom they can depend. If the infant feels threatened and the mother consoles and protects the infant, the infant will learn that the mother is someone who will keep them safe. Repetitive experiences cause the baby to understand that the mother is reliable, and therefore forms a healthy, secure attachment style with her (Perry, 2001). The infant feels secure that the mother, and ultimately other people, is dependable. The infant learns to derive pleasure from relationships and in turn, find them rewarding.

Unfortunately, not all infants are parented in this manner. Neglected children are sometimes left alone to fend for themselves for hours at a time with no support from their caretakers. Infants may be left in their cribs as they cry throughout the night while the caretakers fail to respond to them (Courtois & Ford, 2009; Perry & Szalavitz, 2006). Instead of learning that other people are safe and dependable, the infant learns that caretakers do not provide support, and the only person that they can trust is himself or herself. This belief may persist throughout the development of new relationships, as the child continually does not turn to others for help or support. Instead of learning that relationships are rewarding, the child fails to recognize relationships as worthwhile. The problems that result from this can range from mild discomfort while socializing with people to profound social and emotional problems (Perry, 2001). In addition, these children have problems attuning to the needs and wishes of others. They may also be excessively aggressive and cruel, and exhibit a lack of empathy for others because forming relationships with others is not rewarding to them.

Physiological Reactions. When a child is exposed to an event that elicits a fear response, the body's stress system reacts in a way to best ensure survival. This is often done with the "fight or flight" response in which the body prepares to survive the oncoming threat. When the stress response is initiated, the reaction causes an increase in the activity of the sympathetic nervous system which results in an increase in heart rate, muscle tone, blood pressure, respiration, a sense of hyperarousal, and the tuning out of all non-relevant stimuli (Perry, Pollard, Blakley, Baker, & Vigilante, 1995). All of these reactions prepare the body to either fight or flee from the threat.

During a traumatic event such as sexual molestation, the child's stress reaction elicits the fight or flight response. The child tunes out irrelevant stimuli and only pays attention to the information that is necessary for survival. After the trauma is over, the memory still lingers and the child is likely to have a heightened sense of arousal as they search for cues in their environment that may indicate future trauma (Courtois & Ford, 2009). If the abuse is ongoing over a period of time (which most cases of abuse are), the stress response will be chronically activated. Unfortunately, not only is the stress response initiated during the traumatic events, but it is also reactivated when the child is reminded of the event, such as simply thinking or dreaming about it. Therefore, the stress response becomes generalized across many situations, both safe and threatening (Harris, 2007; Perry & Szalavitz, 2006; Perry et al., 1995). For example, instead of thinking about the trauma solely when the perpetrator is around, the child's hyperarousal causes them to become fearful or stressed in the presence of any adult. This means that previously unthreatening stimuli are now threatening, which more easily evoke the stress response. This leads to the child to live in a constant state of fear because they do not feel that they are in a safe environment. Because of the overgeneralization of the stress response, the child is often in a near-continuous state of hyperarousal. To further support this idea, Perry & Szalavitz (2006) have recorded the resting heart rates of children who have a history of trauma,

and they found that these children had resting heart rates that were well above normal, around 160bpm.

Due to the lack of uniformity of symptoms, it is often challenging to diagnose a child with a trauma-related disorder. No two children react to trauma in the same way. While one child's symptoms may include hyperarousal and hyperactivity, another child's symptoms may include depression and emotional withdrawal. Given the variety of the symptoms, it is equally as challenging to treat each child. Clinicians struggle with deciding which symptoms to treat because presently, there is not much evidential support for treatments that are geared at treating all of the symptoms. The treatments in the present study were based on two of the theories that are directed at treating the majority of trauma-related symptoms.

Evidence-Based Treatment

Currently, there are a handful of evidence-based therapies for children with a history of trauma. Most of these therapies are traditional "talk" psychotherapies, such as Trauma-Focused Cognitive Behavioral Therapy (TF-CBT), Contextual Behavioral Trauma Therapy (CBTT) and Experiential Dynamic Therapy (Courtois & Ford, 2009). The goals of TF-CBT are to improve functioning and emotional well-being by identifying the faulty thinking and psychological disturbances, related to the traumatic experiences, which result in negative behaviors. TF-CBT focuses on targeting the harmful, negative thoughts of the victim and altering them in order to impact their related behaviors. There is a wealth of evidence for the effectiveness of this type of therapy, but most of it comes from studies of adults and adolescents with at least average intelligence and relatively well-developed cognitive skills (Cloitre, M., Cohen, L, & Koenen, K., 2006). The other two types of psychotherapy involve focusing on cognitions and addressing the related negative behaviors. All of these psychotherapies rely heavily on verbal communication. Unfortunately, not every child is able to verbally express their thoughts and emotions, and it is

therefore important to investigate non-traditional forms of therapy that will allow for the child to process the trauma without talking through it (Courtois & Ford, 2009).

Neurosequential Model of Therapeutics

Brain Development. Until recently, the uninformed belief was that children were not affected by trauma because their brains had not finished developing, and so they are not capable of understanding the trauma (Schwarz & Perry, 1994). Unfortunately, only half of this assumption appears correct. It is true that children's brains are not fully developed, but this means that they are even more susceptible to be affected by traumatic events because they disrupt the normal patterns of brain development (Perry & Pollard, 1998). Adults are not as affected by trauma because their brains have largely stopped developing and their brains have the potential to return to the original state of organization after the event. Unfortunately, according to the NMT, the traumatic experiences may serve as the "original organizing experience for the child, thereby determining the foundational organization and homeostasis or key neural systems" (Perry & Pollard, 1998, p. 36). Given that the development of the more basic brain regions occurs earliest in development, the earlier in life that the trauma occurs, the worse the impact. If the more basic brain regions are damaged or have developed irregularly, it will cause the more complex regions to deviate from their normal development.

The brain is organized from the most simple regions (which develop first) to the most complex (which develop last), and each region of the brain typically develops within a particular developmental period in the child's life (Perry & Hambrick, 2008; Perry, 2006). The brain develops in a sequential order, which is the basis of the NMT. The graph below (Table 1) demonstrates the regions of the brain and the age at which they are thought to develop, as well as their functions. In order for the proper brain region to develop, it requires sufficient stimulation in the form of patterned and repetitive activation. The repetitive stimulation causes the neural

systems of the brain to organize into their proper structures and related regions. Healthy, normal repetition is crucial during the development of the brain.

Table 1

Age and Brain Development

Age of most active growth	"Sensitive" brain area	Critical functions formed
0-9 months	Brainstem	Regulation of arousal, sleep, and fear states
6 months- 2 years	Diencephalon	Integration of multiple sensory inputs; fine motor control
1-4 years	Limbic	Emotional states; social language; interpretation of nonverbal information
3-6 years	Cortex	Abstract cognitive functions; socioemotional integration

*(Perry, 2006, p. 41)

According to the NMT, if the brain does not receive the proper repetitive stimulation, the neural systems may begin to organize into incorrect pathways, thus causing the brain to develop in maladaptive ways (Perry & Hambrick, 2008; Perry, 2006). If an infant is neglected and therefore does not hear enough words, see enough visual stimuli, or receive enough physical contact, then they will not have received enough stimulation in order for the basic brain regions to develop normally. Because the neglect and irregular development of the brain occurred at a young age, the growth of more complex regions will continue to be abnormal. Therefore, although the child may physically be 10 years old, they may only possess at least some, but not all, mental capabilities similar to a child of the age at which the trauma occurred. This is why a 10-year-old traumatized boy may throw temper tantrums like a 3-year-old when he becomes upset.

Intervention. The Neurosequential Model of Therapeutics (NMT) focuses on the order in which the brain develops and the age with which the current development correlates. In other words, in order to determine what type of treatment would be most effective for a traumatized child, it is important to know the age at which the trauma occurred and the brain region that should have been developing at that time (Perry & Hambrick, 2008; Perry & Szalavitz, 2006; Perry, 2006). Instead of implementing treatment based on the physical age of the child, it is crucial to provide therapy that is appropriate for the age at which the trauma occurred.

The NMT is comprised of three different principles that investigators can use to guide their NMT-based interventions. The first goal of the treatment is to provide the child with experiences that are relevant to the emotional age of the child (Perry, 2006). For example, talk therapy would not be an effective way to initially address trauma for a child that experienced abuse at the age of four (even if the child is currently much older). The activities and interventions must match the child's developmental age. The intervention must also involve activities that are repetitive. In order to compensate for the incorrect development of the neural pathways, the child must be exposed to enough repetitive stimulation to redirect the neuronal development. It is important that the treatment incorporates experiences that correlate with their developmental needs, which reflect the age the crucial stimuli were missed (Perry and Szalavitz, 2006).

The second principle of the NMT is that the activities are provided in a healthy, stable context (Perry, 2006). It is crucial that the child be removed from the environment in which the trauma occurred, and placed in a stable, predictable environment. The child cannot process the trauma while they are still experiencing the "fight or flight" response. In order for the child to be able to process the trauma, they must feel that they are in a safe place and out of harm's way. If

the child learns to expect what is coming, they are no longer in constant fear of the unexpected, and thus can begin to process the trauma.

The third principle of the NMT is that the treatment should be rewarding for the child (Perry, 2006). The intervention will be much more effective if the child derives pleasure from the activities. A rewarding intervention will be more effective because it will keep the children engaged and excited. This will increase the participation in the activities and the desire for more.

Unfortunately, the NMT has not developed a specific type of therapy- instead, it outlines the basic concepts for an effective therapeutic intervention. An essential component of the NMT is the idea of rhythm (Perry & Szalavitz, 2006; Perry, 2006). Our bodies rely on one fundamental rhythm- the heartbeat. Without it, human beings would not be able to function. The heart and the brain work very closely together, especially when dealing with the response to stress. As part of the stress response, the brain signals the heart to increase the heart rate and blood flow. In addition, heart rate is an excellent indicator of a person's mental state- when someone is stressed, their heart tends to beat faster. When they are calm, the heart beats slower. Humans are very dependent on the heartbeat because it is the fundamental rhythm of life. Therefore, the NMT highly suggests incorporating activities that are focused around rhythm. Dancing, drumming, and singing are examples of incorporating a rhythm into the activity. These types of activities cause the children to pay attention, or attune to, the specific rhythm.

Another important component of the recommended NMT principles is the idea of repetitive, bilateral stimulation of the brain (Perry & Szalavitz, 2006; Perry, 2006). In order for a treatment to be effective, the brain must be able to reorganize itself, and therefore the NMT recommends a repetitive activity that targets both halves of the brain. Bilateral stimulation allows for increased communication between the two brain hemispheres across the corpus callosum. This allows the child to rely equally on both brain hemispheres. The NMT also theorizes that the

bilateral stimulation allows the brain to either reorganize itself or continue to develop from where it left off. The NMT also recommends activities such as dancing and drumming because it causes the child to use their body in a back-and-forth, repetitive motion. When the child uses body parts from both sides of their body, they are stimulating the brain bilaterally. For activities such as dancing and drumming, not only are children paying attention to rhythm, but they are also activating both hemispheres of their brain.

The third and final recommendation of the NMT is to incorporate activities that improve attunement. Attunement is the "ability to read and respond to the communicated needs of others, which involves synchronous and responsive attention to the verbal and non-verbal cues of another" (Perry, 2001, p. 9). Most traumatized children struggle with paying attention to their own body and needs, and struggle even more with attuning to others (Perry & Szalavitz, 2006). However, through exercises that involve following and repeating after a leader, attunement can be promoted because it causes the child to be aware of what someone else is doing. By paying attention and mimicking another person, the child becomes aware of the actions of others. Achieving attunement can be practiced through activities such as drumming and movement because the child can be asked to follow the movements or patterns of a designated leader. Not only is it important to be attuned to the needs of others, but it is also crucial that the child learn to recognize the needs and desires of their own body. Many traumatized children are relatively unaware of their internal bodily states, which can lead to somatization problems (Perry, 2006). Attunement causes children to pay attention to and recognize how they are feeling in the moment.

Sensory Integration Theory

In addition to the NMT, many researchers and clinicians are hard at work to develop effective therapies for children who have experienced complex trauma. Another existing theory

is the idea of treating these children using a sensorimotor intervention. Most children with a history of trauma struggle with being aware of what they are experiencing physically, emotionally, and internally (Courtois & Ford, 2009; Ogden et al., 2006). Sensorimotor theories stress the importance on focusing on both the body and the mind in the present moment during the intervention. During the intervention, both the interventionist and the participants pay close attention to the thoughts, feelings, and inner body sensations that are experienced, which helps to improve self-regulating body arousal. The goal of sensorimotor therapy is to encourage the children to attune to their body and mind during the moment. It is important that the children become attuned to their surroundings and how they are feeling in the present. Unfortunately, research on the effectiveness of these interventions is very limited.

NMT and other sensorimotor therapies share a few of the same principles, especially attunement. Both types of interventions stress the importance of stimulating the child in order to cause them to pay attention to their body and their surroundings. Both interventions recommend similar types of activities, such as movement and dancing, that increase attunement (Perry, 2009, 2008; Ogden et al., 2006). However, these two interventions differ because the NMT has more of a neurological basis (Perry, 2009, 2008, 2006). Although attunement is an important aspect of the NMT, the primary focus of this theory is the idea of providing the brain with enough patterned stimulation in order to allow the brain to develop sequentially.

Present Study

The purpose of this study was to examine the effects of a bilateral sensorimotor intervention on children who have experienced complex trauma. In implementing this intervention, we used the concepts from the NMT as well as other sensorimotor principles. The intervention was comprised of three different categories of treatment- drum circles, spinning groups, and movement therapy. Each of these activities emphasized the principles of NMT and

sensorimotor interventions. It is also important to note that the Illinois Department of Child and Family Services as adopted the principles of the NMT as a promising, evidenced-based model, and recommends incorporating these activities into treatment (Illinois Department of Child and Family Services, 2008).

Drum circles have become increasingly popular in clinical treatment, although studies evaluating them are still very limited. Drumming has been suggested to be effective in the treatment of clinical disorders for multiple reasons, many of which correspond with the principles of NMT and sensorimotor interventions. The results of the Bittman et al. (2001) study suggest that drumming is effective because it increases attunement to rhythm (which is essential to basic human functions), increases group attunement and cohesion, increases fine motor skill abilities, and increases group identity and a feeling of belongingness. In order for the drum circles to be effective, group members must pay attention to the other members of the group and must all play to a central rhythm. This causes the child to attune to others and to how others are responding to them. This attunement helps to increase group association and bonding (Lang, 1990).

In addition to increasing attunement, drumming has also been used as a form of music therapy with PTSD victims. Bensimon et al. (2008) proposed that traumatic memories are presented in the form of flashbacks and nightmares, which are very primitive and are typically stimulated by similar sensory output. According to this theory, traumatic memories are stored in inflexible, primitive structures of the brain and are not easily stored as other memories. According to Bensimon et al., this leads to “an inability to translate sensory motor representations, processed apparently in the right hemisphere, into meaningful symbolic and verbal representations which are processed apparently in the left side. This may result in disability to translate emotions into words”, which can explain why traumatized children have

difficulty expressing what they are feeling (pg. 36). Furthermore, they argue that music and traumatic memories are sensory-mediated, and so drumming may serve as a way to access and reprocess these memories without having to talk about them. Qualitative data indicated that the participants felt a strong sense of group belongingness that was established during the drum circles. The results of this study further supported the concept of increasing group belongingness and attunement to others. For these reasons, the present study included drum circles in the intervention.

The present study also included movement therapy and spinning sessions. Both of these activities are directed at modulating the level of activity in the body while encouraging the children to pay attention to how they are feeling mentally and internally (Malchiodi, 2008). The purpose was to cause the children to notice the changes that their bodies were experiencing during the different activities. By focusing on how the body is feeling in the present moment, it caused the children to acknowledge the current surroundings and to develop a connection with the present (Volkman, 1991). As of the present date, there have not been any studies that have incorporated spinning into their inventions. Spinning groups were included in order to provide the children with a form of safe bodily stimulation with the goal of increasing their awareness of what they were feeling. Spinning groups were also included due to recent success with a child experiencing complex trauma-related stress, living in a foster home, at his school. The child was allowed to spin on a chair for approximately 15-minutes a few times a day. During this time, the teachers noticed a decrease in exhibited problematic behaviors in the child. Unfortunately, this was not an empirically-supported case study.

The present study had several goals. Given that there is a dearth of information about the effectiveness of sensorimotor and NMT-based interventions on children who have experienced complex trauma, one goal of this pilot study was to assess their effectiveness in reducing

problematic behaviors. Despite the small number of participants, it was important to determine whether similar future interventions should be pursued. In order to assess the potential effectiveness of the treatment, we were looking for differences between the two groups (treatment vs. control). We had five hypotheses regarding negative behaviors. Our first hypothesis evaluated major problem behaviors. We predicted that we would see a difference between the two groups after the intervention, such that the treatment group would show fewer major problem behaviors (which are explained in the *Measures* section). Our second hypothesis evaluated minor problem behaviors. We hypothesized that the treatment group would demonstrate fewer minor problem behaviors after the intervention. Additionally, our third and fourth hypotheses regarded time-out procedures. We expected to see fewer time-out procedures, as well less time spent in time-out procedures (which are also explained in the *Measures* section). Our fifth hypothesis regarded bedtime problems. We hypothesized that the treatment group would have fewer bedtime problems than the control group following in the intervention. Given that both groups were involved in regular treatment, we expected that both groups would have fewer behavioral problems over time, but we expected to see less behavioral problems in the treatment group in comparison to the control group following the intervention. In addition to problem behaviors, we had two hypotheses regarding positive behaviors. Our sixth and seventh hypotheses regarded the number of daily points and positive behaviors. We hypothesized that the treatment group, in comparison to the control group, (1) would demonstrate more daily points earned at the RTC for appropriate behavior and (2) would exhibit more positive behaviors following the intervention.

Method

Participants

The study involved a total of 12 males who lived in the Residential Treatment Center (RTC) of The Baby Fold. The RTC has been licensed and designated by the state of Illinois to serve children with severe behavioral and emotional problems through the age of 13. The RTC consists of four units with the older boys living in two of the four units; these boys were the focus of the present study. The ages of the boys in both units ranged from 9-12 (M= 11.4). In the control group, four children were Caucasian, one child was Biracial (African American and Caucasian), and one child was African American. In the treatment group, three children were Caucasian, and three children were Biracial (African American and Caucasian). One unit (the treatment unit, n = 6) received the intervention while the other unit (control unit, n = 6) continued to receive only the regular treatment typically provided by the RTC. Prior to the intervention, each boy was placed in one of the groups upon entrance into the Residential Treatment Center. We chose to keep the boys in their original group for the intervention: therefore it is a quasi-experimental, or natural groups, design. Regardless of the status of the intervention, the children participated in daily Activity Groups (defined in the next paragraph) so they were not recruited nor divided into groups for the purposes of this study.

Each child in the RTC receives a variety of treatment. Treatment involves individual psychotherapy (once a week), group psychotherapy (typically once a week), medication management by a psychiatrist, family therapy (if the family is involved, once or twice a month), case management services, a behavior modification program (including point-level systems which are described in the next section), informal social skills and problem-solving training, and daily Activity Groups. Activity Groups typically consist of hour-long activities that are designed to teach children the qualities, values and skills needed to internalize or develop in order to function successfully in a less restrictive (family) setting. In addition, these groups are intended

to be related to at least one of the children's individual treatment goals or skill deficits based on the children's DSM IV-TR diagnoses. Some examples include taking trips, playing games that promote group cohesion, and engaging in art activities.

Measures

We monitored the effectiveness of the intervention by assessing the level of frequency at which specific behaviors occurred, percentage of daily points earned, and duration of time-out procedures before and after the intervention was implemented. RTC staff members were already trained in assessing the behavior of the children and performed continuous frequency coding of their behavior, regardless of the current intervention. For the purposes of this study, we used the regular agency records of behavior data and did not administer any extra measures. The staff members monitored frequency counts of two types of behaviors: Behaviors to Change ("Point Loss" behaviors) and Behaviors to Increase ("Points Earned" behaviors). This study focused on 23 Behaviors to Change, which fell under the categories of Peers, Equipment, Adults, Directions, and Yourself. Examples of each of the categories include "Aggression to a peer" (Peer), "Destruction of property" (Equipment), "Aggression to an adult" (Adult), "Not following an established rule" (Directions), and "Self-Abuse" (Yourself). We focused on four Behaviors to Increase, which include Demonstrating self-control, Demonstrating appropriate/positive affect, Demonstrating pro-social behavior, and Demonstrating adaptive daily living skills, such as staying on task during homework and chores. Staff members also recorded a point for each 10-minute period of positive behavior, and recorded the frequency and duration of all time-out and crisis intervention procedures. For each "Behavior to Change" that occurs (i.e. being rude to an adult), the child lost a point. For each "Behavior to Increase" that occurs (i.e. helping a peer who has fallen), the child gained a point. The total number of points at the end of the day reflected the number of points lost or gained due to their behaviors. In addition to monitoring these behaviors,

staff members kept track of the number of time-out procedures and their duration. A time-out procedure may occur after a child engages in problematic or unsafe behaviors, such as acting aggressive towards others, that necessitate isolating the child from staff and peers. There are several levels of time-out procedures used in the RTC, depending on the nature of the problem and current level of the child's dangerousness. Additionally, staff members monitored the number of nights per week that the child has difficulty going to bed. Examples of problems include leaving their room and disturbing other children.

The variables represented by the data were the targets of the intervention. A full list of behaviors and explanations can be found in the appendix (Appendix #1). This study used the behavioral coding for pre- and post-intervention comparisons, as well as for between groups comparisons.

We assessed data from the two groups over a 15-week period- five weeks prior to the intervention, five weeks during the intervention, and five weeks following the intervention. Both "Behaviors to Change" and "Behaviors to Increase" were grouped into categories. These categories are "Major Problems", "Minor Problems" and "Positive Behaviors". We also monitored the Average Daily Points earned, number of time-out Procedures, and duration of time-out Procedures.

Intervention Description

The research project lasted for a total of 15 weeks. The pre-intervention data collection lasted five weeks, followed by the intervention for five weeks, and the post-intervention data collection for the final five weeks. The data collected during the intervention was not used in this study. The intervention took place in the form of Activity Groups, which occurred daily in the RTC. The treatment group participated in the special Activity Groups, while the control group continued to participate in their regular Activity Groups. There were three types of Activity

Groups that were all derived from the Neurosequential Model of Therapeutics and other sensorimotor interventions (Courtois & Ford, 2009; Perry, 2009, 2008, 2006, 2002; Malchiodi, 2008; Ogden et al., 2006). The three types of groups included Drum Circles, Spinning Groups, and Movement Therapy. Each type of group took place one day a week, and there were three Activity Groups per week. Each group lasted for one hour, including warm-up activities, the intervention, and cool down activities. Therefore, each child participated in 18 one-hour sessions utilizing the specialized Activity Groups.

The researcher, who was assisted by RTC staff, facilitated each Activity Group. Each Activity Group began with an "icebreaker" activity that was geared toward increasing the group camaraderie and increasing the lightheartedness of the atmosphere. Such icebreakers included activities involving passing around sand-filled plastic eggs at a slow pace, and then increasing the pace until the participants could no longer maintain the pace and dropped it.

Drum Circle. After the icebreaker activity, each participant was given a hand drum that was provided by the researcher. The researcher facilitated many exercises involving the repetition of simple patterns that incorporated both hands. For example, the researcher drummed out a pattern that was consistent with the syllables in her name. Each participant repeated this pattern, and then this pattern went around the circle. Next, each participant drummed out the syllables in their name, and the rest of the group repeated it. Afterwards, the facilitator continued to lead by demonstrating simple patterns that the rest of the group repeated. The rhythms and patterns were passed around the circle and modified by each participant. The facilitator also increased and decreased both tempo and volume. Group members were allowed to lead their own patterns, and the group responded by repeating the designated pattern. The drum circles lasted for one hour and were repeated once a week. The drumming required every participant to use both hands, which is considered bilateral stimulation. It also required the participants to pay

attention to other group members and follow the same beat, which is a form of attunement. The ideas of bilateral stimulation and attunement are key components in the Neurosequential Model of Therapeutics (Perry, 2009, 2008, 2006, 2002).

Spinning Groups. After the icebreaker activity, the facilitator led the group in three levels of spinning- standing, sitting, and swinging. Each child was paired with a staff member. For the standing spinning groups, the participants were asked to begin spinning at a slow rate. After a set time has passed (approximately 10 to 15 seconds), the children were asked a series of questions, geared at focusing the child on how they were feeling internally, which promoted mindfulness and bodily awareness (which is a key aspect of attunement). They were then directed to increase their speed to one at which they were comfortable. After another 15 seconds, the children stopped were asked similar question. Afterwards, the children continued to spin for a given amount of time, and were later asked to pay attention to what they were noticing about their body. For the swivel chair groups, the RTC staff members spun the children at different speeds (as long as the children were comfortable; up to 30 seconds), and also stopped to have the children evaluate how their bodies were feeling. The swing set group followed the same procedure, except that the RTC staff member twisted/wound-up the swing while the children were on it, and then released the swing, which caused it to spin. The goal was to help the children to pay attention to their body, and to vocalize what they were feeling, using expressions more descriptive than “good” and “bad”, such as “dizzy” or “heavy”.

Movement Therapy. The researcher led each Movement group, using instructions provided by a Movement Therapist. In the beginning of the session, the participants listened to music and either walked or clapped to the beat of the song. This was geared towards attuning the children to the music. Some following activities included: asking each child to say their name and do a movement that describes how they were feeling that day, which was mimicked by the

rest of the group; playing "Follow the Leader" around the gym, involving simple steps and arm movements; and asking the children to dance freely to music until the music was stopped and the children froze in their spots. Once the music resumed, the children continued to dance. The dancing was intended to cause the children to pay attention to how they were feeling internally, and what kinds of emotions they were experiencing. In addition, games like "Follow the Leader" were geared towards paying attention to others. In addition, every movement group involved repetitive, bilateral movement. This activity was recommended by the NMT because the bilateral, repetitive movement may stimulate the brain and provide it with the proper stimulation that it needs to continue to develop sequentially (Perry, 2009, 2008, 2006).

Results

As previously stated, we hypothesized that we would see a difference between the two groups after the intervention, such that the treatment group would show fewer major problem behaviors. In order to evaluate this hypothesis, Independent Sample T-Tests were conducted to analyze possible significant differences between the treatment and control groups. Levene's Test for Equality of Variances was performed on all T-Tests, and if the variances of the groups were significantly different, then more stringent values were used to account for this. As predicted, the treatment group (M= 5.14, SD= 5.79) showed significantly fewer major problem behaviors than the control group after the intervention (M= 21.57, SD= 15.78); $t(12)= 2.59$, $p< .017$. There was no significant difference between the groups on major behaviors prior to the intervention; $t(12)= 1.36$, *ns.*

In addition to the major behaviors, we hypothesized that the treatment group would demonstrate fewer minor problem behaviors in comparison to the control group following the intervention. Unfortunately, there was a significant difference between the treatment group (M= 142.29, SD= 103.53) and the control group (M= 288.14, SD= 105.17) before the intervention

was administered (t(12)= 2.62, $p< .023$). Therefore, we were unable to determine if significant changes occurred due to the intervention. We also hypothesized that we would see a significant difference in the number of daily points earned for appropriate behavior between the two groups following the intervention. Unfortunately, there was a significant difference in average number of daily points between the treatment group (M= 89.29, SD= 6.97) and control group (M= 79.00, SD= 6.88) before the intervention began (t(12)= -2.78, $p< .017$), so it was not possible to accurately determine if a difference (due to the intervention) existed after the intervention. Additionally, we were unable to test the hypothesis regarding a significant difference between groups in positive points after the intervention because there was a significant difference in positive points between the treatment group (M= 29.57, SD= 9.33) and control group (M= 9.86, SD= 5.58) before the intervention; t(12)= -4.80, $p< .001$.

We also hypothesized that we would see fewer time-out procedures in the treatment group relative to the control group after the intervention. As predicted, results demonstrated that the treatment group had significantly fewer time-out procedures (M= 3.00, SD= 3.74) than the control group after the intervention (M=13.43, SD= 10.21); t(12)= 2.537, $p< .017$. Prior to the intervention, there was no difference between the two groups for time-out procedures (t(12)= 1.463, *ns*). In addition, results demonstrated that the treatment group spent significantly less time in procedures (M= 95.00, SD= 147.39) than the control group after the intervention (M= 665.29, SD= 429.68); t(12)= 3.32, $p< .006$. There was no significant difference in duration of time-out procedures between the groups before the intervention (t(12)= 1.950, *ns*).

Finally, we hypothesized that the treatment group would have significantly fewer bedtime problems than the control group following the intervention. As predicted, results supported the hypothesis, such that the treatment group (M=20.29, SD= 23.73) demonstrated significantly fewer bedtime problems than the control group (M= 57.29, SD= 23.25); t(12)=

2.95, $p < .006$. There was no significant difference between the groups on number of bedtime problems prior to the intervention, t(12)= 1.871, *ns.* The table below (Table 2) demonstrates the significant findings of this study.

In addition to testing our hypotheses, we ran secondary, exploratory analyses to determine whether any differences existed within each group from pre- to post-intervention. We ran Paired Samples T-Tests for both the control group (pre- to post-intervention) and the treatment group (pre- and post-intervention). Only one test showed significant results, such that the control group was significantly worse in terms of number of positive points (t(12)= 3.78, *p<.01).* This was the only test to show significant differences within each group from pre- to post-intervention.

Table 2

Significant results between treatment and control groups following intervention

	Treatment	Control	
Hypothesis	M (SD)	M (SD)	*p*
*Major Behaviors	5.14 (5.79)	21.57 (15.78)	0.017
*Number of Procedures	3.00 (3.74)	13.43 (10.21)	0.018
**Duration of Procedures (min)	95.00 (147.39)	665.29 (429.68)	0.006
**Bedtime Problems	20.29 (23.73)	57.29 (23.25)	0.006

**denotes p<.05, **denotes p<.01*

Discussion

As previously stated, the purpose of this study was to evaluate the effectiveness of a sensorimotor intervention in children who have experienced complex trauma. There are very limited data available on treatments for complex trauma in children, and even less data available

for sensorimotor interventions. Therefore, it was important to assess the effectiveness of this pilot study in order to help determine directions for future research.

Our first hypothesis stated that we expected to see a greater decrease in major problem behaviors in the treatment group compared to the control group. Our results support this hypothesis; the treatment group had significantly fewer major problem behaviors than the control group following the intervention. Both groups displayed a trend of change in problem behaviors in the expected direction from pre- to post-test, but the treatment group had significantly fewer problems than the control group (and this difference was not present prior to the intervention). These results supported our hypothesis that the sensorimotor intervention would cause the treatment group to exhibit significantly fewer problem behaviors. These results are very reflective of the goals behind the NMT in terms of behaviors (Perry, 2009, 2008, 2006). As a child with a history of trauma, and therefore potential brain development abnormalities, is exposed to more and more bilateral stimulation, their brain could continue to develop normally. As their brain development progresses, they gain more and more executive control, such as emotional regulation. The better emotional regulation they gain, the easier it becomes to control emotions when they become strong, thus preventing hyperarousal. Therefore, less problem behaviors demonstrate better emotional control.

Additionally, we obtained significant results in tests of other hypotheses. We hypothesized that the treatment group would have significantly fewer bedtime problems following the intervention in comparison with the treatment group. Results supported our hypothesis in that the treatment group had significantly fewer bedtime problems than the treatment group (and this difference was not present prior to the intervention). We also hypothesized that, following the intervention, the treatment group would have fewer procedures and would spend less time in the procedures than the treatment group. Results also supported

both of these hypotheses: following the intervention, the treatment group had fewer procedures and spent significantly less time in these procedures than the control group, and this difference was not present prior to the intervention.

Although this study was a pilot study and involved a very limited sample, the results of the study are very exciting and provide preliminary support to the use of interventions derived from NMT and sensorimotor therapies. The significant findings of this study, such as fewer major problem behaviors and less time-out procedures are very reflective of the goals behind NMT and sensorimotor therapies. Fewer problem behaviors and less time-out procedures demonstrate better control over the participants' emotions and arousal. After the intervention, these children were apparently better able to regulate their emotions before becoming too emotionally aroused by upsetting stimuli. The intervention appeared to help them to regulate their emotions and therefore not act out behaviorally, which is one of the core goals of NMT.

Implications. The results of this study provide concrete, useful treatment implications for traumatized children, within and outside of residential placement. This study was the first known study to evaluate the effectiveness of a developing treatment model for children that shows much promise to be effective for children with complex trauma-related disorders. It is a very important contribution to the field because the results support a new therapy that has the potential to be very effective in treating children with a history of trauma.

The use of these interventions has already begun expanding in the RTC of The Baby Fold, so there will be the possibility of larger scale research being conducted at The Baby Fold. While implementing this expansion, the RTC has begun looking for ways to control for the limitations of the pilot study. For example, they are implementing the intervention across more groups, which will increase the sample size. Given the larger sample size, we are hopeful to see more significant results across groups.

Non-traditional therapies, such as the therapies in this study, are still viewed skeptically by the broad clinical and academic community, despite their increasing use. Research such as this study will not only hopefully lead to more support that they are effective, but also to a greater understanding of why they work, greater ability for professionals to implement them, better acceptance by the field, and more willingness of sponsors to fund these services. Further, since more traditional "talk" therapies are more challenging to implement with complex trauma victims, especially young children, clinicians need more evidence-based, non-traditional approaches to use with these children. Further research into non-traditional therapies, such as the ones in this study, have the potential to be very effective for these young children.

Finally, since many of these principles can be implemented by parents, teachers, and other caregivers, treatment can be implemented more extensively and at a much lower cost than traditional treatments. The treatment does not require the children to be in a mental health facility, and can be implemented nearly anywhere. While the treatment can be implemented in individual therapy, it can also be used more efficiently in a group format.

Strengths

Although this was a pilot study, and continued research should be pursued, the present study had several strengths. It is the first study known to date that systematically implemented and examined benefits of applying principles of the Neurosequential Model of Therapeutics and sensorimotor therapies in a short-term group intervention. Although there has been research published on the Neurosequential Model, none of the available research has implemented treatment principles in a controlled study. This study was a critical first step in evaluating the implications of the NMT approach. The significant results that support our hypotheses have

indicated that future research should be pursued in order to further test the effectiveness of the Neurosequential Model and sensorimotor therapies.

Another strength of the study was the naturalistic setting in which the intervention took place. The intervention took place in the residential treatment center (RTC) as part of their daily activity groups, and was therefore a part of their regular treatment. This greatly increases external validity, as the intervention can be easily implemented in other residential treatment centers. In addition, given that the participants in the study had been placed in the residential treatment care due to extreme emotional and behavioral issues related to complex trauma, this sample represents the population of complex trauma victims with the most severe effects of the trauma.

Additionally, a strength of this study was the use of pre-existing groups. Instead of randomly assigning the participants to groups, we used the natural residential groups as our focus. Using the pre-existing groups increases external validity, because most residential treatment centers also have pre-existing groups where treatment is conducted, so it will be easier to implement in other centers.

In addition, our study was strengthened by the high reliability of the data collection. The data collected focused extensively on observable behaviors, which are much more reliable than global measures would have been (.e.g. rating scales on child performance pre and post-intervention). Data collection on observable behaviors limits rater biases, which strengthens the validity of the results. Further, the RTC staff members are extensively trained to obtain highly reliable, consistent data. Therefore, there is a high degree of inter-rater reliability.

Further, not only are the data reliable, but we also used multiple measures and aggregates of multiple measures to test our hypotheses. This method is much more valid than using a single measure to support our hypotheses.

Limitations

There were several limitations that could have impacted the outcome of this study. The first limitation was the very small sample size. Each group contained only six to eight participants, but not all of these participants were able to be included in the data due to entrances and exits from the program during the 15-week intervention period. Therefore, the data was limited to only 12 participants (six per group). The limited sample could have impacted the results because of the difficulty of achieving significant results with a small sample size. It is possible that if the study had included a greater number of participants that it would have seen more significant results.

In addition, the control and treatment groups were not as similar before the intervention as originally anticipated. Although the groups were nearly identical in age and gender, and were assigned to their residential group based solely on availability of beds rather than client characteristics, their behavioral patterns were very different. Prior to the intervention, the treatment and control groups were significantly different on the number of daily points earned, number of minor behavior problems, and number of positive points (with the children in the control group showing significantly more problems and earning fewer positive points). Therefore, although the groups differed significantly in these areas after the intervention, it is impossible to determine the impact that the intervention had on these areas.

This study was further limited by the timing of the intervention. The 15-week data collection took place from October through December, and ended a few days before Christmas. Considering the impact of holidays and emotions on children, this could have negatively impacted the outcome of the study. Children with complex trauma related disorders often have difficulty regulating their emotions (Courtois & Ford, 2009). They are often unable to maintain control over their emotions, and frequently feel overwhelmed by the emotions they experience.

Holidays and other events tend to elicit strong emotions in children, especially in children in residential treatment who are unable to be with their families during the holiday season. This is likely to elicit strong emotional reactions in the children days or even weeks before the actual holiday. Therefore, it is likely that both groups were emotionally aroused by the approaching holiday season, which would have hampered their ability to control their emotions. It is possible that this could have resulted in an increase in problem behaviors despite the effectiveness of the intervention, which could have greatly impacted the results.

Further, it is possible that differences existed between the staff members of each group. All Residential Treatment Center staff members received the same training; however, it is inevitable that individual differences still existed. It is possible that some staff members were more lenient in terms of coding behaviors, while others were stricter with their coding. Despite receiving the same training, individual differences in coding may have limited the outcome of the study.

Further, this study was limited due to the lack of gender differences. We chose to use the two pre-existing all-male groups for our study because they were nearly identical in age and other demographic information. In addition, nearly two-thirds of the children living in the RTC were males. As previously stated, this is very similar to other RTCs, because males are more commonly placed in treatment than females due to differences in exhibited symptoms. Girls tend to exhibit (or rather, internalize) symptoms that are very different than the symptoms exhibited by boys, which is why boys are more commonly placed in treatment. Unfortunately, the all-male groups were a limit of this study because we were unable to determine if this intervention would also be effective on girls with a history of complex trauma.

Finally, it is possible that experiment-wise error impacted the results. Given that we ran 11 T-Tests, there is a greater likelihood that one or more of the test results were due to chance than there would have been if we had run fewer T-Tests.

Future Directions

Given that this study was a pilot study, it is very important that future research be pursued in order to further test our proposed hypotheses, as well as the Neurosequential Model of Therapeutics. Not only is it important to determine if our hypotheses can continually be supported, but it is also important to further determine the effectiveness of the NMT and other sensorimotor interventions on children who have experienced complex trauma.

Additionally, we recommend that future studies involve a greater sample size. It is possible that our intervention would have achieved statistically significant results in other categories, such as minor behaviors or daily points, if our study had included a larger population. It is very important that future research be pursued, especially involving a larger population, in order to further support hypotheses regarding the NMT.

Future studies should ensure comparability of groups prior to intervention, and should also randomly assign participants to condition. This would ensure that the groups were equal before the study, and would eliminate any problems related to unequal groups. However, this may limit generalizability of the study to “real world” residential populations. In addition, another recommendation for future studies would be a more “pure” test of the NMT concepts. Our study was essentially comprised of three interventions from two separate theories. Therefore, it is difficult to know which separate interventions were effective. It would be interesting for future studies to test just one of the three interventions performed in this study, to see if any of them work alone. It would also be interesting for future research to compare all three interventions, using three separate experimental groups and one control group. It is

important for future research to understand which aspects of the present study were effective and which were not. In addition, future research should include additional, broader measures than already existing behavioral data used for the present study. Such measures could include assessment of self-awareness, mindfulness, and attachment.

References

American Psychiatric Association. (2004). Diagnostic and Statistical Manual of Mental Disorders (4th ed.), Text Revision. Washington, DC.

Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., Dube, S. R., & Giles, W. H. (2006). The enduring effects of abuse and related adverse experiences in childhood: A convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neuroscience, 256*(3), 174-186. Retrieved from http://dx.doi.org/10.1007/s00406-005-0624-4;

Bensimon, M., Amir, D.A., & Wolf, Y. (2008). Drumming through trauma: Music therapy with

post-traumatic soldiers. *The Arts in Psychotherapy, 35*(1), 34-48.

Bowlby, John (1978). Attachment theory and its therapeutic implications. *Adolescent Psychiatry, 6(*1), 5-33.

Children's Bureau, U.S. Department of Health and Human Services (1996). *Child Abuse Protection and Treatment Act.*

Cloitre, M. C., Cohen, L. R., & Koenen, K. C. (2006). Treating survivors of childhood abuse: Psychotherapy for the interrupted life. New York: Guilford Press.

Courtois, C. A., & Ford, J. D. (2009). Treating complex traumatic stress disorders: An evidence-based guide. *(2009).Treating Complex Traumatic Stress Disorders: An Evidence-Based Guide.Xxi, 468 Pp.New York, NY, US: Guilford Press; US.*

Harris, D. A. (2007). Pathways to embodied empathy and reconciliation after atrocity: Former boy soldiers in a dance/movement therapy group in Sierra Leone. *Intervention: International Journal of Mental Health, Psychosocial Work & Counselling in Areas of Armed Conflict, 5*(3), 203-231.

Illinois Department of Child and Family Services (2008). *Manual for Mandated Reporters.*

Johnson, D. R. (1987). The role of the creative arts therapies in the diagnosis and treatment of psychological trauma. *The Arts in Psychotherapy, 14*(1), 7-13. Retrieved from http://dx.doi.org/10.1016/0197-4556%2887%2990030-X;

Kirschner, S., & Tomasello, M. (2009). Joint drumming: Social context facilitates synchronization in preschool children. *Journal of Experimental Child Psychology, 102*(3), 299-314. Retrieved from http://dx.doi.org/10.1016/j.jecp.2008.07.005;

Lang, K. (1990). Supplementary Motor Area Activation While Tapping Bimanually Different Rhythms in Musicians. *Experimental Brain Research, 79(*3*),* 504-514.

Long -Term Consequences of Child Abuse and Neglect. Child Welfare Information Gateway. Washington, D.C.: U.S. Department of Health and Human Services, 2006. Retrieved October 10th, 2010 from http://www.childwelfare.gov/pubs/factsheets/long_term_consequences.cfm

Malchiodi, C. A. (2008). *Creative Interventions with Traumatized Children. New York, NY, US: Guilford Press; US.*

Ogden, P., Minton, K., & Pain, C. (2006). *Trauma and the Body: A Sensorimotor Approach to Psychotherapy. .New York, NY, US: Norton & Co.*

Orth, J., Doorschodt, L., Verburgt, J., & Drozeth ek, B. (2004). Sounds of trauma: An introduction to methodology in music therapy with traumatized refugees in clinical and outpatient settings. In J. P. Wilson, & B. Drozethek (Eds.), *Broken spirits: The treatment of traumatized asylum seekers, refugees, war and torture victims* (pp. 443-480). New York, NY, US: Brunner-Routledge; US.

Perry, B.D. (2001). Bonding and Attachment in Maltreated Children. In W.W. [. Norton & Company (Ed.), *Maltreated Children: Experience, Brain Development and the Next Generation"* (pp. 1-10). New York, NY. US: Guildford Press; US.

Perry, B. D. (2002). Childhood experience and the expression of genetic potential: What childhood neglect tells us about nature and nurture. *Brain & Mind, 3*(1), 79-100. Retrieved from http://dx.doi.org/10.1023/A:1016557824657;

Perry, B. D. (2006). Applying principles of neurodevelopment to clinical work with maltreated and traumatized children: The neurosequential model of therapeutics. In N. B. [. Webb (Ed.), *Working with traumatized youth in child welfare* (pp. 27-52). New York, NY, US: Guilford Press; US.

Perry, B. D. (2008). Child maltreatment: A neurodevelopmental perspective on the role of trauma and neglect in psychpathology. In T. P. [. Beauchaine, & S. P. [. Hinshaw (Eds.), *Child and adolescent psychopathology* (pp. 93-128). Hoboken, NJ, US: John Wiley & Sons Inc; US.

Perry, B. D. (2009). Examining child maltreatment through a neurodevelopmental lens: Clinical applications of the neurosequential model of therapeutics. *Journal of Loss and Trauma, 14*(4), 240-255.

Perry, B.D., & Azad, I. (1999). Post-traumatic Stress Disorders in Children and Adolescents. *Current Opinions in Pediatrics, 11*(4), 196-206.

Perry, B.D. & Hambrick, E.P. (2008). The Neurosequential Model of Therapeutics. *Reclaiming Children and Youth, 17*(3), 38-43.

Perry, B. D., & Pollard, R.A. (1998). Homeostasis, stress, trauma, and adaptation: A neurodevelopmental view of childhood trauma. *Child and Adolescent Psychiatric Clinics of North America, 7*(1), 33-51.

Perry, B. D., Pollard, R. A., Blakley, T. L., Baker, W. L., & Vigilante, D. (1995). Childhood trauma, the neurobiology of adaptation, and "use-dependent" development of the brain: How "states" become "traits.". *Infant Mental Health Journal, 16*(4), 271-291. Retrieved from http://dx.doi.org/10.1002/1097-0355%28199524%2916:4%3C271::AID-

IMHJ2280160404%3E3.0.CO;2-B;

Perry, B. D., & Szalavitz, M. (2006). *The Boy Who was Raised as a Dog and Other Stories from a Child Psychiatrist's Notebook: What Traumatized Children can Teach Us about Loss, Love, and Healing. New York, NY, US: Basic Books; US.*

Read, J., Perry, B. D., Moskowitz, A., & Connolly, J. (2001). The contribution of early traumatic events to schizophrenia in some patients: A traumagenic neurodevelopmental model. *Psychiatry: Interpersonal and Biological Processes, 64*(4), 319-345. Retrieved from http://dx.doi.org/10.1521/psyc.64.4.319.18602;

Schwarz, E.d. & Perry, B.D. (1994). The post-traumatic response in children and adolescents. *Psychiatric Clinics of North America, 17*(2), 311-326.

Tripp, T. (2007). A short term therapy approach to processing trauma: Art therapy and bilateral stimulation. *Art Therapy, 24*(4), 178-183.

Volkman, S. (1993). Music therapy and the treatment of trauma-induced dissociative disorders. *The Arts in Psychotherapy, 20*(3), 243-251. Retrieved from http://dx.doi.org/10.1016/0197-4556%2893%2990019-X;

Table 3
Pre-Intervention Data for Treatment and Control Groups

Measure	Mean (Standard Deviation)	Sig. (2-tailed)
Points (%): Pre-		
Treatment	89.29 (6.97)	0.017
Control	79.00 (6.88)	
# of Major Behavior Problems: Pre-		
Treatment	5.71 (7.50)	0.216
Control	19.29 (25.30)	
# of Minor Behavior Problems: Pre-		
Treatment	142.29 (103.53)	0.023
Control	288.14 (105.17)	
# of Positive Points: Pre-		
Treatment	29.57 (9.33)	0.000
Control	9.86 (5.58)	
# of Procedures: Pre-		
Treatment	3.00 (4.48)	0.181
Control	9.14 (10.17)	
Duration of Procedures: Pre-		
Treatment	62.57 (98.50)	0.094
Control	357.29 (387.55)	
Bedtime Problems (%): Pre-		
Treatment	20.57 (29.86)	0.089
Control	46.43 (29.86)	

Table 4
Post-Intervention Data for Treatment and Control Groups

Measure	Mean (Standard Deviation)	Sig. (2-tailed)
Points (%): Post		
Treatment	88.80 (7.89)	N/A
Control	71.53 (19.67)	
# of Major Behavior Problems: Post		
Treatment	5.14 (5.79)	0.017
Control	21.57 (15.78)	
# of Minor Behavior Problems: Post		
Treatment	148.71 (116.50)	N/A
Control	260.29 (123.20)	
# of Positive Points: Post		
Treatment	21.57 (8.58)	N/A
Control	6.29 (5.82)	
# of Procedures: Post		
Treatment	3.00 (3.72)	0.017
Control	13.43 (10.21)	
Duration of Procedures: Post		
Treatment	95.00 (147.39)	0.006
Control	665.29 (429.68)	
Bedtime Problems (%): Post		
Treatment	20.29 (23.73)	0.006
Control	57.29 (23.25)	

Table 5
Pre-Post Data within Control Group and Treatment Group

	Pre-Intervention	Post-Intervention	
Measure	M(SD)	M(SD)	*p*
Points (%): Post			
Treatment	88.80 (8.11)	88.60 (9.65)	0.912
Control	79.00 (6.88)	71.53 (19.67)	0.244
# of Major Behavior Problems: Post			
Treatment	4.60 (7.13)	4.00 (5.15)	0.727
Control	19.29 (25.03)	21.57 (15.78)	0.719
# of Minor Behavior Problems: Post			
Treatment	161.20 (105.98)	144.00 (141.44)	0.452
Control	288.14 (105.17)	260.29 (123.99)	0.547
# of Positive Points: Post			
Treatment	33.60 (3.78)	23.60 (9.61)	0.102
Control	9.86 (5.58)	6.29 (5.28)	0.009
# of Procedures: Post			
Treatment	2.20 (4.38)	2.00 (2.55)	0.886
Control	9.14 (10.17)	13.43 (10.21)	0.220
Duration of Procedures: Post			
Treatment	44.60 (91.57)	45.20 (53.10)	.986
Control	357.29 (387.54)	665.29 (429.68)	.133
Bedtime Problems (%): Post			
Treatment	20.40 (24.85)	17.00 (28.18)	.324
Control	46.43 (29.86)	57.29 (23.25)	.142

Appendix A

RTC Codes: Definitions

Behaviors to Change/Point Loss Behaviors (**Bold Code** = behavior results in Grounding)

Peers *(R)*

R1 **Aggression to a peer** (including spitting). Must show at least 2 of 3 criteria: significant Intent (desire to inflict harm), significant Intensity, and/or significant Outcome (potential trauma, pain or injury caused to victim). Specify type of aggression (e.g., punch, kick, bite, spit). Count episodes vs. individual instances. **Results in -40 points and Grounding.**

R2 **Threat of bodily harm to a peer** (done verbally or physically). May be counted as R1's for children with a history of following through on threats; decide on a case-by-case basis.

R3 **Minor Bother/Rude to a peer (Verbal/Gesture)**. These are relatively mild bothersome behaviors that would be unlikely to provoke a significant reaction in most children. They may include relatively mild verbal teasing or mocking, facial expressions, hand gestures, interrupting, arguing, lying to a peer, not listening/responding, not sharing materials appropriately, and inappropriately interfering in a peer's business.

R5 **Possible Sexual Behavior to a peer**. These are behaviors that have probable sexual undertones (and often give staff "creepy vibes"), but are not overtly sexual. Examples include personal space violations that seem deliberate and sexual in nature but are not clearly so, and "accidental" touches that staff think may not be accidental.

R6 **Minor Sexual Behavior to a peer**. A comment or gesture that is clearly sexual in nature, but is not extremely graphic and does not cause significant embarrassment or distress to observers. This may include flashes for younger children if the intent was not clearly sexual and the flash did not cause distress to observers. If you are less than 95% sure the behavior was sexual in nature, code it as an R5.

R7 **Major Sexual Behavior to a peer**. A comment, gesture, or action that is clearly sexual in nature and is extremely graphic and/or causes significant embarrassment or distress to observers. This involves most physical sexual contact, most flashing, and sexual threats. **Results in -40 points and Grounding.** Note that an incident report should be completed for any particularly significant actions, and the incident should be discussed with a supervisor or the on-call person immediately to determine if further action should be taken.

Equipment *(E)*

E1 **Destruction of Property**. Must show at least 2 of 3 criteria: significant Intent (desire to misuse or destroy object), significant Intensity, and/or significant Outcome (in terms of monetary value, intrinsic value, or disruption to environment). **Results in -40 points and Grounding.** Note that destruction of a personal item of property may be treated as a Natural Consequence if the only outcome is loss of the item and the supervisor believes this would be the best learning experience for the child.

Adults *(A)*

A1 **Aggression to an adult** (including spitting). Must show at least 2 of 3 criteria: significant Intent (desire to inflict harm), significant Intensity, and/or significant Outcome (potential trauma, pain, or injury caused to victim). Specify type of aggression (e.g., punch, kick, bite, spit). Count episodes vs. individual instances. **Results in -40 points and Grounding.**

A2 **Threat of bodily harm to an adult (done verbally or physically)**. Optional: may be counted as A1's for children with a history of following through on threats; decide on a case-by-case basis.

A3 **Minor Bother/Rude to an adult (Verbal/Gesture)**. These are relatively mild bothersome behaviors that would be unlikely to provoke a significant reaction in most adults. They may include relatively mild verbal teasing or mocking, facial expressions, hand gestures, interrupting, arguing, not listening/responding, not sharing materials appropriately, and inappropriately interfering in an adult's business (MYOB).

A4 **Major Bother/Rude to an adult (Verbal/Gesture)**. These are relatively serious bothersome behaviors that would be likely to provoke a significant reaction in most adults. They may include insults, severe verbal teasing or mocking, provocative hand gestures, and swearing at an adult.

A5 **Possible Sexual Behavior to an adult**. These are behaviors that have probable sexual undertones (and often give staff "creepy vibes"), but are not overtly sexual. Examples include personal space violations that seem deliberate and sexual in nature but are not clearly so, and "accidental" touches that staff think may not be accidental.

A6 **Minor Sexual Behavior to an adult**. A comment or gesture that is clearly sexual in nature, but is not extremely graphic and does not cause significant embarrassment or

distress to observers. If you are less than 95% sure the behavior was sexual in nature, code it as an A5.

A7 **Major Sexual Behavior to an adult**. A comment, gesture, or action that is clearly sexual in nature and is extremely graphic and/or causes significant embarrassment or distress to observers. This involves most physical sexual contact, flashing, and sexual threats. **Results in -40 points and Grounding.** Note that an incident report should be completed for any particularly significant actions, and the incident should be discussed with a supervisor or the on-call person immediately to determine if further action should be taken.

A9 **Gang-up**. When two or more children put staff in danger and/or create an unsafe situation for the staff and other residents.

A. Gang-up must meet the following 3 criteria:
   1) Two or more children have significant behavior problems at the same time with increasing escalation
   2) One or more children do not accept consequences (e.g., Sit out, practice sit, going to ATO) for the behavior
   3) One or more children encourage another child to act out negatively (e.g., laughing at each other, yelling, swearing, aggressing to others, making sexual comments, etc.)

Although two or more children are involved, supervisory staff may decide that one child is coded with a gang-up for creating a danger to staff while the other child is not coded with a gang-up. Example: one child may have ganged-up by acting out, refusing to accept consequences and encouraging another child to aggress to staff while the other child used self-control and did not continue to act out and ignored the peer's comments about aggressing to a staff.

Before coding a behavior as a gang-up and prior to informing the child he had a gang-up, supervisory staff must be notified. Supervisory staff will determine whether the behavior warrants a gang-up for one or more of the children involved. Supervisory staff will determine consequences for a gang-up. **Results in -40 points and Grounding.**

A10 **Lying to an adult**. When a child lies, significantly distorts the truth, or omits critical information when they should reasonably provide it.

Directions *(D)*

D1 **Not following a reasonable direction from an adult**.

D2 **Not following an established rule**.

Yourself *(Y)*

Y1 **Major Run**. The child left the building or made an attempt to leave the building (must show intent to leave the building), or the child ran while off-grounds. **Results in -40 points and Grounding.**

Y4 **Tantrum**. Expressing extreme emotional displeasure by yelling, screaming, crying, swearing, and/or showing physical agitation.

Y5 **Threat to Self-Abuse**. Use when a child threatens to hurt him/herself verbally or via gestures, but does not act on the threat.

Y6 **Minor Self-Harm**. Use when a child engages in self-harm behavior, but does not meet 2 of the 3 self-harm criteria (see Y8).

Y7 **Public sexual self-stimulation**. Masturbating or otherwise sexually stimulating oneself in front of others.

Y8 **Self-Abuse/Self-Harm**. Must show at least 2 of 3 criteria: significant Intent (desire to inflict harm to oneself), significant Intensity (possibility of actual damage to self exists), and/or significant Outcome (potential trauma, pain, or injury caused to self by the action). Specify type of self-abuse behavior (e.g., bite self, bang head). Count episodes vs. individual instances. If 2 of the 3 criteria are not met, code as Y6. **Results in -40 points and Grounding.**

Y9 **Intentional Enuresis**. Purposely urinating outside of the toilet (or hiding of urine-contaminated items if this is designated as a Y9 for a particular child). **Results in -40 points and Grounding.**

Y10 **Intentional Encopresis**. Purposefully defecating outside of the toilet (or hiding of feces-contaminated items if this is designated as a Y10for a particular child). **Results in -40 points and Grounding.**

Y11 **Off Task/Silly Behavior**. May specify Academic (A), Homework (H), Non-Academic (NA), or Questions (Q).

Behaviors to Increase (Earn points for these behaviors)

PR ***Positives with Peers***

PR1 **Positive interaction with peer(s)**. Any verbal/nonverbal interaction between children that fosters mutual respect.

PR2 **Initiates positive interaction with peer(s)**. Spontaneously starting a positive interaction.

PR3 **Give peer(s) positive feedback**

PR4 **Help peer(s)**

PR5 **Ignore peer(s) undesirable behavior**

PR6 **Share spontaneously with peer(s)**

PR7 **Setting a good example/being a peer leader**

PR8 **Give personal space to a peer; maintain appropriate boundaries with peers**. Demonstrating respect for another's space (e.g., proper arms length distance). Appropriate physical contact with a peer (e.g., hugging, pat on backs, high-fives) under staff supervision. Also child refrains from verbally or nonverbally communicating with a peer that a staff is disciplining.

PR9 **Initiate problem-solving with peer(s)**. Appropriately working with peer(s) to solve a problem without being told to do so by an adult.

PE ***Positives with Equipment***

PE1 **Use equipment properly**. Child uses materials appropriately and/or for its intended Purpose; child spontaneously attempts to fix or restore things that are broken.

PE2 **Initiate chore or cleanup**. Child spontaneously initiates doing their chore or spontaneously cleans/straightens up an area.

PA ***Positives with Adults***

PA1 **Positive interaction with adult(s)**. Any respectful verbal/nonverbal communication from a child towards an adult.

PA2 **Initiate positive interaction with adult(s)**. Spontaneously starting a positive interaction.

PA3 **Accept consequences**. Child responds to discipline in a calm, agreeable manner, or the child accepts a step in the behavior modification program without escalating to the next step.

PA5 **Accept adult decision(s)**. Child responds to an adult decision in a polite way. The child may express, in an acceptable manner, his or her disagreement with the decision, but ends the discussion when the adult says it is over.

PA6 **Give personal space; maintain appropriate boundaries with adult(s)**. Child demonstrates respect for an adult's personal space (e.g., proper arms length distance). Child asks permission before giving appropriate physical contact to an adult (e.g., hugs).

PA7 **Initiate problem-solving with adult(s)**. Appropriately working with adult(s) to solve a problem without being told to do so by an adult.

PA8 **Being honest with adult(s)**. Child tells the truth without omitting important information or distorting the facts.

PD ***Positive Compliance***

PD1 **Follow a direction**. Child follows adult instruction or guidance.

PD2 **Remember/follow a rule**. Child keeps in mind and adheres to the established procedures and regulations for the living unit.

PY ***Positive Independent Behaviors***

PY1 **Use proper social skills in the community**. child obeys community laws and adheres to acceptable social standards when off Baby Fold property.

PY2 **Use proper social skills in the RTC**. Child utilizes skills learned in therapy, activity groups, or everyday interactions that foster respect for themselves and others while residing in the RTC.

PY3 **Use proper social skills on a family visit**

PY4 **Appropriate expression of emotion**. Emotional expression is deemed acceptable and/or reasonable given the situation and the potential for inappropriate expression.

PY5 **Use self-control appropriately**

PY6 **Demonstrate good self-esteem/self-regard**

PY7 **Accept responsibility for behavior**. Child holds him or herself accountable for mistakes. Child makes amends to those they have wronged.

PY8 **Participate actively in LSI**. Child participates in each step of the TCI Life Space Interview process.

PY9 **Participate positively in therapy/group**. Child exerts him or herself in learning skills during therapy that help them make progress on their treatment goals.

PY10 **Show good sportsmanship**

PY 11 **Stay on task with homework, chore; participate fully in activity group**. Complete and/or work on assigned activities in a focused and thorough manner.

PY 12 **Use daily care skills independently**. Child engages in basic hygiene/ chores (e.g., brushes teeth, makes bed, takes shower, put on clothes, combs hair) without help and/or prompts from staff.

PY 13 **Demonstrate cultural competence**. Child demonstrates respect and/or sensitivity for people of diverse races, cultures, ethnicities, or backgrounds.

PY 14 **Appropriate school behavior**. Child demonstrates safe and appropriate school and/or bus behavior. NOTE: this code will generally not be used unless specifically designated for a child due to a special program that ties school or bus behavior with consequences in the RTC.