EFFICACY OF NEUROFEEDBACK FOR CHILDREN WITH HISTORIES OF
ABUSE AND NEGLECT: PILOT STUDY AND META-ANALYTIC
COMPARISON TO OTHER TREATMENTS

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This two-part study investigates the effectiveness of neurofeedback training for reducing behavioral problems commonly observed in abused/neglected children, and compares its efficacy to other treatment interventions with this population. Neuro-developmental sequelae of early relationship trauma are explored as an etiological framework for understanding disturbed affect-regulation, which appears central to the behavioral and emotional difficulties commonly experienced by this pediatric population. It is suggested that neurofeedback teaches children to self-regulate brain rhythmicity mechanisms, which in turn affects global improvements in behavior and mood.

The pilot study utilizes records of 20 children removed from their biological homes by Child Protective Services. Children were assessed prior to treatment using the Child Behavior Checklist (CBCL) and the Test of Variables of Attention (TOVA), and again after 30 sessions of individualized, qEEG-guided neurofeedback training. A $t$-test analysis of pre- and post-scores was computed, and indicated significant improvements following treatment.

A meta-analysis of existing literature on treatment interventions with abused/neglected children provides individual and aggregate effect sizes for 33 outcome studies with this clinical population, and contextualizes the results of the present pilot study within other empirically validated treatment modalities. Establishment of an overall effect size for treatment for this pediatric population provides a needed method of comparing research results across studies when control groups may not be ethical or feasible.
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CHAPTER 1

INTRODUCTION

Each year, hundreds of thousands of children in the United States suffer some form of childhood maltreatment. Actual figures vary, depending on how the phenomenon is defined and the nature of the research. However, according to the most recent federally mandated National Incidence Studies (NIS-3), approximately 1,553,800 children were abused or neglected in 1993 in the United States (Sedlack & Braodhurst, 1996). This represents a 67% increase since the NIS-2 findings in 1986 and a 149% increase since the NIS-1 in 1980. The NIS-4 analysis is currently underway, and maltreatment estimates are expected to again increase.

The repercussions of these numbers extend far beyond the psycho-social and physiological injuries experienced by the direct victims of childhood maltreatment. Indeed, child maltreatment represents a society-wide tragedy with profoundly negative intergenerational effects on quality of life issues such as education, crime, and economics. It is remarkable that it was only as recently as 1968 that all fifty states adopted laws requiring health professionals to report suspected cases of abuse and neglect (ten Bensel, Rheinberger, & Radbill, 1997). As recently as 1974, the National Center on Child Abuse and Neglect was formed, and the Child Abuse Prevention and Treatment Act was passed by the U.S. Congress (English, 1998).

Although theoretical knowledge has developed substantially over the past decades with regard to treatment for abused and neglected children, little of this information has been critically evaluated through rigorous research designs. It is evident that the process of empirically validating treatments for this pediatric population is in its
early stages. Few studies have employed randomized control groups, largely due to ethical concerns over delaying treatment for such a vulnerable population (Reeker, Ensing & Elliott, 1997), and only a minority has utilized standardized outcome measures and large enough sample sizes for meaningful statistical analysis. Furthermore, until the last decade, most treatment interventions designed to address child maltreatment were directed at interrupting maladaptive parenting practices, without addressing the abuse-related sequelae for the child (Kaplan, Pelcovitz, & Labruna, 1999).

The quality and quantity of outcome research on the subject of therapeutic interventions aimed at children as a whole pales in comparison to outcome research for adults. There are, however, several hundred efficacy studies of psychosocial therapies for children, applying different modalities and methodologies to various clinical populations. At least four meta-analyses have been completed within the past twenty years that encompass diverse therapeutic treatment methods for diverse child/adolescent problems. These analyses indicate that the overall impact of child psychotherapy is positive, with effect sizes ranging from a medium Cohen’s effect size of .54 (Weisz, Weiss, Han, Granger, & Morton, 1995) to a large Cohen’s effect size of .88 (Kadzin, Bass, Ayers & Rogers, 1990).

Children with histories of abuse and neglect are frequently described by child welfare professionals as especially difficult to treat therapeutically (Chanitz, 1995; Wilson, 2001). This is likely due to the fact that abuse and neglect are not distinct disorders or syndromes, but rather experiences. The patterns and extent of the symptoms have major variations, are developmentally dynamic, typically involve co-morbid diagnoses, are behaviorally entrenched in family dynamics, and may be
susceptible to “sleeper effects” (Finkelhor & Berliner, 1995). Thus, an overarching aim of the present study is to establish whether treatment outcome data for this particular population are as robust as those for the broader population of children. Specifically, the present pilot study explores the potential of neurofeedback training to help children recover from abuse and neglect, and contextualizes its efficacy within a meta-analysis of other empirically substantiated treatment modalities for the same population.
CHAPTER 2

EFFECTS OF EARLY SOCIAL TRAUMA ON NEURODEVELOPMENT

Attachment Relationships and the Development of Self-Regulation

Over thirty years ago, Bowlby asserted the central importance of early caretaker relationships on the social and emotional development of children. His attachment theory suggested that an infant’s ability to cope with stress is correlated with biologically driven mother-child behavior patterns that promote primary caretaker proximity (Bowlby, 1969). Ainsworth, Blehar, Waters and Wall (1978) expanded this theory by defining four infant attachment styles and contributing a greater understanding of the purpose behind the primary caregiver’s role: to provide a secure base from which a child explores his/her surroundings and incorporates internal working models of trusting relationships. This seminal work was followed by a wealth of empirical research demonstrating a correlation between level of attachment security and the development of a wide range of psychopathology in children and adults, including mood, personality, conduct, and anxiety disorders (Crittenden, 1995; Schore, 1994).

Attachment behaviors serve important protective functions beginning at birth, and are believed to correspond with the onset of independent locomotion in vertebrates (Clutton-Brock, 1991). Increasing evidence suggests that a primary function of the attachment relationship is to develop a child’s ability to self-monitor affect, self-regulate physiological arousal level, and self-organize coping functions for stress (Cassidy, 1994; Cicchetti, & Tucker, 1994). Kopp (1989) asserts that the development of affect regulation proceeds from initial reliance on a caregiver, to self-soothing behaviors, and finally to language based cognitive coping strategies. The central role of attachment in
the development of self-regulation may explain why relational trauma from the social environment has been shown to have more negative impact on the rapidly developing brains of infants and children than assaults from the inanimate physical environment (Schore, 2001; Sgoifo, Koolhaas, & De Boor, 1999).

Because infants and young children are unable to effectively modulate affective and physiological arousal states independently, their developing capacity to cope with dysregulated states depends on the responses of caregivers who are psychobiologically attuned to their needs (Schore, 1994). Caretakers externally manage infants’ psychophysiological states by responding to them in consistently sensitive ways, for example through accurate mirroring of affect and sensitivity to gaze aversion as a signal of over-stimulation (Field, 1994). Through such processes, children learn to develop strategies to manage high arousal and regain a state of organization when homeostasis has been disrupted. Research by Goldberg, MacKay-Soroka, and Rochester (1994) showed that mothers in securely attached relationships with their infants responded equally to their babies’ positive and negative affects, whereas mothers in poorly attached relationships responded predominantly to negative affects (therefore conditioning their children to increase negative affective behaviors). Thus, strategies developed early in life to manage arousal can be understood as forming the neurodevelopmental building blocks of lifelong personality structure and affective behavior patterns (Bradley, 2000).

Neurophysiological Impact of Early Relationship Trauma

When caregivers are neglectful, inconsistent, or abusive, infants and young children are left vulnerable to psychophysiological distress states from which they
cannot escape. Two interacting response patterns have thus far been identified in children. The first is a hyperarousal (fight or flight) response, which is mediated by sympathetic activation of the limbic hypothalamic-pituitary-adrenal (HPA) axis, and results in increased levels of cortisol, acetylcholine, adrenaline, and noradrenaline within the developing brain. The second response, more common in girls and younger children/infants, is the “dissociative” continuum, which is mediated by the parasympathetic activation of dorsal vagal responses (i.e., reduced metabolism, heart rate, and respiration rate), endogenous opioids, and the dopaminergic system (Perry & Pate, 1994). The hyperarousal and dissociative responses to stress are not discreet; rather, when stressful situations are perceived to be hopeless or overwhelming, initial sympathetic arousal may be followed by disengagement from external stimuli via parasympathetic activation of the vagal and opioid systems (Perry, 1994).

Prolonged hyperarousal/dissociative states can chronically dysregulate a child’s psycho-physiological stress-response systems (e.g., the HPA axis) and patterns of coping behaviors (e.g., withdrawal or aggression; Manassis & Bradley, 1994; Post, Weiss, & Leverich, 1994). Chronic dysregulation is associated with sensitization of the brain stem and midbrain neurotransmitter systems, such that early adverse attachment experiences essentially “kindle” the limbic areas of the brain to be physiologically reactive (Post, Rubinow, & Ballenger, 1984). In particular, van der Kolk and Greenberg (1987) have suggested that the repeated trauma of child abuse may dispose the stress-sensitive amygdaloid nuclei to develop a kindling response, by which repeated intermittent stimulation produces increasingly greater alterations in neuronal excitability, potentially resulting in seizures. Othmer, Othmer, and Kaiser (1999) describe the
kindling process as a “practice effect” of the brain’s successive experiences of dysfunction or overarousal, and suggest that vulnerable physiologic feedback systems tend to become more dysregulated over time when left alone. Work by Adamec and Stark-Adamec (1989) demonstrates that kindling in the amygdala induces a “defensive personality” in domestic cats, the intensity of which is mediated by both experience and strength of neurotransmission between the basomedial nucleus of the amygdala and the ventromedial nucleus of the hypothalamus. Because of the dense interconnections amongst the prefrontal cortex, hypothalamus, amygdala, thalamas, cingulate gyrus, and hippocampus, it appears likely that various patterns established through early attachment experiences could set a precedent for the development of relatively automatic affect-regulating mechanisms within these feedback systems of the brain (Schore, 1994; Bradley, 2000).

In relational trauma, the developing limbic system is repeatedly exposed to high levels of excitotoxic neurotransmitters, such as glutamate, cortisol, and NMDA-sensitive glutamate receptor, all of which are associated with neurotoxicity and abnormal synapse elimination in early brain development (Choi, 1992; Moghaddam, Bolinao, Syein-Behrens, & Sapolsky, 1994). It is hypothesized that stress-induced increases in gluccocorticoids in postnatal periods selectively induce neuronal cell death in the limbic system and impact abnormal limbic circuitry. In particular, there is ample evidence that, in adults, the cellular organization of the hippocampus can be dramatically affected by levels of corticosteroids, which can exert deleterious effects on the hippocampal pyramidal cells (Sapolsky, 1993; Watanabe, Gould, & McEwen, 1992). In separate studies, Carrion et al. (2001) and De Bellis et al. (1999) found that children with histories
of trauma and post traumatic stress disorder (PTSD) symptoms had significantly smaller total brain cerebral volume than matched control groups. In both studies, after statistically controlling for total brain volume, no significant decreases in hippocampal volumes were found in the PTSD child population, suggesting a more generalized effect of the early developmental neurotoxic effects of glucocorticoids.

According to Schore (2001), attachment experiences in infancy particularly influence the experience-dependant maturation of the right orbitofrontal cortex, which is dominant for the processing of affect-regulation, visual emotional information, and attachment experiences. During the first few months after birth, the right hemisphere develops more rapidly than the left, which theoretically makes it more vulnerable to the consequences of extreme stress and neglect (Galaburda, 1984). Furthermore, Read, Perry, Moskowitz, and Connolly (2001) propose that abuse from 6 months until 3 to 6 years of age may have the greatest differential effect on the left hemisphere. Their findings are supported by the work of Teicher et al. (1997), which suggests that dendritic growth in the left hemisphere surpasses that of the right hemisphere at about 6 months of age.

Nonspecific electroencephalogram (EEG) abnormalities have been found in populations of abused children, including psychologically abused children and physically abused children without head trauma (Green, Voeller, & Gaines, 1981; Teicher et al., 1997). Van Bloem’s (2000) work with children and adolescents diagnosed with reactive attachment disorder (RAD) revealed specific patterns of EEG slowing in the frontal lobes and right temporal lobe. Fisher, Turber, and Gunkelman (2005) also reported right temporal as well as vertex slowing in quantitative electroencephaloegams (QEEGs) of
children with RAD. Ito, Teicher, Glod, and Ackerman (1998) observed childhood physical and sexual abuse to be associated with an increased prevalence of left-sided EEG abnormalities (particularly fronto-temporally). In terms of cortical EEG coherence, Teicher et al. (1997) found that a group of sexually and physically abused children had greater average left hemisphere hypercoherence than normal children, but comparable right hemisphere coherence patterns (indicating diminished left hemisphere differentiation in the abused group). Their work highlights the relationship between limbic system dysfunction and reversed left/right hemispheric asymmetry, asserting the possibility that early abuse may impede hemispheric integration and the establishment of normal left cortical dominance. In contrast, in a small clinical sample of women, Black, Hudspeth, Townsend and Bodenhamer-Davis (2002) found histories of childhood sexual abuse to be associated with hypocoherence in left frontal regions in the theta and beta bands and hypercoherence in posterior central regions across all bands; however these findings were not wholly replicated with a high functioning non-clinical college sample of women with sex abuse histories (Black, 2005).

The question naturally arises whether these brain abnormalities may be at least partially the result of genetic factors, intergenerational effects of parenting, or learned stress-coping behaviors. Indeed, in addition to evidence of intergenerational transmission of child abuse in humans (Kaufman & Zigler, 1989), there is evidence in group-living pigtail macaques of genealogical and demographic influences on maternal neglect and abuse of offspring (Dario, Wallen, & Carroll, 1997). Because it is ethically difficult to design studies to tease apart these hypotheses, there has not been definitive research to clarify these questions. However, there are a number of studies of
neglected and abused children in orphanage settings that have found dramatically smaller frontal-occipital head circumferences (38% below the third percentile), as well as computed axial tomography (CT) and magnetic resonance imaging (MRI) findings of enlarged ventricles and cortical atrophy in this population (Perry & Pollard, 1998; Rutter et al., 1998). Using functional magnetic resonance imaging (fMRI) with a population of Romanian orphans, Chungani et al. (2001) found these children had decreased metabolic activity in the orbital frontal gyrus, intralimbic prefrontal cortex, amygdala, hippocampus, lateral temporal cortex, and brainstem.

Animal Research on Neurodevelopmental Trauma

Animal research with rats provides further support for the neurodevelopmental impact of neglect/physical abuse, specifically on hemispheric laterality (Denenberg, 1983), hippocampal shrinkage (Meaney, Aitken, van Berkel, Bhatnagar, & Sapolsky, 1988), and alterations of neuro-endocrine stress response systems (Fride, Dan, Feldon, Halevy, & Weinstock, 1986). Research conducted with chimpanzees and gorillas (Davenport & Rogers, 1970) and with rhesus monkeys (Harlow & Harlow, 1965), though not neurophysiological in focus, demonstrates the profoundly negative behavioral outcomes of severe social deprivation during the first year of life (similar to behaviors seen in neglected and abused children). Intriguingly, there is even evidence that maternal neglect in invertebrate wolf spiders results in decreased central nervous system (CNS) development, as observed in decreased brain weight and number of brain cells (Punzo & Ludwig, 2002). Spiderlings removed from their mothers also show less ability to hunt and learn maze navigation, as compared to spiderlings who remain with their mothers.
Recent observations of elephant behavior in South Africa, India, and Southeast Asia have brought international attention to the dramatic increase in incidents of juvenile elephant attacks on villages and elephant killings of humans and rhinoceroses (Siebert, 2006). Ethologist Gay Bradshaw and colleagues describe contemporary elephant populations as suffering from chronic stress due to decades of poaching and habitat loss, which have disrupted the intricate web of familial and societal relationships governing the rearing of young elephants (Bradshaw, Schore, Brown, Poole, & Moss, 2005). Like humans, elephants are known for their close social relationships, and young elephants are traditionally raised in a matriarchal society that includes multigenerational “allomothers.” Bradshaw et al. have observed that calves witnessing culls or raised by isolated mothers are high risk candidates for inability to regulate stress-reactive aggressive states and for an array of behavior patterns similar to human PTSD (i.e., abnormal startle reflex, depression, asocial behavior, and hyper-aggression). This appears to be especially relevant for male calves, who traditionally go through a second phase of all-male group socialization and neurodevelopment during adolescence. The critical role of older males in their normal social development was demonstrated when researchers re-introduced older bulls to successfully quell male juvenile hyper-aggression.

**Behavioral Manifestations of Relationship Trauma**

Neurodevelopmental research has established that, because of the brain’s extreme malleability and sensitivity to experience in early childhood, traumatic events in the first few years of life can have long-term impacts on socio-emotional and cognitive functioning. This is particularly likely if events are severe, unpredictable, or ambient – all
of which describe relational trauma in the form of neglect or abuse (Perry, 1994). Child neglect and abuse have been shown to have an etiological role in a remarkable range of behavioral disorders affecting children, including attention deficit disorders, mood and anxiety disorders, conduct and oppositional defiant disorders, RAD, learning disabilities, PTSD, eating disorders, substance abuse, and dissociative disorders (Beitchman et al., 1992; Boney-McCoy, & Finkelhor, 1995). Although estimates vary widely, some researchers propose that up to 80% of abused children display symptoms of severe attachment disturbance or RAD (Hall & Geher, 2003).

Numerous studies demonstrate that children who have been mistreated or have had multiple, inconsistent caregivers are unlikely to develop secure attachment styles (Egeland & Sroufe, 1981). Insecure or “disorganized” attachment (George & Main, 1979) is suggestive of a lack of pattern/strategy for regulation of affect; thus it is not surprising that children with histories of disrupted attachment commonly experience externalizing problem behaviors, sleep and eating irregularities, and attentional difficulties indicative of poor self-regulation functions (DeGangi, 2000). Behaviorally, limbic dysregulation may inhibit a child’s capacity to cope with stressors by maintaining heightened arousability (e.g., a child may rapidly escalate from feeling slight anxiety to terror) and supporting chronically heightened arousal states (e.g., a child may not maintain a focused state for academic learning due to hypervigilance to threat). Foster and adoptive parents and professionals at Child Protective Services (CPS) commonly voice concerns that these children demonstrate peer aggression, stealing, food hoarding/gorging, destruction of property, poor impulse control, limited cause-and-effect thinking, inappropriate sexual behavior, school failure, and hyperactivity (Iwaniec,
Difficulty forming trusting relationships, indiscriminate affection with strangers concomitant with refusal to give affection to family members, limited ability to empathize, and poor social skills are also prevalent in this population of children, particularly those diagnosed with RAD (Hall & Geher, 2003).

Child maltreatment research suggests that the developmental and psychosocial consequences of childhood abuse/neglect have implications across the lifespan. Early maltreatment is associated with adult involvement in coercive relationships (Malamuth, Sockloskie, Koss & Tanaka, 1991), diagnoses of personality disorders (Barach, 1991), and high incidences of adult depression, anxiety, and suicidality (Brown & Smails, 1999; Dube et al., 2001). A longitudinal study of victims of childhood maltreatment by Widom (1999) found childhood experiences of abuse and neglect to be strong predictors of PTSD. Specifically, Widom's interviews with victims approximately twenty years following substantiated maltreatment revealed that 37% of childhood sexual abuse victims, 33% of physical abuse victims, and 31% of neglect victims met criteria for PTSD as defined by the revised third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R).
CHAPTER 3

TREATMENT APPROACHES FOR CHILDREN WITH HISTORIES OF ABUSE/NEGLECT

Treatment modalities for maltreated children fall into five primary categories – group/peer therapy, play therapy, cognitive-behavioral therapy (CBT), family therapy, and experimental therapies (such as eye movement desensitization and reprocessing [EMDR], neurotherapy, and holding therapy). Sometimes, children in research sample groups are involved in multiple intervention modalities (e.g., both group play therapy and family therapy). This complicates the interpretation of discrete treatment outcome data, and was handled in the present meta-analysis by creating a separate category of treatment, i.e., multi-modal or combined therapy.

Group Therapy

Based on the quantity of literature on the subject, group therapy appears to be the most popular treatment approach for working with sexually abused children and adolescents, in particular. Group therapy is distinctive in that it centrally addresses two hallmark effects of abuse and neglect – feelings of isolation and social stigmatization – while also being cost-effective and labor conserving (Silovsky & Hembree-Kigin, 1994). Additionally, group therapy can decrease resistance to treatment through mutual self-disclosure and fostering of a positive peer milieu (Carozza & Heirsteiner, 1982). Groups for this particular population may be open or closed, and may take a process-oriented approach or, more commonly, a structured psycho-educational approach.

Issues frequently encountered in groups for maltreated children include feeling “damaged,” feeling guilty and responsible, feeling fearful and betrayed, feeling
depressed, and experiencing low self-esteem (Porter, Blick, & Sgroi, 1983). Other common group themes for this population are social and communication skills, separation and abandonment difficulties, blurred role boundaries, and inappropriate sexual behaviors (Gil, 1992). Alternatively, some groups de-emphasize abuse themes and instead aim to provide normalizing social experiences for participants (Borgman, 1984). Because trust forms the foundation for willingness to self-disclose, trust-building exercises are generally introduced early in group treatment (Grammer & Shannon, 1992).

Psycho-educational components of group treatment for maltreated children frequently include stress management, anger management, assertiveness training, safety, appropriate touch, and individualized coping/problem solving strategies. A parallel group for non-offending parents is often advocated (Damon & Waterman, 1986). It is not uncommon that parents have their own past abuse issues that re-emerge when they become aware their children have been victimized. In particular, mothers of children who have been sexually abused may have emotional reactions that mirror their children’s, such as fear, anger, and feelings of over-responsibility (Hagans & Case, 1988). Parallel treatment for non-offending parents is also believed to increase parental commitment to therapy and prepare parents for changes in their child’s behavior, such as increased assertiveness (Silvosky & Hembree-Kigin, 1994).

Family Therapy

Family therapy uniquely offers a systems-based approach to the treatment of abused and neglected children, whereby family members are involved in exploring the significance of individual roles and interpersonal dynamics within the family that
contribute to the mental health of the child (Goldenberg & Goldenberg, 1996). The family systems model considers the child to be the symptom bearer of dysfunction in the family system. As such, the focus of intervention is the family unit rather than the individual child (Wagner, 2003). In highly dysfunctional families, children are often removed from the home, and intervention with the biological family is less pertinent than family interventions with foster and adoptive families. As is frequently cited in the literature, family therapy for maltreated children may consist of parent-child dyads excluding the offending parent, either for legal, logistical, or safety reasons. Family therapy is also often utilized as an adjunctive treatment to individual child therapy interventions.

There is a great deal of diversity in terms of family therapy approaches and interventions for maltreated children. Psychodynamic family systems therapy relates intra-psychic functioning to interpersonal relationships to explain family members’ behaviors within the context of the family system. Specifically, object relations family therapists address transference issues and help the family develop nurturing “holding relationships” (i.e., environmental extensions of an emotionally responsive maternal presence) (Scharff & Scharff, 1987). Multigenerational family systems therapists additionally focus on the transmission of family patterns over multiple generations (Bowen, 1996) – a perspective that is particularly relevant in the case of intergenerational family violence and maladaptive parenting schemas. Bowen describes how stressed families are composed of interlocking emotional triangles whose composition changes as family members realign to reduce tension. Interventions are aimed at disengaging from dysfunctional emotional triangulation by using such
strategies as taking personal responsibility for one’s actions and using “I statements” to express feelings without criticism.

Humanistic family therapists encourage family members to be genuine with each other, to be honest about their feelings, and to resolve conflicts through effective communication. There is an understanding that families operate through largely unspoken family rules that govern family members' behaviors and communication styles (Satir, 1972). In abusive families, a typical unspoken family rule might be that one child is the source of all problems encountered by the family. Families are encouraged to examine their spoken and unspoken rules, and to take risks to negotiate rules that enhance the self-worth of all family members. Dysfunctional families also frequently demonstrate unhealthy communication styles, including "double-bind messages" that leave the listener feeling confused (Bateson, Jackson, Haley, & Wakeland, 1968). Satir (1972) observed that family members respond to stress in predictable ways, such as placating, blaming, or distracting, which serve to maintain the family’s unhealthy homeostasis.

Structural family systems therapy shares a focus on family rules and patterns of homeostasis, and focuses on boundaries and levels of authority within the family. Minuchin (1974) described family boundaries as “dictating who interacts with whom and in what manner,” and labeled them as either clear (i.e., healthy), diffuse, or rigid. Families with diffuse or rigid boundaries sacrifice the members’ autonomy for the family unit, resulting in either overly enmeshed relationships or overly detached ones. Structural family therapy is present-oriented and, like humanistic therapy utilizes live enactments to clarify family behavior patterns.
Most clinical settings that treat the families of maltreated children practice time-limited therapy that relies heavily on cognitive-behavioral, strategic, and solution-focused family systems approaches (Wagner, 2003). These modalities adopt a pragmatic approach in which the focus of treatment is the resolution of family problems, usually without emphasis on insight into the causes behind the presenting concerns (Sharf, 2000). Psycho-education, parent training, establishment of behavioral contingencies, and therapy “homework” are typically involved. Solution-focused therapy with families of maltreated children typically strives to restructure common dysfunctional beliefs (e.g., the problem is destined to continue, or the problem is beyond the family’s control; De Shazer & Molnar, 1984).

Play Therapy

Play therapy provides a nurturing relationship between a child and a trained provider in which therapeutically derived play activities occupy the central aspect of treatment (Phillips, 1985). It may be directive, non-directive (i.e., client-centered), or filial (i.e., involving training parents in therapeutic play). In all cases, the child has the opportunity to have a corrective emotional experience with an adult who is positive and consistent, and who allows the child to have an influential role in shaping the relationship (Reams & Friedrich, 1994). The adult models the core conditions for healthy relationships (i.e., congruence, acceptance, and understanding), fostering the child’s feelings of self worth and innate value. Through unconditional acceptance of the child, careful selection of toys, and the use of reflective remarks, children are believed to grow by reconstructing their world and managing emotional and cognitive material through the safe medium of play (Landreth, 2002).
Play therapy approaches for maltreated children vary widely, but several abuse-specific approaches appear more commonly in the literature. Trauma focused play therapy is a dynamic model of therapy that uses the medium of play to enhance emotional mastery, lend insight to cognitive distortions, experience emotional catharsis, and process abuse related material (Gil, 1998). Trauma-focused eclectic integrative therapy advocates the use of play to enhance the child’s insight, and addresses specific issues of shame, self-blame, and understanding of the self in relationships (Friederich, 1995). This technique typically combines parent-child interactive therapy, in which directed play activities are designed to correct cognitive distortions and process abuse-related material. Landreth (2002) has suggested that play therapy may be particularly beneficial in helping abused and neglected children deal with ambivalent feelings toward the aggressor. Targeted feelings include fear and negativity, as well as positive attachments toward the perpetrator. This state of ambivalence often brings about anxiety in maltreated children, which play therapy may help alleviate.

Extensive research on the common play characteristics of abused and neglected children has identified several behavioral patterns in this population. These include developmental immaturity, oppositionality and aggression, withdrawal and passivity, self deprecation and self harming, hypervigilance, age-inappropriate sexuality, and dissociation (White & Allers, 2001). Recurrent play themes have also been observed in the literature, such as unimaginative, inhibited, and literal play (Jacobson & Straker, 1982). Repetitious play with a compulsive dynamic is also frequently noted by clinicians, including ritualized behaviors and mechanistic play behaviors that appear to serve stress reducing functions for the child (Terr, 1981).
Cognitive-Behavioral Therapy

Cognitive-behavioral approaches with children who have experienced abuse and/or neglect tend to be individually-administered or shared between the child and a non-offending family member. Typical goals of treatment include providing education, teaching coping and safety skills, and conducting gradual exposure and processing exercises to help the child overcome harmful, oppositional, or anxious/avoidant behavior patterns stemming from maltreatment (Deblinger & Heflin, 1996). With very young children, CBT interventions typically incorporate the use of play or expressive arts as a medium of communication.

Treatments are based on the application of social learning principles and cognitive theories, designed to reduce children’s negative emotional and behavioral responses related to the abusive or neglectful situations. Trauma focused CBT assumes that symptoms develop and are maintained at least in part by conditioned and learned behavioral responses and maladaptive cognitions. Interventions are thus designed to target trauma-induced thoughts, behaviors, and feelings through the use of psychoeducation, gradual exposure, cognitive reframing, and stress management (Cohen & Mannarino, 1993; Deblinger & Heflin, 1996). As evidenced in the above descriptions of group, family, and play therapies, CBT interventions and approaches are frequently incorporated fluidly into other treatment modalities.

The role of the child in cognitive-behavioral therapies is one of active involvement. Ronen (1998) describes the child in cognitive-behavioral therapy as “an active partner” who learns “how she or he behaves and how to acquire knowledge in order to change.” Therapists impart this knowledge as they teach children how to use
techniques such as stress management or self-monitoring, but it is ultimately the child who actually evaluates and reinforces the application of these strategies outside the therapy session. Homework is typically an integral part of cognitive-behavioral treatments because it gives children an opportunity to practice skills learned in therapy sessions.

**Neurofeedback with Pediatric Populations**

Neurofeedback, or electroencephalographic (EEG) biofeedback, is among the most promising modalities for the treatment of child and adolescent psychological disorders. Interest in neurofeedback’s potential as a therapeutic intervention for pediatric populations is heightened by concerns regarding the uncertain long-term effects of psychiatric and stimulant medications on the developing brain (Wilens, 2004). Furthermore, for children with histories of relational trauma, attachment disorders, or reactive attachment disorder (RAD), conventional relationship-based therapies (including cognitive therapies and play-based therapies) have demonstrated limited clinical success (Chanitz, 1995; Wilson, 2001).

There has been increasing clinical and empirical support for the efficacy of neurofeedback interventions for adolescent and child applications (Hirshberg, Chui, & Frazier, 2005). The most substantial literature supports neurofeedback training to decrease slow wave activity while increasing the power of 12-15 hertz (Hz) and 15-18 Hz activity for improvement of attention deficit hyperactivity disorder (ADHD) symptoms in children (Fuchs, Birbaumer, Lutaenberger, Gruzelier, & Kaiser, 2003; Linden, Habib & Radojevic, 1996; Lubar, Swartwood, Swartwood, & O’Donnell, 1995; Monastra, Monastra, & George, 2002; Rossiter, 2004; Rossiter & La Vaque, 1995). In addition, the
literature includes some clinical evidence that neurofeedback benefits children with autism spectrum disorder (Jarusiewicz, 2002; Sichel, Fehmi, & Goldstein, 1995), asthma (Tansey, 1992), pediatric stroke (Ayers, 1995), and pediatric migraine (Siniatchkin et al., 2000). As of yet, no study has investigated the effectiveness of neurofeedback with children and adolescents with histories of relational trauma, though there are a few unpublished clinical reports of success with this pediatric population (e.g., Fisher et al., 2005).

Models Supporting Neurofeedback for Maltreated Children

There is an increasing number of voices in the behavioral sciences asserting the prominent role of arousal dysregulation in the development of psychopathology (Grotstein, 1986; Le Doux, 1996). This has fostered a meaningful integration of biological and psychosocial approaches regarding the conceptualization and treatment of mental health and illness. Based on work by Gorman, Liebowitz, Fryer, and Stein (1989), Bradley (2000) proposes a general model for the development of affect regulation in which the pre-frontal cortex integrates experiential learning and cognitive schemas with the output of the limbic and reticular activating systems. Similarly, Schore (1994) describes a model of arousal regulation in which the orbitofrontal cortex sits at the apex of a fluctuating sympathetic-parasympathetic autonomic nervous system (ANS) balancing system. As outlined above, early experiences of relational trauma produce deficits in the ability to regulate affect and manage arousal through processes of limbic kindling, dysregulation of neurochemical ANS stress-response mechanisms, and maladaptive internalized coping strategies. In addition, the fact that relational trauma is a risk factor common to a wide array of psychological disorders points to the
centrality of physiological and emotional self-regulation as a key variable in psychopathology.

Othmer et al. (1999) propose a dysregulation model of psychopathology based on a failure of control systems and feedback loops in the brain, specifically in terms of the regulatory EEG activity of the central nervous system (CNS). This model contributes the addition of the electrical frequency domain to the traditional neurochemical conceptualization of CNS functioning, and asserts that rhythmicity is the basis for the organization of brain function. Rhythmic activity of the brain is produced by complex interactions of feedback loops (or “servosystems”) that are potentially vulnerable to “setpoint errors,” “instabilities,” and “over/under-shooting” in response to stimuli. Thompson and Thompson (2003) describe three basic resonant cortical loops that affect EEG rhythmicity (local, regional, and global), all of which can operate spontaneously or may be driven by subcortical thalamic pacemakers. As explained by Lubar (1997), changes in the patterned functioning of cortical loops (as a result of learning, for example) can affect the intrinsic firing rate of thalamic pacemakers, which is ultimately associated with changes in mental state.

As conceptualized by Sterman (1996) and by Othmer and colleagues (1999), EEG biofeedback is a means of operantly conditioning the rhythmic electrical manifestations of CNS regulatory function by challenging the brain to shift away from unstable firing patterns toward more homeostatic ones. The addition of an external feedback loop via biofeedback encourages the brain to alter its prevailing rhythmicity through a repetitive process of imposed disequilibrium and attempted return to baseline. This “regulatory challenge model” of neurofeedback facilitates improved ability to
maintain homeostasis and improved stability of the regulatory CNS system itself. Although factors other than early relational trauma can disrupt normal brain development and regulation patterns, it would appear that children with histories of traumatic attachment struggle fundamentally with self-regulatory challenges. EEG biofeedback may teach children to self-regulate brain rhythmicity, which in turn may impact their ability to adaptively manage physiological and emotional arousal states. Because poor self-regulation of arousal is central to the vast majority of the behavioral difficulties experienced by children with traumatic attachment histories, neurofeedback has the potential to affect global improvements in the typical problem areas of attention, aggression, impulse control, hypervigilance, classroom learning, empathy and trust formation, sleep, hyperactivity, etc. The mechanisms and objectives of EEG biofeedback would seem to be expressly appropriate for the behavioral and neurophysiological needs of this population. The present pilot study using a clinical case series represents an initial step in the empirically-based investigation of neurofeedback treatment for children with reactive attachment disorder (RAD) symptoms.
Data for this study were obtained from files of 20 children treated in a private neurotherapy practice affiliated with the University of North Texas. All of the children had documented histories of removal from their biological home by Child Protective Services (CPS) and were currently living with adoptive parents. Participants included 9 girls and 11 boys, all of whom were brought by their adoptive parents between 2002 and 2005 for treatment of behavioral problems associated with attachment difficulties. Many of the children had previously been diagnosed with reactive attachment disorder (RAD) and all of the children manifested many of the typical symptoms of RAD, as described above. The children ranged in age from 6 years to 15.5 years, with a mean age of 10.43 years ($SD = 2.66$). Fifteen of the participants were Caucasian, two were Latino, and three were African-American. All 20 children had experienced multiple previous therapies for RAD related symptoms, with little or no success. Each child participated in approximately 30-40 neurofeedback sessions ($M = 38$) over the course of 2 to 8 months ($M = 5$); however, all post-treatment assessments used in the analysis for this study were collected at the end of 30 sessions. The majority of the participants were taking medications concurrent with neurofeedback training, including serotonin reuptake inhibitors, amphetamine, methylphenidate, atomoxetine, ziprasidone, and risperidone.

**Quantitative Electroencephalogram (QEEG) Profiles**

All 20 of the children’s files were included in a separate study at the University of
North Texas investigating QEEG findings for adults and children with abuse histories. QEEGs of the 26 children comprising the latter study (i.e., the present sample plus six additional children) were compared to the NxLink (John, Prichep, & Easton, 1987) and NeuroGuide (Thatcher, 1998) databases of normal controls. The results showed that, in general, the abused children had significantly decreased delta in frontal sites with a Z-score range of -2.05 to -2.31. All 26 children in this larger sample had increased theta in at least one frontal International 10-20 site (Jasper, 1958), and 21 of these had relative power Z-scores in excess of 1.20. (See Appendix A for a graphic depiction of the International 10-20 Electrode Placement System). NxLink maturational lag scores were also computed to express, in years, how much the children in the sample lagged behind children in an age-matched reference group. All of the maturational lag averaged values except those at O1, O2, T5, and T6 were in the negative direction. Left fronto-central lag scores for the group ranged from -.05 at C3 to -1.07 at Fp1, indicating that the left anterior relative power values of the abused/neglected sample were more consistent with values seen in normal children one year younger. Seventy-five percent of the QEEG records showed significant coherence Z-score abnormalities (either hypercoherence, hypocoherence, or both). Although these QEEG findings refer to a slightly expanded sample of 26, they are descriptive of the children comprising the neurofeedback treatment group in this study.

 Instruments

 All QEEG assessments and neurofeedback treatments were conducted by a licensed counselor who is also a Biofeedback Certification Institute of America (BCIA) certified electroencephalogram (EEG) biofeedback provider. EEG data was digitally
recorded at 19 scalp electrodes contained within a stretchy QEEG cap and referenced to linked ears using either a Lexicor digital EEG system (NRS-2D) or a Deymed TruScan 32 digital system. Electrode resistances were kept below 5 Kohms and equal to within ± 1 Kohm between leads. On the Lexicor equipment, bandpass filters were set at .5-30 Hz, and the sampling rate was set at 128 samples per second. On the Deymed equipment, bandpass filters were set at .5-80 Hz. Because the Deymed samples 4,096 times per second during the recording process, the sampling rate was decreased to 128 samples per second when exported for analysis. Neurofeedback sessions were recorded and conducted using either Lexicor Biolex or BrainMaster equipment and software. Settings on the BrainMaster equipment were set for single channel training at the third filter order with peak to peak amplitude scaling and manual thresholding. The Lexicor equipment also was set for single channel training, utilizing digital filters set in the eighth order with manual thresholding. In all sessions, EEG was recorded from a referential montage, with a single-electrode placement referenced to the ipsilateral ear and a ground on the opposite ear, using a sampling rate of 128 Hz.

The Test of Variables of Attention (TOVA; Greenberg, 1987) was used to assess self-regulatory changes in attention following neurofeedback training. The TOVA is a computerized visual continuous performance test in which two easily discriminated visual stimuli are presented for 100 milliseconds every 2 seconds for 22.5 minutes. The variables assessed by the TOVA (i.e., errors of omission, errors of commission, response time, and response time variability) have been shown to be significantly different between pre-treatment and methylphenidate treatment conditions, and are reported to be invulnerable to test-retest practice effects (Greenberg, 1987).
The Child Behavior Checklist (CBCL) is widely utilized in both clinical and research applications (Achenbach, 1991). It was used in the present study to assess behavioral and emotional changes following neurofeedback training, as reported by adoptive parents. The CBCL is a four-page form designed to obtain descriptions of the competencies and behavioral-emotional problems of children that impact successful adaptive development. Parents with a reading ability at the fifth grade level or greater typically complete the form in 10 to 15 minutes. The CBCL includes competence scales (i.e., activities, social, and school), as well as eight syndrome scales. The syndrome scales include an internalizing grouping (i.e., withdrawn, somatic complaints, and anxious/depressed), an externalizing grouping (i.e., delinquent behavior and aggressive behavior), as well as scales for social problems, thought problems, and attention problems.

Procedures

All procedures for this study were approved by the Committee on the Use of Human Subjects at the University of North Texas. All participants gave informed parental consent and/or assent for inclusion in the study. The pre-treatment CBCL was completed by an adoptive parent prior to or concurrent with the child’s first intake session. Child clients completed the pre-treatment TOVA during the initial session. All but three participants in the study completed a post-treatment TOVA following the 30th neurofeedback training session. Several of the children continued for about 10 additional sessions, but only the post 30 session assessment data was used for treatment outcome analysis. The same adoptive parents who completed the pre-treatment CBCLs also completed the post-treatment CBCLs at 30 sessions of training.
QEEG data collection and analysis occurred prior to neurofeedback training, so that individualized treatment protocols could be developed.

Neurofeedback training consisted of 30 minutes of auditory and visual feedback per session, while the child was seated comfortably in a quiet room. Although each child was treated with an individualized protocol, there was nevertheless much similarity among these protocols due to the common features seen in the group’s QEEGs. The training site locations were derived from the individual NeuroRep weighted average QEEG topographies (not from the relative power Z scores reported earlier from the larger university sample of children with relational trauma). The weighted average topographies showed excess slow wave amplitude in the frontal and/or central vertex locations for all subjects treated. This pattern was consistent with the RAD QEEG patterns reported by Van Bloem (2000) and by Fisher et al. (2005). In all cases, feedback initially was contingent on the reduction of 2-7 Hz activity at CZ or FZ based on the International 10-20 electrode placement system (Jasper, 1958). Training at the frontal sites usually commenced by rewarding the reduction of 2-7 Hz activity. In a few cases, both the CZ and FZ sites were trained within the first 20 sessions, targeting FZ first for 10-15 sessions and then moving to CZ for 5-8 sessions. In cases where the QEEG showed excessive fast frequency activity at FZ or CZ as well, a second inhibit filter band of 20-32 Hz was also utilized in the initial protocol. No frequencies were enhanced during the initial frontal training period; all protocols were inhibiting only.

This protocol was followed until the individual subject’s training records indicated consistent ability to maintain targeted thresholds, i.e., consistently reducing 2-7 Hz and 20-32 Hz activity below baseline levels, and also when changes in behavioral symptoms
were observed. In the majority of cases, guided by subjects’ individual QEEGs and/or behavioral changes, the next stage of training targeted right hemisphere protocols enhancing 12-15 Hz and reducing 2-7 Hz at T4, P4 or C4. Often, this right side training was initiated following treatment at frontal and vertex sites if the clinician observed or parents reported increased agitation in the child. Right side training reliably reduced such responses. For those children not requiring this right side training focus, second stage protocols targeted various QEEG-determined sites and frequencies, most often reducing 8-12 Hz Alpha activity at C3, CZ, C4, P3, PZ, P4, T5, or T6. Again, no frequencies were enhanced in these alpha reduction protocols.

Results

Child Behavior Checklist

Differences in CBCL raw scores before and after neurofeedback training were analyzed using the Statistical Package for the Behavioral Sciences (SPSS). Eighteen of the 20 participants’ adoptive parents completed valid pre- and post-CBCL parent forms, which were included in the analysis. Raw scores were used for analysis in accordance with CBCL manual recommendations for research (Achenbach, 1991). A two-tailed paired \( t \)-test analysis yielded meaningful statistical differences in 10 of the 14 assessed competence and syndrome scores, indicating that significant behavioral improvements were observed by adoptive parents following neurofeedback training. Total syndrome scale scores decreased an average of 23.05 points (\( SD = 21.44 \)) with a 95% confidence interval of 12.73-33.39, and were significant at \( t(18) = 4.69, p < .001 \). Externalizing scale scores decreased an average of 7.32 points (\( SD = 8.40 \)) with a 95% confidence interval of 3.27-11.36, and were significant at \( t(18) = 3.799, p = .001 \). Both total and
externalizing scale score changes represent large effect sizes ($d = .78$ and $d = .94$, respectively). Internalizing scale scores decreased an average of 4.74 points ($SD = 7.26$), with a 95% confidence interval of 1.24-8.24, and significance at $t(18) = 2.84$, $p < .01$. This represents a medium effect size ($d = .59$). Figure 1 presents these results graphically.

![Figure 1. Averaged raw scores on the CBCL total, externalizing, and internalizing scales before and after neurotherapy treatment. All differences are statistically significant at $p < .05$.](image)

Within the CBCL syndrome scales, six of the eight scale scores significantly improved: social problems [$t(18) = 3.59$, $p = .002$], aggressive behaviors [$t(18) = 3.72$, $p = .002$], thought problems [$t(18) = 3.33$, $p = .004$], delinquent behavior [$t(18) = 2.82$, $p = .01$], attention [$t(18) = 2.82$, $p = .01$], and anxious/depressed [$t(18) = 2.80$, $p = .01$]. All of these changes represent medium effect sizes ($d > .55$). Somatic complaints and withdrawn scale scores also improved, but not to statistical significance. Figure 2 presents these results graphically. Of the three competence scales, there was a
statistically significant improvement on the social scale \([t(12) = 2.67, p = .021]\) with medium effect size \((d = .68)\). Activities and school scale scores also showed positive trends following treatment, but not to statistical significance.

![Figure 2](image)

*Figure 2.* Averaged raw scores on the CBCL syndrome scales (social problems, delinquent behaviors, aggressive behaviors, somatic complaints, attention problems, anxiety/depression, withdrawn, and thought problems) before and after neurotherapy treatment. An asterisk indicates significance at \(p < .05\).

*Test of Variables of Attention*

Pre- and post-TOVA standard scores were also analyzed using SPSS. Ten children completed valid pre- and post-TOVAs, while the remaining 10 protocols were not included due to incompletion or one or more invalid quarter scores, (e.g., due to >10% anticipatory errors). Two-tailed paired \(t\)-test analysis found significant differences post-treatment for three of the four TOVA variables: omission errors \([t(9) = -2.37, p = .04]\), commission errors \([t(9) = -3.16, p = .011]\) and total variability \([t(9) = -2.39, p = .04]\).
On the TOVA, lower scores represent more problematic behavior, with average standard scores ranging from 85-115. Omission errors improved an average of 17.3 points ($SD = 23.0$) from an average pre-treatment score of 71.5 to an average post-treatment score of 88.8 (95% CI 0.8-33.8). Commission errors improved an average of 16.4 points ($SD = 16.4$) from an average pre-treatment score of 91.5 to an average post-treatment score of 107.9 (95% CI 4.7-28.1). Total variability scores increased an average of 12.3 points ($SD = 16.3$) from 67.1 at pre-test to 79.4 at post-test (95% CI 0.7-23.9). Omission, commission, and total variability scale score changes all represent medium effect sizes ($d > .60$), with average omission and total variability scores moving from abnormal to normal ranges following treatment. Total response time standard scores decreased slightly (from an average of 71.9 to 70.0). These results are depicted in Figure 3.

*Figure 3.* Averaged TOVA standard scores (omission errors, commission errors, response time, and response time variability) before and after neurotherapy treatment. An asterisk indicates significance at $p < .05$.  

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Discussion

The CBCL and TOVA score improvements observed in this study suggest that neurofeedback is an effective treatment for children with behavioral problems associated with histories of neglect and/or abuse. Specifically, aggressive, delinquent, and socially problematic behaviors (e.g., lying, fighting, demanding attention, etc.) appear to be strongly impacted. Behaviors associated with attentional problems, anxiety/depression, and thought problems also appear to be significantly reduced. These data are encouraging because these problematic behaviors are not only common and disabling for children with traumatic attachment histories, but are also frequently resistant to change via traditional therapeutic interventions. On the other hand, because these behaviors are often the primary impetus for referral, they are also potentially vulnerable to overly-optimistic behavior ratings from parents seeking to justify treatment.

It should be noted that the CBCL activities and school scales may not have shown significant changes because many children received treatment during summer vacation and, as several parents reported, it was difficult to assess these behaviors during summer months when school was not in session and social activities were less frequent.

Improvement of self-regulatory behaviors characterizes the changes in CBCL and TOVA Scale scores observed in this sample. For the majority of the children, CBCL and/or TOVA scores shifted from clinical/borderline ranges into normal ranges, indicating meaningful behavioral changes occurred. The statistical significance and medium to large effect sizes of score changes following treatment is notable, especially considering the small sample size of the study. If, as has been suggested,
neurofeedback training teaches children to self-regulate brain rhythmicity, the broad changes observed in the CBCL scale scores suggest a general decrease of physiological and emotional arousal dysregulation. CBCL externalizing scale score changes, as well as decreases in thought problems (e.g., repetitive actions, distractibility), attention problems (e.g., poor concentration, impulsiveness), anxiety/depression (e.g., nervousness, crying), and somatic complaints (e.g., tiredness, headaches) may all be expressions of improved stability of the regulatory CNS system. Improvements on TOVA omission, commission, and total variability scores imply decreased impulsivity and improved attention modulation, and corroborate positive changes on the attention scale of the CBCL. (The slight decrease in response time scores on the TOVA is commonly seen immediately following neurofeedback, as individuals become more focused and deliberate in their responses.)

Although encouraging, this pilot study clearly represents only a preliminary clinical investigation of the effectiveness of neurofeedback treatment for this population. Some of the major caveats of the study include the small and non-randomized sample, the lack of control group, and the failure to control for potential effects of medications and concurrent additional therapies. The use of an external behavioral rating (CBCL) and a standardized performance test (TOVA) provides a multidimensional method of evaluation, but with considerable limitations. In addition to the potential vulnerability of the CBCL to low reliability and validity due to parental investment in positive change, the CBCL is designed to be given at intervals of 6 months or more. In the present study, some children were re-evaluated as early as 3 months following the initial session. Standard deviations of certain CBCL and TOVA scores were also large, thus should be
interpreted with some caution in spite of the robustness of $t$ tests to violations of normality. These data imply that there is a high degree of variability between children in terms of their initial presentation and their patterns of improvement following neurofeedback training.

It should be noted that randomized controlled trials, while strong in terms of internal validity, have been criticized by some for their lack of external validity and practical application to the broader clinical population. Recent studies cited by Hirshberg, Chiu, and Frazier (2005) indicate the results of non-randomized observational studies are generally similar to those of randomized controlled trials; thus, the authors assert the conservative emphasis on randomized controlled trials to demonstrate efficacy of treatments may be misguided. Specifically, Hirshberg et al. (2005) suggest that "effectiveness research" — i.e., formal measurement of outcomes from treatments administered in typical clinical practice — may provide empirical support that is better aligned to accurately represent treatment outcomes for a general clinical population. The authors further note that the American Psychological Association (APA) and the EEG biofeedback professional organizations have considerably more stringent parameters for evaluating the efficacy of clinical practices than the American Academy of Child and Adolescent Psychiatry (AACAP), which gives more weight to the knowledge base that emerges from shared clinical experience. In this light, the lack of a randomized control group for the present neurotherapy pilot study (and indeed for the vast majority of studies designed to treat maltreated children) may potentially be considered a less serious design liability.
It is interesting, both clinically and etiologically, that the majority of the children’s initial QEEGs (specifically the weighted average amplitude topographies in NeuroRep) indicated use of similar treatment protocols (inhibiting 2-7 Hz activity at CZ or FZ followed by inhibiting 2-7 Hz and enhancing 12-15 Hz at T4, P4 or C4). Other clinicians have reported combining the slow wave inhibits at Fz and Cz with enhancement of 15-18 Hz (Fisher, Turber, & Gunkelman, 2005), which is apparently an effective alternative to the inhibit-only focus of the treatment reported in this study. Although T6 has been mentioned in the literature as a focal site in RAD (Schore, 1994), T6 was not found to have as much slow wave activity as the Cz and Fz sites in the pre-treatment QEEGs of the current sample. It should be noted that some of the children who comprised the sample had never received a formal diagnosis of RAD. Further analysis of QEEG patterns in this population may clarify areas of the developing brain that are particularly susceptible to early relationship trauma, as well as help establish more standardized neurofeedback protocols for this population. In the future, it would also be beneficial to analyze the actual power changes in the EEG frequency bands as a result of neurofeedback. Long-term follow-ups, additional assessment measures, larger, randomized samples, and control of additional therapies were regrettably not possible for the present study. Nonetheless, the findings clearly support the use of neurofeedback training for children with histories of relationship trauma and serve to clarify directions for further research.
CHAPTER 5

META-ANALYSIS

The second part of the present project aims to contextualize the neurofeedback pilot study in terms of its practical efficacy. Due to the fact that it was not possible to include a control or comparison group in the study, the results, though significant, lack meaning in terms of their realistic clinical application. Thus, for the purposes of further evaluating the clinical and statistical relevancy of this pilot study, comparison of its outcomes to those of other treatments was deemed necessary. Initial attempts to find empirical literature documenting the efficacy of various treatments with pediatric populations suffering from abuse and/or neglect were unfruitful. It quickly became apparent that no such comparative or meta-analytical research had yet been conducted; thus, there was no existing literature that could provide general guidelines for the expected treatment outcome efficacy for this population.

The following meta-analysis is intended to remedy this gap in the research literature by providing a comprehensive overview of the outcome research with this population. The use of a meta-analysis (rather than a qualitative review of the literature) provides a statistically meaningful method to measure effect sizes (i.e., outcome efficacy) across different studies. Meta-analysis creates a uniform “yardstick” to measure the effectiveness of one treatment study against another, in spite of their potentially differing outcome measures. Ultimately, a quantitative estimate of net benefit aggregated over all the included studies can provide a basic comparative guideline for the pilot study outcomes, as well as for other studies with this population.
Method

Definition of Terms

Following the guidelines of Weisz, Donenberg, Han, and Weiss (1990), therapeutic treatment was defined for the present study as any intervention designed to alleviate psychological distress, reduce maladaptive behavior, or enhance adaptive behavior through counseling, structured or unstructured interaction, training programs, or predetermined treatment plans. Treatments were excluded from the meta-analysis if they were described purely as reading interventions (e.g., bibliotherapy), were psychopharmacological in nature, involved teaching or tutoring intended only to increase knowledge about a specific subject, predominantly involved intervention via relocation (e.g., foster placement), or were purely preventative in nature (e.g., school-based family education for the prevention of child abuse). For meta-analysis inclusion, the primary recipient of intervention was necessarily the child, although adjunctive family interventions were commonplace and did not exclude studies from inclusion.

The working definition of abuse for the present study included severe emotional, physical, and sexual maltreatment; and the working definition of neglect included caretaker failure to provide basic physical, emotional, and medical/educational needs. Diagnosis of failure to thrive was not considered relevant to the study unless it occurred specifically as a result of neglect. Although abuse and neglect (and indeed each of their subtypes) are likely associated with different risk indicators, the vast majority of studies reflect the reality that there is a high level of co-occurrence in clinical child populations (Allin, Wathen, & MacMillan, 2005; Scher, Forde, McQuaid, & Stein, 2004). Thus, there
was no attempt to separate these sub-groups in terms of their discrete outcomes following therapeutic interventions.

**Literature Search**

Attempts were made to locate all completed, English-language outcome studies of treatments for abused and/or neglected children and adolescents ages 3-17. The computerized databases PsychInfo, EBSCO Host, Social Work Abstracts, and Medline were searched from 1970 to 2006, using the key words child, adolescent, youth, abuse, neglect, sexual abuse, maltreatment, treatment, therapy, counseling, child protective services, and intervention. From this search, approximately 670 articles and abstracts were found, of which approximately 120 were more closely examined for possible inclusion in the present study. Ultimately, twenty research articles from databases were found to meet inclusion criteria for the present meta-analysis.

Secondly, relevant child therapy meta-analyses (e.g., Weisz et al., 1995; Casey & Berman, 1985), child therapy review articles (e.g., MacMillan, 2000; Kadzin et al., 1990), and recent volumes of pertinent journals (e.g., Child Maltreatment) were individually examined for possible inclusion articles. This yielded another 28 articles, which were more closely examined for potential inclusion, ultimately yielding five studies meeting criteria.

Finally, dissertations were utilized to represent completed studies not subject to publication bias (i.e., an unrealistic predominance of significant findings). Dissertations written between 1970 and 2006 involving treatment outcome studies with abused/neglected children were identified through the Dissertation Abstracts International (DAI) database for possible inclusion in the present meta-analysis. Twenty-
six dissertations and theses were examined for potential inclusion, of which eight ultimately met criteria and were included in the meta-analysis. Table 1 depicts the stages of literature review and the total number of studies involved in each stage of the inclusion process.

Table 1

*Number of Studies Included at Initial and Final Stages of Literature Review*

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<th>Initial literature search</th>
<th>Final inclusion following review</th>
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<td>Computerized data bases – PsychInfo, EBSCO Host, Social Work Abstracts, and Medline (1970 to 2006). Key words: child, adolescent, youth, abuse, neglect, sexual abuse, maltreatment, treatment, therapy, counseling, child protective services, and intervention.</td>
<td>670</td>
<td>20</td>
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<tr>
<td>Hand searches – Literature reviews, meta-analyses, recent journals (2005-2007)</td>
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*Criteria for Study Inclusion*

The criteria for the inclusion of studies in the meta-analysis was as follows: (1) studies were designed to examine the effectiveness of a treatment intervention for children and/or adolescents ages 3-17 who had experienced abuse and/or neglect; (2) results were based on empirical measures, as opposed to clinical impressions or unstructured interviews; (3) sufficient statistical information was reported in the study to allow for calculation of effect size estimates; and (4) sample sizes were greater than or
equal to four ($N \geq 4$). In two cases where inclusion status was not straightforward, an impartial second review was sought from a clinical psychology doctoral student who had experience doing meta-analyses, but no investment in the outcome literature with this population.

The most common reasons for rejection of studies for the present meta-analysis included parent rather than child-focused interventions and outcome measures, insufficient statistical information (e.g., failure to report standard deviations, confidence intervals, $t$-scores, or adequate raw data to extrapolate key statistics), lack of clear empirical outcome measures, and single case study design. Unfortunately, there were over 20 older empirical studies that reported significant $p$ values without providing further statistical data, thus precluding the calculation of effect sizes. Attempts to contact the authors for additional data were not successful.

Due to the limited quantity of outcome research with abused and/or neglected children, the present meta-analysis did not require that studies utilize a randomized control group design for inclusion. This leniency is discrepant with the gold standard for meta-analysis (e.g., Weisz et al., 1995), but due to the current state of research with this pediatric population, this represents a necessary and reasonable design compromise. Due to the paucity of controlled experimental design studies for this population, a more inclusive meta-analysis provides a means of comparing research results across different studies, with the end result of supporting stronger future research on the subject.

It should be noted that some authors suggest that inclusion of single treatment group pre- post-designs in a meta-analysis may inflate effect sizes. Although the reason
for this potential inflation is debatable, Lipsey and Wilson (1993) speculate that it may be a result of the confounding of maturational effects with treatment effects. Alternately, slight effect size inflation may be due to the fact that single group repeated measure designs do not control as well as matched-control designs for regression to the mean (Reeker, Ensing, & Elliott, 1997). Indeed, this concern is relevant to any meta-analysis of therapeutic interventions because these studies necessarily utilize predominantly clinically distressed samples.

In a number of studies reviewed for potential inclusion in the current meta-analysis, single data sets were found to be included in multiple research papers. For example, data from a sample group of child participants in an initial pilot study might again serve as part of a larger sample group in a follow-up study by the same author. To maintain independence between included data sets, information was sought in the articles and through personal communication with the authors to determine whether the same data sets had been used in multiple studies. If the data sets overlapped, the study with the largest sample size and most complete set of outcome measures was included while the others were excluded.

On the other hand, there were also a number of empirical studies that compared two or more different therapeutic interventions utilizing two distinct sample groups within one study. For example, one study was designed to evaluate two randomly selected samples of abused children from a community mental health center who received either group or individual therapy. The two groups were compared pre- and post-treatment on behavioral outcome measures. In this case, a single empirical study essentially provided distinct intervention outcome data for two treatment approaches, each with
separate and non-overlapping participant pools. Because the goal of the present meta-
analysis was not only to determine an overall effect size for therapeutic interventions
with abused/neglected children, but also to attempt to separate out the utility of different
treatment approaches, studies involving more than one intervention approach with
distinct sample groups were especially valuable. In these cases, as long as the samples
did not overlap, multiple treatment outcome data were separated out for analysis of
specific treatment approaches before being recombined to calculate the aggregate
effect size for the study.

**Computation and Analyses of Effect Size**

Effect sizes for each within-group design study included in the present meta-
analyses were calculated using reported pre-post group means and standard deviations
of the dependent variables. Specifically, Cohen’s $d$-values (Cohen, 1988) were
computed by finding the difference between the pre-treatment and post-treatment mean
scores and dividing by the pooled standard deviation of measures in that study (see
Equation 1 depicting Cohen’s $d$ calculation for within groups studies).

$$d = \frac{\text{mean}_1 - \text{mean}_2}{\sqrt{\text{SD}_1^2 + \text{SD}_2^2}/2}$$  \hspace{1cm} (1)

Cohen’s $d$ calculation was followed by correcting for sample size using the
Hedges’ $\hat{g}$ formula. Imitating a similar model by Reeker and colleagues (1997), this
correction was utilized because the variance of an effect size is partially a function of a
study’s sample size. According to Weisz et al. (1995), small sample sizes ($N < 15$)
commonly result in slightly greater effect sizes than larger sample sizes. Hedges and
Olkin (1985) have noted that a problem with the Cohen’s $d$ statistic is that the outcome is heavily influenced by the denominator of the equation. If one standard deviation is larger than the other, the denominator is weighted in that direction and the effect size is more conservative. However, large standard deviations are associated with studies utilizing larger sample sizes, which logically should be more heavily weighted for their statistical importance. Hedges’ $\hat{g}$ incorporates sample size by computing a denominator that incorporates the sample sizes of the respective standard deviations while also adjusting for overall effect size based on this sample size (see Equation 2 depicting the formula for Hedges’ $\hat{g}$ sample size adjustment).

$$
\hat{g} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{(n_1-1)SD_1^2 + (n_2-1)SD_2^2}{N_{total} - 2}} \times \left(1 - \frac{3}{4(n_1 + n_2) - 9}\right)}.
$$

For empirical studies that utilized an independent groups design without reporting standard deviation values, effect sizes were alternatively calculated using the $F$-test statistic, mean score, and standard deviation/mean squared error. Equation 3 depicts the Cohen’s $d$ calculation for between group studies using $F$-test data. This calculation method is recommended by Thalheimer and Cook (2002) for studies utilizing between-group designs, such as randomized controlled studies. Two studies included in the current meta-analysis utilized this method of effect size calculation.

$$
d = \frac{x_t - x_c}{\sqrt{MSE(n_t + n_c - 2/n_t + n_c)}}
$$
In cases where independent group design studies reported t-test values but no standard deviation or standard error values, Thalheimer and Cook (2002) recommend that effect size may alternatively be calculated using number of subjects (n) and the t-test statistic. Equation 4 depicts the Cohen’s d calculation for between group studies using t-test data. This alternative approach was utilized for four studies included in the current meta-analysis.

\[ d = t \sqrt{(n_t + n_c/n_t n_c)( n_t + n_c / n_t + n_c - 2)} \]  

Equation 4

Three publicly available effect size calculators were utilized to cross-compare effect size calculations and ensure accurate Cohen’s d statistics for meta-analysis inclusion. These included a frequently cited on-line effect size calculator created by Lee A. Becker at the University of Colorado at Colorado Springs (Becker, 2000), an on-line Excel spreadsheet calculator created by Samathna Cook of Harvard University and Will Thalheimer of Work Learning Research (Thalheimer & Cook, 2002), and a downloadable effect size calculation program created by Grant Devilly of Swineburn University, Austria (Devilly, 2004).

Analysis of pre-post change effect sizes within each study allowed the use of the largest number of studies, although, as described above, the effect size values can be expected to be only roughly equivalent to the between group effect sizes described in most meta-analyses (e.g., Lipsey & Wilson, 1993). Rosenthal (1991) suggested that because the paired t-test value takes into account the correlation between the two scores, paired t-test values will be larger than a between groups t-test values. Thus, effect sizes computed using paired t-tests will always be larger than effect sizes
computed using between-groups $t$-tests. Dunlop, Cortina, Vaslow and Burke (1996) argue that this discrepancy between within-group and between-group designs is best managed by using the original standard deviations to compute effect sizes, rather than the paired $t$-test value or the within-subject’s $F$ value. Thus, the present study attempted to use standard deviations for all within-group effect size calculations, as described above. In two cases, due to constraints with paucity of reported data, this was not possible.

To control for non-independence of findings within studies that employed multiple measurements of the same subjects (i.e., “conceptually replicated designs”), an overall effect size was computed for each study. As recommended by Hunter and Schmidt (1990), individual $d$-values for each relevant outcome measure were averaged together. For fully replicated designs based on separate groups of subjects, averaging of effect sizes was not necessary.

In a few cases, outcome measures were described in the methods section, but the follow up data were not presented in the results section. In this situation, an effect size value of zero was assigned to that measure. Zero was also assigned as an effect size when results were reported as non-significant and no further data was provided. Casey and Berman (1985) recommend this approach due to the fact that excluding non-significant or non-reported statistics would result in an artificial inflation of the overall effect size. Assigning an effect size of zero is thus a conservative procedure to counterbalance investigator bias toward exclusively reporting statistically significant data. This approach was also used in a meta-analysis of child and adolescent group treatment by Hoag and Burlingame (1997). After calculating an average effect size for
each study, all study effect sizes were averaged to derive a total overall mean effect size for treatment of children with histories of abuse and/or neglect.

Results

The grand total average Cohen’s effect size for all 33 studies included in the meta-analysis for children with histories of abuse and neglect is medium ($d = .70; \, SD = .45; \, 95\% \, CI \, .54-.85$). It is inevitably complex making generalizations across 33 studies with so much diversity in terms of research designs, treatments, outcome measures, sample age, etc. Nonetheless, it is hoped that the following examination of key variables will help to contextualize and integrate the broad effect size results. Using the Statistical Package for the Social Sciences (SPSS), appropriate statistical analyses have been employed to give a rough sense of the contributions of various factors. However, due to the small size and heterogeneity of the present meta-analysis, an individualized and narrative approach also is helpful in interpreting the significance of effect size findings.

When asserting the overall effectiveness of various treatments, concerted attempts have been made to incorporate effect size results with relevant variables, such as design strength, sample size, breadth of outcome measures, and treatment duration. Information regarding these details is summarized in table form for clarity and ease of accessibility in Appendix B. To the extent made available by the studies’ authors, Appendix B displays each study’s essential data regarding treatment setting, sample demographics, sample sizes, specific treatment interventions, treatment duration, client contact time, treatment outcome measures, measure response perspective, research design, as well as individual outcome effect sizes and overall study effect sizes. Presentation in this way is intended to facilitate easy reference and to allow readers to
compare characteristics of particular interest across studies (for example, length of
treatment or Child Behavior Checklist effect sizes).

Participant Characteristics: Type of Abuse History

Looking broadly at the studies meeting criteria for meta-analysis inclusion, it is
immediately apparent that significantly more empirical research has been conducted on
the treatment of sexually abused children than on the treatment of physically abused
and neglected children. Of the 33 studies included, 24 involved interventions designed
specifically for children with histories of sexual abuse. Of these, five solely investigated
outcomes of individual therapy interventions and 11 looked solely at group therapy
outcomes. In both individual and group studies, about half included parallel parent
therapies (either group, individual, or family treatment). Deblinger et al. (1996)
compared the effectiveness of individual therapy to family therapy, and Baker (1985)
compared group therapy to individual therapy, with similar effect size outcomes in all
cases. A study by Nolan et al. (2002) investigated the effectiveness of combining
individual and group therapy; Rust and Troupe (1991) investigated the full combination
of group, individual, and family therapy; and Clendenon-Wallen (1991) investigated
group therapy with the addition of music therapy. These studies collectively suggest that
adding individual, family, or music therapy to group therapy does not significantly add to
the benefits of group therapy alone for sexually abused youth.

Of the studies designed to treat children with histories of sexual abuse, the
largest effect sizes were consistently seen in correlation with (1) parallel group therapy
treatments for children and non-offending caretakers (e.g., Hall-Marley & Damon, 1993;
Humberson, 1998), and (2) structured child group therapy with a specific educational
component for the treatment of sexual abuse (e.g., De Luca et al., 1995; Verleur et al., 1986). Treatment duration for these studies ranged from three months to a year, with longer durations almost always resulting in stronger results on behavior outcome measures. One notable exception is the study by Perez (1987), which found strong results and large effect sizes on self-concept and locus of control measures using group play therapy and individual play therapy with sexually abused children after three months of weekly sessions. Also pertinent is the finding by Deblinger et al. (1996) that family dyad cognitive behavioral therapy had very large effects on measures of child post traumatic stress disorder (PTSD) symptoms after three months of treatment.

For samples of sexually abused children, cognitive-behavioral individual child therapy was, in general, not as effective as group cognitive-behavioral therapy. Non-structured or “supportive” individual therapy was less effective still (e.g., Cohen & Mannarino, 1996; 1998). The least effective treatment for children with sex abuse histories in the present meta-analysis was individual non-directive play therapy (e.g., Cotton-Cornelius, 2000; Zion, 1999). It should be noted, however, that the play therapy study by Perez (1987) referenced above supports the benefits of play therapy for this population, particularly in a group modality. Additionally, Baker (1985) found large effect size outcomes for sexually abused teenagers using both client-centered group and client-centered individual interventions. The mean Cohen’s effect size for the entire group of 24 studies geared toward the treatment of sexually abused children and teens was medium ($d = .71; SD = .41; 95\% CI .54 -.88$).

A total of nine studies included in the meta-analysis focused on samples of children with physical abuse and neglect histories. In all cases there was no separation
of the two forms of maltreatment, and groups were made up of children who may have experienced one or both maltreatment types (and/or unspecified sexual abuse, as well). Two studies utilized group treatment, one of which utilized parallel group therapy for caregivers. As with the sexual abuse studies, group therapy was associated with medium to very large effect size changes on global measures of behavior, with longer treatment durations producing stronger effects (McGain & McKinzy, 1995; Stauffer & Deblinger, 1996). Neurotherapy with this population was associated with comparably large effect sizes (Huang-Storms et al., 2007).

Three studies with physically abused and/or neglected samples utilized play-based therapies. Educational theraplay and social-modeling play therapies were associated with large effect size outcomes on developmental inventories (Fantuzzo et al., 1988; Stubenbort, 2000), while structured individual play therapy was associated with only small effect size changes on outcome measures (Reams & Friedrich, 1994). Least effective of the included study treatments for abused and neglected children was the use of outdoor adventure groups (Tucker, 2006), though it should be noted that this was the only abuse/neglect sample comprised primarily of adolescents.

Overall, the mean Cohen’s effect size for the treatment of physically abused and neglected children was medium \( (d = .66; SD = .56; 95\% CI .23 -1.09) \), slightly lower than the effect size for the treatment of sexually abused youth. A two-tailed \( t \)-test for independent samples indicated that the difference in mean effect sizes for sexually abused and physically abused/neglected youth was not statistically significant, \( t(31) = .29, p = .77 \). This suggests that children who have experienced these different
categories of abuse are similarly responsive to treatment interventions, overall (see Figure 4).

Figure 4. Effect size means for studies grouped by type of abuse.

Participant Characteristics: Age

Age characteristics of the samples included in the meta-analysis varied greatly, with some studies including participants ranging in age from pre-school to high school and other studies geared toward single-aged participants. Studies were categorized into four age groups described below. A one-way ANOVA indicated that age groupings did not differ significantly from one another in terms of effect size results, $F(3,29) = .85$, $p = .48$ (see Figure 5).
Five of the studies focused on pre-school and kindergarten aged children (3 to 6 years old), and five more included a wider age range from age 3 to 9 years. All of these studies involved play and/or group therapies, and two included additional “milieu” or multi-modal family support. Of these ten studies, seven demonstrated medium to large effect sizes, making for a medium to large total effect size average for the 3-9 year old group ($d = .77; SD = .51; 95\% CI .40-1.14$).

Six studies focused on late grade-school through middle school-aged children (approximately 9 to 13 years old), and primarily utilized group and/or cognitive-behavioral approaches for treatment. The two strongest studies in terms of outcome measures for this age group utilized family (dyad) cognitive-behavioral therapy (Deblinger et al., 1996) and eye movement desensitization and reprogramming (EMDR; Nasrin et al., 2004) for the treatment of PTSD symptoms. Of the six total studies for this

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*Figure 5. Effect size means for studies grouped by age.*
age group, four demonstrated large or very large effect sizes, making for a large total effect size average for the 9-13 year old group ($d = .90; \ SD = .60; \ 95\% \ CI .27-.15$).

Another age category was comprised of adolescents and teenagers, consisting of eight studies included in the meta-analysis. All of these studies utilized group therapy in some form, often with adjunctive therapies (e.g., music skills training, perpetrator group therapy, or individual therapy). In general, groups meeting for 6 months or more demonstrated large effect size changes on outcome measures (e.g., Rust & Troupe, 1991; Verleur et al., 1986), while small effect sizes were observed in group treatment durations of 12 weeks or less (e.g., Clendenon-Waller, 1991; Thun et al., 2002). An exception is a study by Baker (1995) using a 6 week unstructured group therapy intervention with sexually abused teen girls that found large effect size changes on a self concept measure. Also of note is the apparent success of inclusion of a sex education component to a girls’ group therapy program for increasing levels of self esteem (Verleur et al., 1986). Altogether, the mean Cohen’s effect size on outcome measures for the adolescent and teen studies is medium ($d = .59; \ SD = .40; \ 95\% \ CI .25-.93$).

Finally, nine studies included in the meta-analysis utilized heterogeneous samples of mixed-age youth, ranging from young children to teen-agers. The total mean Cohen’s effect size for the group is medium ($d = .58; \ SD = .25; \ 95\% \ CI .38-.77$). Two exceptions with large effect sizes include the study by Sullivan et al. (1992) utilizing individual psychotherapy conducted in sign language for 35 sexually abused deaf youth, and the study by Huang-Storms et al. (2007) utilizing neurofeedback with maltreated youth. As a group, the mixed-age studies described heterogeneous treatment
interventions and intervention combinations. It is notable within this group that longer treatment durations did not generally correlate with better outcomes on global measures of behavior. It appears that the most effective treatments of the mixed-age studies utilized more focused treatment interventions (rather than multiple treatment approaches), and/or were geared toward a more specific population of youth (e.g., deaf students).

Participant Characteristics: Gender, Ethnicity, and Socio-economic Status

The majority of the studies in the meta-analysis included both boys and girls in their samples. These 24 mixed studies were diverse in participant demographics and treatment interventions, and have an overall medium Cohen's effect size ($d = .67$; $SD = .24$; 95% CI .47-.87). Eight of the studies included in the meta-analysis had female only samples, and one utilized a boys-only sample. The female-only studies were all designed for older children (between the ages of 9 and 17 years) who had experienced sexual abuse. All but one of these utilized a group treatment intervention, including one drama therapy group (Mackay et al., 1987). The mean Cohen's $d$ effect size for the all-girls studies is large ($d = .84$; $SD = .32$; 95% CI .57-1.10). However, this is not statistically significantly higher than the mixed-gender studies, $F(1,30) = .88$; $p = .36$.

The single all-male study by Hack et al. (1994) was also designed for group treatment of sexual abuse, and had a very small sample size and overall small effect size ($d = .15$) on outcome measures (see Figure 6).

Eighteen of the studies included in the meta-analysis provided statistics regarding the racial/ethnic makeup of the participants, and seven provided socio-
economic information. There are no discernable patterns in terms of effectiveness of treatment based on socio-economic or racial-ethnic distinctions among the studies.

**Figure 6.** Effect size means for studies grouped by gender.

**Study Characteristics: Empirical Design**

Just under half of the empirical studies included in the meta-analysis (13 studies) utilized a single-group repeated measure design. In other words, one sample group of children was initially assessed pre-treatment using a standardized measure(s), then the entire group received the treatment intervention(s), and finally the group was re-assessed for changes on the standardized measure(s) post-treatment. Sometimes, long-term follow up post-testing was also part of the methodology (i.e., longitudinal design). This design methodology is typical in clinical settings where control groups of children are not readily available, and it enables researchers to investigate whether
treatment is associated with changes on specific outcome measures. Of course, although correlation may be inferred using this design, causal relationships between treatments and changes in targeted outcomes cannot be established without a control group. Confounding variables such as maturational and placebo effects cannot be ruled out as alternative explanations for differences between pre- and post- measures. However, due to ethical concerns regarding denying or delaying treatment for children identified as maltreated, single group repeated measure designs currently represent a compromise between clinical pragmatism and research vigor.

The group of 13 single group repeated measure studies included in the meta-analysis represents a heterogeneous mixture of treatment interventions and sample characteristics, as well as an array of effect size outcomes ranging from negligible to very large. Again, group therapy interventions generally found stronger results on outcome measures for sexually abused children, while theraplay and neurofeedback demonstrated the strongest effect size outcomes for abused and neglected children. The mean Cohen's $d$ effect size for the entire group of 13 is medium ($d = .59; SD = .5; 95\% \text{ CI} .29-.90$).

The second research design category represented in the meta-analysis is quasi-experimental, or comparison group design. Specifically, theses studies utilized two or more sample groups (sometimes randomly assigned) to assess the differential effects of two or more treatment interventions on a specific pre-post- measure(s). Because they lack a control group, these studies are similar to single group repeated measure studies in that they can assert a correlation between treatments and targeted outcome measures, but cannot assert causation. Ten of the studies included in the meta-analysis
utilized this design methodology. Again, treatment approaches and participant demographics were heterogeneous, and effect size outcomes varied from small to large. The mean Cohen’s $d$ effect size for the group is medium ($d = .60; SD = .29; 95\% CI .40-.80$).

Some interesting tentative findings arose in the comparison group studies regarding the effectiveness of differential treatment interventions. For example, Berliner and Saunders (1996) unexpectedly found that adding a stress inoculation training component to structured group therapy for sexually abused children did not improve the participants’ outcomes on measures of fear or anxiety. On the other hand, Cohen & Mannarino (1996; 1998) found significantly better outcomes on global behavior and anxiety/depression measures using sexual abuse-specific cognitive-behavioral therapy, as compared to using non-directive supportive therapy with individual children. Nasrin et al. (2004) found significantly more improvement on PTSD symptom outcomes for a small group of sexually abused Iranian girls using EMDR, as compared to individual manualized cognitive-behavioral therapy. Clendenon-Wallen (1991) found that the addition of music therapy to a mixed-gender sexual abuse therapy group did not enhance results on an outcome measure of self-esteem. In another study, structured individual play therapy did not improve children’s scores on developmental inventories above and beyond changes observed in a multi-modal therapeutic daycare treatment setting (Reams & Friedrich, 1994). And finally, Nolan et al. (2002) found no significant gains on depression/anxiety or global behavior measures with the addition of non-manualized group therapy to supportive individual therapy for mixed-gender samples of sexually abused children.
The third and last research design category represented in the meta-analysis is experimental control group design. These 10 studies represent the most desirable of empirical designs, as their utilization of a control group allows for a level of causal inference about the relationship of the treatment intervention to changes on targeted outcome measures. In particular, five studies represent the gold standard in that they utilized a randomized control group and had sample sizes of at least 12 participants per group (Deblinger et al., 1996; Fantuzzo et al., 1988; King et al., 2000; Perez, 1987; Sullivan et al., 1992). Specifically, Deblinger et al. (1996) and King et al. (2000) both investigated cognitive-behavioral family therapy and cognitive-behavioral/trauma-focused individual therapy for mixed-aged survivors of sexual abuse. The studies used a variety of outcome measures, and both found medium to large effect sizes for both treatment interventions. Fantuzzo et al. (1988) and Perez (1987) both investigated play therapy interventions (group, individual, peer-dyad, and adult-child dyad), and both studies found medium to large effect size outcomes overall for young, maltreated children. Finally, Sullivan et al. (1992) found large effect size outcomes for individual psychotherapy in sign language for a mixed-age sample of sexually abused youth.

Other control group designs in the meta-analysis utilized matched, waitlist, or non-randomized community control groups. Three investigated group therapy treatments (De Luca et al. 1995; McGain & McKinsey, 1995; Verleur et al., 1986), and two investigated multi-modal treatment interventions (Culp et al. 1991; Rust & Troupe, 1991). Taken as a group, the mean effect size for the control group design studies is quite large ($d = .92; SD = .45; 95\% CI .60-1.25$). It is encouraging that among the three research design categories included in the meta-analysis, the most stringent
demonstrates the strongest treatment results on outcome measures. Differences in effect size between the three research design groups were not robust enough to reach statistical significance, however, \( F(2,30) = 2.0; p = .15 \) (see Figure 7).

![Box plot showing effect size means for studies grouped by design.](image)

**Figure 7.** Effect size means for studies grouped by design.

**Study Characteristics: Length of Treatment**

Length of treatment is a particularly relevant study variable, as it has practical implications regarding the cost and feasibility aspects of treatment intervention. Large effect sizes on outcomes for interventions of shorter duration may well be more readily utilized by families and clinicians than those with similar change outcomes but more extensive treatment requirements. Indeed, the importance of efficiency and cost effectiveness is the likely reason why there has been more empirical research on group treatment interventions than on individualized treatments.
In terms of total treatment duration, the 33 studies included in the meta-analysis ranged from 2 weeks (Kruczek & Vitanza, 1999) to 1 year (Humberson, 1998), with a mode of 12 weeks and a mean of 14.7 weeks. Incidentally, Humberson’s (1998) study of parallel group therapy for 4-8 year olds and their non-offending caregivers boasts the largest effect size of all the studies included in the meta-analysis ($d = 1.95$). The second largest effect size outcome ($d = 1.90$) was found in McGain & McKinze’s (1995) matched control group study, which was the second longest duration in the meta-analysis at 6-9 months. Indeed, it appears that for group therapy interventions, durations of 12 or more weeks up to 1 year are correlated with incrementally improved outcome results, in general. This is distinct from the individual treatment interventions in the meta-analysis, which did not gain consistently on outcome effect sizes with durations extending beyond 12 weeks.

Duration of treatment is not a singularly valid way to assess treatments in terms of time, energy, and resources, however. For example, the 1 year study by Humberson (1998) involved approximately 96 hours of actual treatment intervention, whereas Stubenbort’s (2000) theraplay intervention study had a duration of only 12 weeks, but the equivalent of over 180 client contact hours. Actual time spent receiving/delivering therapeutic interventions may well be a better gauge of “dose effects” and feasibility of treatment. For this reason, individual client contact time is included in the summary tables in Appendix B.

A two-tailed Pearson correlational analysis of the relationship between client contact hours and Cohen’s effect size was calculated for the 33 studies in the meta-analysis. Overall, there was no correlation between the two variables ($r = -.005$, $p = $
.98), indicating that greater therapy contact hours were not clearly related to greater changes on targeted outcome measures. For studies specifically examining treatments for sexually abused youth, the relationship between effect size and contact time was somewhat stronger but also not significant ($r = .38, p = .07$); nor was it significant for studies designed for physically abused and neglected children ($r = -.05, p = .90$). On the other hand, separating out the group therapy intervention studies, the relationship between contact hours and effectiveness of treatment was significant at the .05 level ($r = .46, p = .03$). This is congruent with the findings discussed above of improved outcomes with longer group treatment durations, and the general superiority of group treatment interventions for sexually abused youth, in particular.

**Study Characteristics: Treatment Intervention**

It was originally hoped that enough studies would meet inclusion criteria to allow for meaningful comparison of different treatment interventions for abused and neglected children. Unfortunately, empirical research on the topic is clearly in its nascent stages, and the present sample of 33 studies is unbalanced in terms of treatment representation. Because a number of the studies included separate outcome data for two or more distinct interventions, a total of 38 treatment trials were analyzed from the 33 studies. These include family therapy ($N = 2$), individual therapy ($N = 8$), play therapy ($N = 5$), group therapy ($N = 15$), multi-modal therapy ($N = 5$), and miscellaneous experimental therapies ($N = 3$). Statistical comparison of the group means of these six treatment categories yielded non-significant results, $F(5,32) = .44; p = .82$, indicating that they do not differ meaningfully from each other in terms of their efficacy (see Figure 8).
The two family treatment interventions were components of larger controlled studies for sexually abused youth that compared cognitive behavioral/trauma-focused family therapy outcomes to cognitive-behavioral individual therapy outcomes (Deblinger et al., 1996; King et al., 2000). Trauma-focused family therapy had a medium effect size, and cognitive-behavioral family therapy had a large effect size, making for a large combined family therapy average \((d = .80; SD = .29; 95\% CI -1.8-3.40).\)

Of the individual therapy samples, five utilized cognitive-behavioral approaches (Cohen & Mannarino, 1996; Cohen & Mannarino, 1998; Deblinger et al., 1996; King et al, 2000; Nasrin et al., 2004) and five utilized non-directive/"supportive" therapies (Cohen & Mannarino, 1996; Cohen & Mannarino, 1998; Nolan et al., 2002; Baker, 1985; Sullivan et al., 1992). Altogether, the average Cohen’s effect size of these 10 studies
was medium ($d = .67; SD = .18; 95\% CI .14-.81$). The average effect size of the cognitive-behavioral interventions was medium ($d = .73$) and the average effect size of the non-directive interventions was medium ($d = .54$); this difference in effect sizes is not statistically significant, $t(8) = 1.19; p = .29$.

The five play therapy interventions included a trained peer-dyad and adult-dyad play comparison (Fantuzzo et al., 1988), an educational theraplay intervention (Stubenbort, 2000), and three non-specific individual and group play therapy interventions (Cotton-Cornelius, 2000; Perez, 1987; Zion, 1999). The average effect size for the play therapy interventions was medium ($d = .64; SD = .41; 95\% CI .14-1.15$).

Combined therapies represented the lowest combined effect size average of the different treatment types ($d = .49; SD = .27; 95\% CI .15-.83$). These studies included a structured play therapy and milieu therapy combination (Reams & Friedrich, 1994), a multi-modal parent support plus therapeutic day treatment (Culp et al., 1991), a combination of individual, family, and group therapies (Lanktree & Briere, 1995), and a combination of group plus individual plus parent group therapy (Rust & Troupe, 1991).

Of the group therapy studies, 13 were aimed at youth with histories of sexual abuse and are described above. The remaining two group intervention studies for physically abused and neglected children investigated parallel cognitive-behavioral therapy for young children and their caregivers (Stauffer & Deblinger, 1996) and compared group treatment to a control group (McGain & McKinsey, 1995). Their large mean effect size ($d = 1.21$) averaged with the other 13 group therapy studies for
sexually abused youth makes for an overall large group therapy effect size ($d = .80$; $SD = .27$; 95% CI .49-1.11).

The three studies making up the miscellaneous/experimental treatment group include a neurotherapy intervention for maltreated children by Huang-Storms et al. (2007; $d = .82$), an EMDR intervention for Iranian adolescents with PTSD by Nasrin et al. (2004; $d = 1.07$), and an outdoor adventure group intervention for maltreated adolescents by Tucker (2006; $d = .08$). As a group, these studies have a mean medium effect size ($d = .66$; $SD = .51$; 95% CI -.6 -1.9).

Summary

The grand total average effect size for the 33 studies included in the meta-analysis was medium ($d = .70$). No particular therapeutic interventions stood out as statistically more effective than the others, though some trends may be tentatively speculated from the data. Cognitive-behavioral approaches appeared superior to non-directive/client-centered approaches, overall; however, this may be an effect of the larger number of CBT-oriented studies represented in the meta-analysis. Because the meta-analysis also included a majority of group therapy studies, data on group treatment can likely be interpreted with most confidence.

Overall, group therapy was associated with medium to very large effect size changes on measures of behavior, with longer treatment durations producing stronger effects. Specifically, it appears that for group therapy interventions, durations of 12 weeks up to 1 year are correlated with incrementally improved outcome results, particularly for youth with histories of sexual abuse. Individual treatment interventions,
on the other hand, did not gain consistently on outcome effect sizes with increased client contact hours or treatment durations.

Other variables that were hypothesized as potentially relevant to treatment outcome were, across the board, not statistically significant contributors to the effectiveness of treatment. Type of abuse (sexual or physical/neglect) and age group did not appear to impact outcomes, nor did mixed vs. all-female sample group makeup. Unfortunately, there were not enough data available to evaluate the impact of socio-economic status or racial background. There was also only one all-male study, so gender group comparisons were not possible. Outcome measures varied so greatly between studies that no meaningful patterns could be discerned regarding the types of outcome measures most responsive to client changes following treatment.

Controlled studies made up just under one-third of the studies in the meta-analysis and their authors reported strong positive outcomes overall. Although this limited number of studies (culled from over 30 years of literature) indicates there is a great need for further empirical research, these studies do build a foundation of support for the efficacy of therapies for abused and neglected children.
CHAPTER 6

DISCUSSION

There were five major aims of the present two-part study: (1) to explore through a clinical pilot study the effectiveness of neurofeedback training for a sample of children with histories of abuse and neglect; (2) to establish through meta-analysis the average effect size of treatment outcomes for abused and neglected children, overall; (3) to ascertain whether treatment outcome data for children with histories of abuse and neglect are as robust as those for the broader population of children; (4) to ascertain whether certain treatment modalities are associated with stronger effect sizes for this population; and (5) to compare the efficacy of neurofeedback training to other empirically substantiated treatment modalities for abused and neglected children. All of these goals were met by the present study. However, the scarcity of empirical research on treatment outcomes for this population of children makes it difficult to answer with confidence the question of the comparative effectiveness of different treatment modalities.

Comparison of Findings to Previous Research

The medium-sized total average Cohen’s effect size of the 33 studies included in the meta-analysis ($d = .70$) falls within the range of three broad-based meta-analyses of general child psycho-therapy interventions. Weisz et al. (1995) looked at 150 child and adolescent psychotherapy outcome studies and reported a mean Cohen’s effect size of .54 (medium); Kadzin et al. (1990) analyzed 223 studies and reported a mean Cohen’s effect size of .88 (large); and Casey and Berman (1985) reported a mean effect size of .71 (medium) for 75 studies with children 12 years of age and younger. Reeker et al.
(1997) found a somewhat larger aggregate effect size in their meta-analysis of 15 group
treatment studies for sexually abused children ($d = .79$), and Hoag and Burlingame (1997)
found a slightly smaller aggregate effect size for their meta-analysis of 56 group therapy
studies for a general population of children and adolescents ($d = .61$). The present
results are therefore in line with previous research; moreover they are encouraging, as
abused and neglected children have been described in the literature as less responsive
to treatment than the general pediatric population (Chanitz, 1995; Wilson, 2001). Based
on these effect size outcomes, it appears that a variety of empirically researched
treatment interventions have clear benefits for maltreated children.

Although further research is greatly needed, the present meta-analysis tentatively
indicates that various forms of psychotherapy are similar in effectiveness with this
population. This is congruent with broad-based adult psychotherapy meta-analyses,
which also suggest the “Dodo verdict,” – i.e., “everybody has won and all must have
prizes” (Parloff, 1984; Smith, Glass & Miller, 1980). Although evidence has been mixed,
larger meta-analyses have suggested that behavioral methods yield larger effect sizes
for the general population of children than non-behavioral methods (Casey & Berman,
1985; Weisz et al., 1995). Although not statistically significant, effect size trends in the
present meta-analysis also suggest that cognitive-behavioral approaches are correlated
with stronger outcomes than non-directive therapy interventions for abused and
neglected children. As mentioned above, group approaches further demonstrated a
trend toward increased effectiveness with sexually abused youth, in particular.

It may be important to note which modalities of therapy have not been the subject
of empirical studies, and therefore were not included in the meta-analysis. For example,
a great deal of attention has been paid in recent years to holding therapy as a treatment intervention for children with reactive attachment disorder (RAD), in particular. No holding therapy studies meeting the minimum research criteria were found during the literature search. Similarly, parent attunement and re-birthing therapies were nowhere to be found in the research literature.

It has also been debated among researchers whether the age of the child impacts psychotherapy outcomes. Some have suggested that younger children respond more cooperatively to adult authority (Kendall, Lerner, & Craighead, 1984), while others suggest that cognitive maturity favors psychotherapy for adolescents and teens (Shirk, 1988). The evidence on age and therapy outcomes has been mixed thus far. Casey and Berman (1985) found no relationship between child age and study effect size, but Weisz et al. (1987) found a significant negative relationship suggesting older youth do less well in therapy than their younger counterparts. Trends in the current meta-analysis, though not to statistical significance, suggest that 9-13 year olds make more positive gains on outcomes than younger and older age groups. Research has been similarly mixed thus far regarding gender effects on psychotherapy outcomes for youth. Unfortunately the present meta-analysis cannot offer much clarification on the topic due to the paucity of all-male studies; however, trends from the data suggest that all-girl study samples had better outcomes than mixed group samples.

Clinical Implications for Neurofeedback

With a large mean effect size of .82, the neurofeedback pilot study outcomes stand shoulder to shoulder with other more established treatment interventions for children with abuse and neglect histories. The results indicate that neurotherapy
treatment was more effective than the average treatment intervention for this particular population, as based on the aggregate meta-analysis effect size mean of \( d = .70 \). This is particularly encouraging when client contact hours are considered an important factor in treatment feasibility. With total contact time averaging 15 hours and treatment duration averaging five months, the neurotherapy pilot study represents one of the more efficient therapeutic interventions in the meta-analysis.

There were 12 studies included in the meta-analysis with equal or higher effect size outcomes compared to the neurotherapy pilot study. Eleven of these studies were designed specifically for youth who had experienced sexual abuse, and seven of these were group therapy interventions. As discussed above, group therapy appears from the present meta-analysis to be the most effective treatment for this sub-population of abused children, potentially because of its success in normalizing the sexual abuse experience through group sharing and psycho-education. The other four studies included treatment of sexual abuse victims through individual cognitive behavioral interventions (two studies), individual or group play therapy (one study), and eye movement desensitization and reprocessing therapy (one study).

Only one study designed for the treatment of abused and neglected children reported stronger effect size outcomes than the neurotherapy pilot study. This was the theraplay intervention designed for maltreated preschoolers (Stubenbort, 2000; \( d = 95 \)). Compared to the neurotherapy intervention, the theraplay intervention was significantly more extensive in terms of contact time and multi-modal support for the child clients. Theraplay was described by the study’s authors as providing developmentally appropriate therapeutic and educational activities in a therapeutic pre-school setting, 3
hours per day, 5 days per week for 12 weeks (totaling approximately 180 contact hours). Outcomes were measured in terms of improvements on broad developmental inventories. The neurotherapy intervention, by contrast, was the equivalent of approximately 15 contact hours and treated an older and broader age range from 6 to 15.5 years.

According to the meta-analysis by Weisz et al. (1995), social aggression is typically least amenable to change following psychotherapy interventions for children. Interestingly, the neurotherapy pilot study indicates that aggressive, delinquent, and socially problematic behaviors (e.g., lying, fighting, demanding attention, etc.) were most strongly impacted by treatment. Other behaviors associated with attentional problems, anxiety/depression, and thought problems also were significantly reduced. The global nature of the changes observed following neurotherapy treatment may well be one of its distinct assets as a treatment modality. Changes observed in both physiological and behavioral outcomes following the pilot treatment can be characterized as anchored in improved emotional self-regulation. As neglect and abuse represent diverse experiences with a common component of autonomic nervous system (ANS) dysregulation (rather than a specific symptom-based diagnosis), it may be that the self-regulating effects of neurotherapy are particularly well-suited to this population of children.

Study Strengths and Limitations

Unlike the large meta-analyses referred to above, a strongpoint of the present study is that it did not rely solely on published reports. Although published studies afford meta-analyses a level of quality control, relying solely on them may introduce a
distortion of effect sizes due to publication bias. Ample evidence suggests that journal editors and reviewers favor publications of statistically significant findings (e.g., Atkinson, Furlong, & Wampold, 1982). McLeod and Weisz (2004) suggest that, paradoxically, large meta-analyses requiring publication for inclusion may actually skew outcomes too positively. They further suggest that dissertations entail a high level of peer review via the committee process, and therefore constitute a methodologically sound alternative sample that is less vulnerable to the "file drawer effect." The present meta-analysis included approximately one-quarter dissertations, with effect size findings similar to those of previously published meta-analyses.

Another strength of the present meta-analysis is its heavy inclusion of clinical studies, as opposed to majority inclusion of laboratory research studies. This is atypical of meta-analyses, and was possible due to the leniency of the inclusion criteria in accepting non-controlled designs. There has been criticism regarding the over-representation of laboratory studies in psychotherapy outcome literature (e.g., Weisz et al., 1995). Specifically, clinical studies are reported to have weaker outcomes than laboratory research studies due to the real-life complexity of their participants in terms of heterogeneity and co-morbidity of diagnoses. Typically, laboratory research studies differ significantly from clinical studies in terms of their well-screened (or recruited) samples, better retention rates, manualization of treatments, and controlled treatment durations. It has been suggested that this may unrealistically inflate effect sizes found in most meta-analyses. The majority of the studies included in the present meta-analysis were based in community mental health centers or other clinical settings; thus, the
robust effect sizes bode well for the positive impact of therapeutic interventions in clinical as well as research settings.

Drawbacks to the meta-analysis design have been discussed above in the meta-analysis methods section – primarily the risk of inflated effect size findings when including single treatment group repeated measures designs and small sample sizes in a meta-analysis (Lipsey & Wilson, 1993). However, efforts were made in accordance with other meta-analyses to offset this potential problem by using effect size calculations that were less vulnerable to inflation and by adjusting statistically for sample sizes.

There are caveats to the neurofeedback pilot study as well, as described above in the pilot study discussion section - chiefly regarding the non-experimental research design and the inability to control for medication effects. However, these design weaknesses are unfortunately the norm amongst clinical studies with this population, so are not reasonable grounds for minimizing the comparative strength of the neurofeedback outcome data. In fact, the pilot sample size was comparable to or larger than most studies included in the meta-analysis, and the outcome measures had the unique advantage of both a broad behaviorally-based parent report (Child Behavior Checklist) and a physiological assessment (Test of Variables of Attention). As a first study of this kind, the results are necessarily tentative, but very encouraging.

It is hoped that the present meta-analysis will give impetus to further outcome research for this population, and may serve as a practical “yardstick” comparison to gauge the efficacy of treatment interventions in the future. It is also hoped that the positive outcomes of the pilot study will stimulate interest in the potential of
neurofeedback treatment for the many children and families struggling with the
developmental effects of abuse/neglect. As neurotherapy is generally utilized as an
adjunctive treatment, one clinical conclusion that could be drawn from the present study
is the suggestion that adding neurofeedback to an existing proven multi-modality
therapy, such as theraplay, might provide a very a powerful bio-psycho-social approach
for treating this challenging population.
APPENDIX A

INTERNATIONAL 10-20 ELECTRODE PLACEMENT SYSTEM
(Looking from above the head)

Front of head

Back of head
APPENDIX B

SUMMARY TABLES OF STUDIES INCLUDED IN META-ANALYSIS
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<td>Clendenon-Wallen (1991)</td>
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<td>Cotton-Cornelius (2000)</td>
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<td>Culp, Little, Letts &amp; Lawrence (1991)</td>
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<td>Fantuzzo et al. (1988)</td>
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<td>Hack, Osachuk &amp; De Luca (1994)</td>
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<td>Hall-Marley &amp; Damon (1993)</td>
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<td>Huang-Storms, Bodenhamer-Davis, Davis &amp; Dunn (2006)</td>
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<td>Humberson (1998)</td>
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<td>King, Tonge et al. (2000)</td>
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<td>Kruczek &amp; Vitanza (1999)</td>
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<td>Lanktree &amp; Briere (1995)</td>
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<td>Mackay, Gold &amp; Gold (1987)</td>
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<td>Nasrin et al. (2004)</td>
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<td>Nolan et al. (2002)</td>
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<td>Perez (1987)</td>
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<td>Reams &amp; Friedrich (1994)</td>
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<td>Rust &amp; Troupe (1991)</td>
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<td>Stauffer &amp; Deblinger (1996)</td>
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<td>Stubenbort (2000)</td>
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<td>Sullivan, Scanlan, Brookhouser &amp; Schulte (1992)</td>
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<td>Tucker (2006)</td>
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<td>Verleur, Hughes &amp; Dobkin de Rios (1986)</td>
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<tr>
<td>Waters (1998)</td>
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<td>Zion (1999)</td>
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<tr>
<td>Study</td>
<td>Intervention(s)</td>
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</table>
| Ashby, Gilchrist & Miramontez (1987) | Group therapy (with culturally relevant activities)  
Sessions: 2 hours/week  
Duration: 10 weeks  
(Contact time: 20 hours) | $N = 11$  
Age: 12 - 17 ys.  
Gender: 100% girls  
Inclusion criteria: Hx of sexual abuse  
Ethnicity: Native American  
SES: n/a | *Piers-Harris Children’s Self-Concept Scale* (Piers & Harris, 1984) (Child) | $d = 1.0$  
(large) | $d = 1.0$  
(large) |
<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention(s)</th>
<th>Participants</th>
<th>Outcome Measure(s)</th>
<th>Measure Effect Size(s)</th>
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</table>
| Baker (1985)  | Short term group therapy (unstructured)  
OR  
Client centered individual therapy  
Sessions:  
1 hr/week – Individual  
1.5 hr/week – group  
Duration:  
10 weeks – Individual  
6 weeks – Group  
(Contact time:  
10 hours – Individual  
9 hours – Group) | N = 39  
Age: 13 - 17 ys.  
(M = 14.7)  
Gender:  
100% Girls  
Inclusion criteria:  
CPS verified Hx of sexual abuse  
Ethnicity:  
n/a  
SES:  
n/a | 1. *Piers Harris Children’s Self Concept Scale* (Piers & Harris, 1984)  
2. *Anxiety Scale Index*  
(Institute for Personality and Ability Testing)  
3. *Depression Scale Index*  
(Institute for Personality and Ability Testing) | Group CSS $d = 2.0$  
Individual CSS $d = .91$  
Group ASI $d = .22$  
Individual ASI $d = .68$  
Group DSI $d = .21$  
Individual DSI $d = 1.1$  
Study total $d = .85$  
(large) |
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<th>Study</th>
<th>Intervention(s)</th>
<th>Participants</th>
<th>Outcome Measure(s) (Response Perspective)</th>
<th>Measure Effect Size(s)</th>
<th>Mean Effect Size(s)</th>
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<tbody>
<tr>
<td>Berliner &amp; Saunders (1996)</td>
<td>Group therapy (structured) WITH Stress Inoculation Training (SIT) (n = 48) OR Group therapy (structured) (n = 32)</td>
<td>N = 80&lt;br&gt;Age: 4 - 13 yrs.&lt;br&gt;Gender: 88% girls 22% boys&lt;br&gt;Inclusion criteria: CPS verified Hx of sexual abuse&lt;br&gt;Ethnicity: 74% Caucasian 11% African American 7% Latina/o 8% Other&lt;br&gt;SES: n/a</td>
<td>1. <em>Fear Survey Schedule for Children – Revised (FSSC-R)</em> (Ollendick, 1983) <em>(Child)</em>&lt;br&gt;Failure/Criticism –&lt;br&gt;Fear of Unknown –&lt;br&gt;Injury/Small Animals –&lt;br&gt;Danger/Death –&lt;br&gt;Medical Fears –</td>
<td>FSSC-R SIT total d = .21&lt;br&gt;FSSC-R GT total d = 1.19</td>
<td>FSSC-R total d = .70</td>
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<td></td>
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<td>SIT d = .22&lt;br&gt;GT d = 1.16&lt;br&gt;SIT d = .08&lt;br&gt;GT d = 1.19&lt;br&gt;SIT d = .25&lt;br&gt;GT d = 1.11&lt;br&gt;SIT d = .38&lt;br&gt;GT d = 1.10&lt;br&gt;SIT d = .17&lt;br&gt;GT d = .98</td>
<td>SAFE total d = .75</td>
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<td>2. <em>Sexual Abuse Fear Evaluation Scales (SAFE)</em> (Wolfe &amp; Wolfe, 1986) <em>(Child)</em>&lt;br&gt;Sex Associated Fears –&lt;br&gt;Interpersonal Discomfort –</td>
<td>SAFE SIT total d = .40&lt;br&gt;SAFE GT total d = 1.11</td>
<td>RCMAS total d = .20</td>
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<td></td>
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<td></td>
<td>SIT d = .14&lt;br&gt;GT d = 1.14&lt;br&gt;SIT d = .66&lt;br&gt;GT d = 1.09</td>
<td>CBCL total d = .68</td>
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<td>3. <em>Revised Children’s Manifest Anxiety Scale (RCMAS)</em> <em>(Child)</em>&lt;br&gt;Sex Associated Fears –&lt;br&gt;Interpersonal Discomfort –</td>
<td>RCMAS SIT total d = .15&lt;br&gt;RCMAS GT total d = .24</td>
<td>CDI total d = .59</td>
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<td></td>
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<td></td>
<td>CSBI total d = .48</td>
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<tr>
<th>Study</th>
<th>Intervention(s)</th>
<th>Participants</th>
<th>Outcome Measure(s) (Response Perspective)</th>
<th>Measure Effect Size(s)</th>
<th>Mean Effect Size(s)</th>
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<tr>
<td>Berliner &amp; Saunders (1996)</td>
<td>Note: The addition of Stress Inoculation Training (SIT) did not result in significant improvements over Group Therapy (GT) alone.</td>
<td></td>
<td>Physiological Anxiety – Worry/Oversensitivity – Concentration Anxiety –</td>
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<td></td>
<td></td>
<td></td>
<td>Social – Internalizing – Externalizing –</td>
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<td></td>
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<td></td>
<td>5. Children’s Depression Inventory (CDI) Kovacs, 1992 (Child)</td>
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<td></td>
<td>SIT $d = .18$ GT $d = .77$ SIT $d = .01$ GT $d = .58$ SIT $d = .18$ GT $d = .52$</td>
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<td></td>
<td>CBCL SIT total $d = .47$ CBCL GT total $d = .89$</td>
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<td></td>
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<td></td>
<td>SIT $d = .27$ GT $d = 1.1$ SIT $d = .37$ GT $d = .58$ SIT $d = .22$ GT $d = .67$</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>CDI SIT total $d = .66$ CDI GT total $d = .52$</td>
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<td></td>
<td></td>
<td></td>
<td>CSBI SIT total $d = .21$ CSBI GT total $d = .74$</td>
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Note: The addition of Stress Inoculation Training (SIT) did not result in significant improvements over Group Therapy (GT) alone.
<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention(s)</th>
<th>Participants</th>
<th>Outcome Measure(s)</th>
<th>Measure Effect Size(s)</th>
<th>Mean Effect Size(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clendenon-Wallen (1991)</td>
<td>Therapeutic group support AND Music therapy ((n = 3)) OR Therapeutic group support only ((n = 11))</td>
<td>(N = 14) Age: 14 - 18 ys. ((M = 15)) Gender: 82% Girls 18% Boys Inclusion criteria: Hx of sexual abuse Ethnicity: n/a SES: n/a</td>
<td>The Adjective Checklist (Child) Indicators – Contra-indicators –</td>
<td>(AC \text{ total } d = .32) (d = .25) (d = .39)</td>
<td>Study Total: (d = .32) (small)</td>
</tr>
</tbody>
</table>

Note: No statistically significant differences on the outcome measure were observed between the two groups.
<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention(s)</th>
<th>Participants</th>
<th>Outcome Measure(s) (Response Perspective)</th>
<th>Measure Effect Size(s)</th>
<th>Mean Effect Size(s)</th>
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<tbody>
<tr>
<td><strong>Cohen &amp; Mannarino (1996)</strong></td>
<td><strong>1. Sexual Abuse Specific Cognitive-behavioral Therapy (SAS-CBT), Manualized</strong> i.e., Individual therapy for child AND Individual therapy for non-offending parent (n = 39 children) OR  <strong>2. Non-directive Supportive Therapy (NST)</strong> i.e., Individual therapy for child AND Individual therapy for non-offending parent (n = 28 children)</td>
<td>N = 67 children</td>
<td>1. <em>Child Behavior Checklist (CBCL)</em> (Achenbach &amp; Edelbrock, 1983) (Parent) Internal – External – Social Competence –</td>
<td>CBCL SAS-CBT total $d = 1.18$ CBCL NST total $d = .18$ SAS-CBT $d = 1.16$ NST $d = .01$ SAS-CBT $d = .96$ NST $d = .29$ SAS-CBT $d = .36$ NST $d = .42$ CSBI SAS-CBT $d = .92$ CSBI NST $d = .44$ PRESS SAS-CBT total $d = 0$ PRESS NST total $d = 0$ WBR SAS-CBT total $d = 1.15$ WBR NST total $d = .62$</td>
<td>CBCL total $d = .57$ CSBI total $d = .68$ PRESS total $d = 0$ WBR total $d = .86$ SAS-CBT total $d = .82$ NST total $d = .28$ Study Total: $d = .55$ (medium)</td>
</tr>
<tr>
<td></td>
<td>Sessions: Twelve 45-min sessions for both child and parent Duration: 12 - 16 weeks (Contact time: 18 hours)</td>
<td>Age: 2.11 – 7.1 ys. ($M = 4.68$) Gender: 58% girls 42% boys Inclusion criteria: CPS-validated Hx of sexual abuse in past 6 months Exclusion criteria: Psychosis, mental retardation, serious medical illness, pervasive developmental delay Ethnicity: 54% Caucasian 42% African-American 40% Other SES: n/a</td>
<td>2. <em>Child Sexual Behavior Inventory (CSBI)</em> (Friedrich, Grambsch, et al., 1992) (Parent)</td>
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<tr>
<td>Study</td>
<td>Intervention(s)</td>
<td>Participants</td>
<td>Outcome Measure(s) (Response Perspective)</td>
<td>Measure Effect Size(s)</td>
<td>Mean Effect Size(s)</td>
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</table>
| **Cohen & Mannarino (1998)**  | **1. Sexual Abuse Specific Cognitive-behavioral Therapy (SAS-CBT), Manualized**  
AND  
**i.e., Individual therapy for child**  
AND  
**Individual therapy for non-offending parent (n = 30 children)**  
**OR**  
**2. Non-directive Supportive Therapy (NST)**  
**i.e., Individual therapy for child**  
AND  
**Individual therapy for non-offending parent (n = 19 children)** | **N = 49**  
**Age: 7 - 15 ys. (M = 11.1)**  
**Gender:**  
**69% girls**  
**31% boys**  
**Inclusion criteria:**  
**CPS-validated Hx of sexual abuse in past 6 months**  
**Ethnicity:**  
**59% Caucasian**  
**37% African American**  
**2% Latina/o**  
**2% Bi-racial**  
**SES:**  
**Internal –**  
**External –**  
**Social Competence –**  
**2. Child Sexual Behavior Inventory (CSBI) (Friedrich, Grambsch, et al., 1992)**  
**3. Child Depression Index (CDI) (Kovacs, 1985)**  
**4. State-Trait Anxiety Inventory for Children (STAIC) (Spielberger, 1973)**  
**State –**  
**Trait –** | **CBCL CBT**  
**CBCL NST**  
**CBT**  
**NST**  
**CDI CBT**  
**CDI NST**  
**STAIC CBT**  
**STAIC NST** | **CBCL**  
**Total d = .29**  
**CSBI**  
**Total d = .48**  
**CDI**  
**Total d = .71**  
**STAIC**  
**Total d = .63** | **Medium** |
<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention(s)</th>
<th>Participants</th>
<th>Outcome Measure(s) (Response Perspective)</th>
<th>Measure Effect Size(s)</th>
<th>Mean Effect Size(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sessions: 1/week</td>
<td>Age: 5 - 13 ys. (M = 9.5)</td>
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<tr>
<td></td>
<td>Duration: 12 – 18 weeks (M = 13)</td>
<td>Gender: 43% Girls 57% Boys</td>
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<tr>
<td></td>
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<td>Inclusion criteria: Hx of abuse and/or neglect, Foster care placement</td>
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<tr>
<td></td>
<td></td>
<td>Ethnicity: 32% Caucasian 10.7% Latina/o 57% African American 1% Other</td>
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<td></td>
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<td>SES: n/a</td>
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- Study Total: d = .2 (small)
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<tr>
<th>Study</th>
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<th>Mean Effect Size(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culp, Little, Letts &amp; Lawrence (1991)</td>
<td>Therapeutic day treatment program, (group “milieu” focus with speech, physical, and play therapies) AND Parent counseling, group therapy, crisis intervention, and parenting education services ( (n = 17) ) OR No treatment ( (n = 17) )</td>
<td>( N = 34 ) (children) Age: 3.9 – 5.9 ys. ( (M = 4.9) ) Gender: 44% girls 66% boys Inclusion criteria: Hx of physical abuse and/or neglect Ethnicity: 44% Caucasian 56% African American SES: low income</td>
<td>1. Perceived Competence and Social Awareness Scale (Harter &amp; Pike, 1984) (Child) Cognitive Competence – Peer Acceptance – Physical Competence – Maternal Acceptance – 2. Early Intervention Developmental Profile (Bricker, 1982) (Teacher) Cognitive – Perception/Fine Motor – Social Emotional – Gross Motor –</td>
<td>PCSAS total ( d = .45 ) EIDP total ( d = .67 )</td>
<td>( d = .56 ) (medium)</td>
</tr>
</tbody>
</table>

Note: The treatment group showed significantly more improvement on outcome measures than the control group.
<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention(s)</th>
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<th>Outcome Measure(s) (Response Perspective)</th>
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<th>Mean Effect Size(s)</th>
</tr>
</thead>
</table>
| Deblinger, Lippman, J., & Steer, R. (1996) | 1. Individual cognitive-behavioral therapy, child only \( (n = 25) \)  
OR  
2. Family cognitive-behavioral therapy, mother and child \( (n = 25) \)  
OR  
3. Individual cognitive-behavioral therapy, mother only \( (n = 25) \)  
OR  
4. Community comparison group \( (n = 25) \)  
Sessions: 45 min/week (child individual, mother individual)  
OR  
90 min/week (mother and child dyad)  
Duration: 12 weeks (Contact time: Dyad – 18 hours Individual – 9 hours) | \( N = 100 \) (children)  
Age: 7 - 13 ys. \( (M = 9.89) \)  
Gender: 83% girls 17% boys  
Inclusion criteria: DYFS referred for sexual abuse, >2 PTSD symptoms  
Ethnicity: 70% Caucasian 21% African American 7% Latina/o 2% other  
SES: n/a | 1. *The Schedule for Affective Disorders and Schizophrenia - School Age Version* (K-SADS-E) PTSD section (Orvaschel et al., 1982) (Child, Parent)  
2. *Child Depression Inventory* (CDI) (Kovacs, 1985) (Child)  
3. *Child Behavior Checklist* (CBCL) Externalization Scale (Parent) | Individual child CBT: \( d = 1.75 \)  
Family CBT: \( d = 2.1 \)  
Individual child CBT: \( d = .51 \)  
Family CBT: \( d = .66 \)  
Individual child CBT: \( d = .27 \)  
Family CBT: \( d = .30 \) | Individual child CBT: \( d = .84 \) (large)  
Family CBT: \( d = 1.0 \) (large)  
**Study Total:** \( d = .93 \) (large) |

Note: Treatment groups did not differ significantly overall from each other, but were significantly stronger on outcome measures as compared to the community comparison group.
<table>
<thead>
<tr>
<th>Study</th>
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</thead>
</table>
(n = 35)  
OR  
2. No treatment  
(n = 35) | N = 70  
Age: 9 - 12 ys.  
Gender: 100% Girls  
Inclusion criteria: Hx of intra-familial sexual abuse  
Ethnicity: n/a  
SES: n/a | 1. Self Esteem Inventory (SEI) (Coopersmith, 1981) (Child)  
2. Revised Children’s Manifest Anxiety Scale/What I Think and Feel Questionnaire (CMAS) (Reynolds & Richmond, 1978) (Child)  
3. Child Behavior Checklist (CBCL) (Achenbach & Edelbrock, 1983) (Parent) | d = 1.27  
d = .80  
d = 1.16 | Study Total: d = 1.07 (large) |
<table>
<thead>
<tr>
<th>Study</th>
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<th>Mean Effect Size(s)</th>
</tr>
</thead>
</table>
| Fantuzzo, Jurecic, Stovali, Hightower, Goins, & Schachtel (1988) | 1. Play sessions with a trained socially initiating peer  
                           (n = 12)  
                           OR  
                           2. Play sessions with a trained socially initiating adult  
                           (n = 12)  
                           OR  
                           3. No treatment  
                           (n = 12)  
                           Sessions: 8  
                           Duration: 3 - 4 weeks  
                           (Contact time: 8 hours) | N = 36  
                           Age: 3.1 – 5.3 ys.  
                           (M = 4.3)  
                           Gender: 28% girls  
                           72% boys  
                           Inclusion criteria: Dept. of Social Services referred for abuse (24%), neglect (46%), and “high risk” (30%)  
                           Ethnicity: 46% Caucasian  
                           54% African American  
                           SES: below poverty line | 1. The Preschool Behavior Questionnaire (PBQ)  
                           (Behar & Stringfiled, 1974)  
                           (Teacher)  
                           2. The Brigance Diagnostic Inventory of Early Development (Brigance, 1978)  
                           (Teacher) | Peer play: d = .17  
                           Adult play: d = 1.6  
                           Peer play: d = .44  
                           (medium)  
                           Adult Play: d = 1.10  
                           (large) | Peer play: d = .76  
                           (large)  
                           Note: Both treatment groups showed significantly better gains on outcome measures than the control group |
<table>
<thead>
<tr>
<th>Study</th>
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<th>Mean Effect Size(s)</th>
</tr>
</thead>
</table>
| Hack, Osachuk & De Luca (1994) | Semi-structured group therapy  
Sessions: 90 minutes x 1/week  
Duration: 12 weeks | $N = 6$  
Age: 8 – 11 ys.  
Gender: 100% boys  
Inclusion criteria: Hx of sexual abuse  
Ethnicity: n/a  
  Externalizing-  
  Internalizing –  
  2. *Child Depression Inventory (CDI)* (Kovacs, 1986) (Child)  
  3. *Children’s Manifest Anxiety Scale (CMAS)* (Reynolds & Richmond, 1978) (Child)  
  4. Self-Esteem Inventory (Coopersmith, 1984) (Child) | CBCL total $d = 0.0$  
  Externalizing- $d = 0.0$  
  Internalizing – $d = 0.0$  
  $d = .74$  
  $d = 0.0$  
  $d = 0.0$ | $d = .15$ (small) |
<table>
<thead>
<tr>
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<th>Outcome Measure(s)</th>
<th>Measure Effect Size(s)</th>
<th>Mean Effect Size(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design: Single group</td>
<td>Sessions: 90 minutes x 1/week (each group)</td>
<td>Age: 4 - 7 ys.</td>
<td>2. <em>The Child Sexual Behavior Inventory (CSBI)</em> (Friedrich et al., 1991) (Parent)</td>
<td>CSBI $d = .92$</td>
<td></td>
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<tr>
<td>Repeated measures</td>
<td>Duration: 13 weeks</td>
<td>Gender: 54% girls 46% boys</td>
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<tr>
<td>Treatment Setting:</td>
<td>(Contact time: 39 hours)</td>
<td>Inclusion criteria: Hx of sexual</td>
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<tr>
<td>Child guidance clinic</td>
<td></td>
<td>abuse</td>
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<tr>
<td>Study</td>
<td>Intervention(s)</td>
<td>Participants</td>
<td>Outcome Measure(s) (Response Perspective)</td>
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<td></td>
<td>Sessions: .5 hr x 30</td>
<td>Age: 6 – 15.5 ys. ($M = 10.4$)</td>
<td>Total TOVA $d = .70$</td>
<td>Omission – $d = .77$</td>
<td></td>
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<tr>
<td></td>
<td>Duration: 2 – 8 months ($M = 5$)</td>
<td>Gender: 45% girls 55% boys</td>
<td>Commission – $d = .96$</td>
<td>Internalizing – $d = .78$</td>
<td></td>
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<tr>
<td></td>
<td>(Contact time: 15 hours)</td>
<td>Inclusion criteria: Hx of abuse and/or neglect, CPS removal from biological home, QEEG for protocol development</td>
<td>Social problems – $d = 1.26$</td>
<td>Speed – $d = .27$</td>
<td></td>
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<tr>
<td></td>
<td>Ethnicity: 75% Caucasian 20% African-American 5% Latina/o</td>
<td>SES: n/a</td>
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<tr>
<td>Study</td>
<td>Intervention(s)</td>
<td>Participants</td>
<td>Outcome Measure(s) (Response Perspective)</td>
<td>Measure Effect Size(s)</td>
<td>Mean Effect Size(s)</td>
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<tr>
<td>Humberson (1998)</td>
<td><strong>Group therapy -</strong> Parallel groups for children and non-perpetrating caregivers (using a psycho-educational curriculum)</td>
<td><strong>N = 40 (children)</strong>&lt;br&gt;- Age: 4-8 yrs&lt;br&gt;- Gender: 42% Boys 58% Girls&lt;br&gt;- Inclusion criteria: Hx of sexual abuse&lt;br&gt;- Ethnicity: 62% Caucasian 38% Latina/o&lt;br&gt;- SES: n/a</td>
<td>1. <em>Child Behavior Checklist</em> (Achenbach &amp; Edelbrock, 1983) (Parent)</td>
<td><em>d = 2.4</em></td>
<td>Study total <em>d = 1.95</em> (very large)</td>
</tr>
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<td></td>
<td>Sessions: ~ 48 (weekly sessions)&lt;br&gt;Duration: 1 year&lt;br&gt;(Contact time: ~ 96 hours)</td>
<td></td>
<td>2. <em>Teacher Report Form</em> (Achenbach &amp; Edelbrock, 1983) (Teacher)</td>
<td><em>d = 1.5</em></td>
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<tr>
<td>Study</td>
<td>Intervention(s)</td>
<td>Participants</td>
<td>Outcome Measure(s) (Response Perspective)</td>
<td>Measure Effect Size(s)</td>
<td>Mean Effect Size(s)</td>
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<tr>
<td>Study</td>
<td>Intervention(s)</td>
<td>Participants</td>
<td>Outcome Measure(s)</td>
<td>Measure Effect Size(s)</td>
<td>Mean Effect Size(s)</td>
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<tr>
<td><strong>Kruczek &amp; Vitanza (1999)</strong></td>
<td>Structured Solution-Focused group therapy</td>
<td><em>N</em> = 41&lt;br&gt;Age: 13 - 17 ys. (<em>M</em> = 14.21)&lt;br&gt;Gender: 48% girls, 52% boys&lt;br&gt;Inclusion criteria: Hx of sexual abuse&lt;br&gt;Ethnicity: 61% Caucasian, 32% African American, 2% Latina/o&lt;br&gt;SES: low income</td>
<td>1. <em>The Solution Focused Recovery Scale for Survivors of Sexual Abuse</em> (Dolan, 1991) (Child)&lt;br&gt;2. <em>The Skill Mastery Test</em> (SMT) (Kruczek, 1995) (Child)</td>
<td><em>d</em> = .73&lt;br&gt;<em>d</em> = 0.0</td>
<td><em>d</em> = .46 (medium)</td>
</tr>
<tr>
<td>Study</td>
<td>Intervention(s)</td>
<td>Participants</td>
<td>Outcome Measure(s) (Response Perspective)</td>
<td>Measure Effect Size(s)</td>
<td>Mean Effect Size(s)</td>
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<td></td>
<td>Sessions: ≥1/week Duration: ~12 weeks</td>
<td>Age: 8 - 15 ys. (<em>M</em> = 11.6)</td>
<td>2. <em>Trauma Symptom Checklist for Children (TSCC)</em> (Briere, 1995)</td>
<td></td>
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<td></td>
<td>Note: Effect size statistics could not be calculated for 6, 9, and 12 months of treatment (Contact time: ~36 hr)</td>
<td>Gender: 85% Girls 15% Boys</td>
<td>Anxiety – <em>d</em> = .74</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Inclusion criteria: Hx of sexual abuse</td>
<td>Depression – <em>d</em> = .81</td>
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<tr>
<td></td>
<td></td>
<td>Ethnicity: 43% Caucasian 31% Latina/o 26% Other</td>
<td>Post-traumatic Stress – <em>d</em> = .52</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>SES: n/a</td>
<td>Sexual Concerns – <em>d</em> = .26</td>
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<td>Dissociation – <em>d</em> = .45</td>
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<td>Anger – <em>d</em> = .47</td>
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<td></td>
<td>Total – <em>d</em> = .54</td>
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<tr>
<td>Mackay, Gold &amp; Gold (1987)</td>
<td>Structured group drama therapy</td>
<td>( N = 5 )</td>
<td>1. <em>Beck Depression Inventory</em> (BDI) (Beck, 1978) (Child)</td>
<td>BDI ( d = .85 )</td>
<td>( d = .55 ) (medium)</td>
</tr>
<tr>
<td></td>
<td>Sessions: 4 - 5 hours x 1/week</td>
<td>Age: 12 – 18 ys.</td>
<td>2. <em>Symptom Checklist-90</em> (SCL-90) (Derogatis, Lipman, &amp; Covi, 1973) (Child)</td>
<td>SCL-90 total ( d = .63 )</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Duration: 8 weeks</td>
<td>Gender: 100% girls</td>
<td>Hostility – Depression – Psychoticism – Anxiety – Interpersonal Sensitivity – Paranoid Ideation – Obsessive-compulsive – Phobic Anxiety – Somatization –</td>
<td>Hostility ( d = .47 ) Depression ( d = 1.32 ) Psychoticism ( d = .79 ) Anxiety ( d = .36 ) Interpersonal Sensitivity ( d = .58 ) Paranoid Ideation ( d = .25 ) Obsessive-compulsive ( d = .43 ) Phobic Anxiety ( d = .50 ) Somatization ( d = .42 )</td>
<td></td>
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<tr>
<td></td>
<td>(Contact time: 36 hours)</td>
<td>Inclusion criteria: Hx of sexual abuse</td>
<td>3. <em>The Texas Social Behavioral Inventory-Short Form</em> (TSBI) (Helmreivh &amp; Stapp, 1974)(Child)</td>
<td>TSBI ( d = .44 )</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Ethnicity: 60% Caucasian 40% African American</td>
<td>4. <em>The Attributional Style Questionnaire</em> (ASQ) (Petersen et al., 1982) (Child)</td>
<td>ASQ ( d = .78 )</td>
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<td></td>
<td></td>
<td>SES: low income</td>
<td>5. <em>The Social Support Questionnaire</em> (SSQ) (Sarason et al., 1983) (Child)</td>
<td>SSQ ( d = .02 )</td>
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<td>6. <em>The Marlowe-Crowne Social Desirability Scale</em> (Crowne &amp; Marlowe, 1960) (Child)</td>
<td>MCSDS ( d = .27 )</td>
<td></td>
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<tr>
<td><strong>McGain &amp; McKinze (1995)</strong></td>
<td>Group therapy ((n = 15))</td>
<td>(N = 30) (M = 10.5)</td>
<td>1. <em>Quay Revised Behavioral Problem Checklist (RBPC)</em> (d = 1.8) (d = 1.4) (d = 1.5) (d = 3.3) (d = 1.9) (d = .66) (d = 2.03)</td>
<td>(d = 1.9) (\text{very large})</td>
<td></td>
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<tr>
<td>Design: Matched control group</td>
<td>OR</td>
<td>Age: 9 - 12 yrs (44% \text{ girls}) (66% \text{ boys})</td>
<td></td>
<td></td>
<td>Note: The treatment group made statistically significantly greater gains on outcome measures compared to the control group</td>
</tr>
<tr>
<td>Treatment Setting: In-patient psychiatric hospital</td>
<td>No treatment ((n = 15))</td>
<td>Inclusion criteria: Hx of physical abuse and/or neglect within past year</td>
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<tr>
<td></td>
<td>Sessions: 1/week</td>
<td>Ethnicity: n/a</td>
<td>2. <em>Eyberg Child Behavior Inventory (ECBI)</em> (d = 2.15) (d = 3.0) (d = 1.3)</td>
<td></td>
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<tr>
<td></td>
<td>Duration: 6 – 9 months</td>
<td>SES: n/a</td>
<td>(Contact time: (~30 \text{ hours}) )</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1. <em>Quay Revised Behavioral Problem Checklist (RBPC)</em></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(Child)</td>
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<td></td>
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<td></td>
<td>Conduct Disorder – (d = 1.4)</td>
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<td></td>
<td></td>
<td></td>
<td>Socialized Aggression – (d = 1.5)</td>
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<td></td>
<td>Attention problems/ Immaturity – (d = 3.3)</td>
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<td></td>
<td>Anxiety Withdrawal – (d = 1.9)</td>
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<td></td>
<td>Psychotic Behavior – (d = .66)</td>
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<td></td>
<td></td>
<td>Motor Excess – (d = 2.03)</td>
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<td></td>
<td>2. <em>Eyberg Child Behavior Inventory (ECBI)</em> (Parent) (d = 2.15) (d = 3.0) (d = 1.3)</td>
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<td></td>
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<tr>
<td>Study</td>
<td>Intervention(s)</td>
<td>Participants</td>
<td>Outcome Measure(s)</td>
<td>Measure Effect Size(s)</td>
<td>Mean Effect Size(s)</td>
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<tr>
<td>Nasrin, Greenwald, Rubin, Zand &amp; Dolatabadi (2004)</td>
<td>Cognitive-behavioral individual therapy (Manualized) ( (n = 7) ) OR Eye Movement Desensitization and Reprocessing therapy (Manualized) ( (n = 7) )</td>
<td>( N = 14 ) Age: 12-13 ys Gender: 100% Girls Inclusion criteria: Hx of sexual abuse Ethnicity: Iranian SES: n/a</td>
<td>1. <em>Child Report of Post-traumatic Symptoms (CROP)</em> (Fletcher, 1993) (Child) 2. <em>Parent Report of Post-Traumatic Stress Symptoms (CROPS)</em> (Fletcher, 1993) (Parent) 3. <em>Rutter Teacher Scale</em> (Rutter, 1967) (Teacher) 4. <em>Subjective Units of Distress Scale (SUDS)</em> (Shaprio, 1995) (Child)</td>
<td>EMDR ( d = 1.9 ) CBT ( d = .92 ) EMDR ( d = 1.6 ) CBT ( d = 1.1 ) EMDR ( d = .78 ) CBT ( d = .85 ) EMDR ( d = .78 ) CBT ( d = .85 )</td>
<td>EMDR ( d = 1.07 ) (large) CBT ( d = .71 ) (medium) Study total ( d = .89 ) (large)</td>
</tr>
</tbody>
</table>

Note: CBT and EMDR groups were not statistically different on outcome measures.
<table>
<thead>
<tr>
<th>Study</th>
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<th>Participants</th>
<th>Outcome Measure(s) (Response Perspective)</th>
<th>Measure Effect Size(s)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Nolan, Carr, Fitzpatrick, O’Flaherty, Keary, Turner, O’Shea, Smythe &amp; Tobin (2002)</td>
<td>1. Individual therapy ((n = 20)) OR 2. Combined individual and group therapy (non-manualized) ((n = 18))</td>
<td>(N = 38) \nAge: 6 - 17 yrs. ((M = 12.6)) \nGender: 93% Girls 7% Boys \nInclusion criteria: Hx of sexual abuse \nEthnicity: n/a \nSES: Predominantly middle income</td>
<td>1. <em>Child Depression Inventory (CDI)</em> (Kovacs, 1983) (\text{(Child)}) \n- Negative Mood – \n- Interpersonal Problems – \n- Ineffectiveness – \n- Anhedonia – \n- Negative Self-esteem –</td>
<td>(d = .28) (\text{CDI Total (I)}) (d = .55) (\text{CDI Total (C)}) (d = .69) (C) (d = .43) (C) (d = .46) (C) (d = .20) (I) (d = .14) (I)</td>
<td>Total CDI (d = .41) (\text{Total TSCC} \ d = .39) (\text{Total CBCL} \ d = .76) (\text{Total YSR} \ d = 0.0)</td>
</tr>
<tr>
<td>Design: Non-randomized comparison groups</td>
<td>Sessions: Individual (m = 18) Combined (m = 20) Duration: 6 months (Contact time: Individual – 18 hours Combined – 20 hours)</td>
<td></td>
<td>2. <em>Trauma Symptom Checklist for Children (TSCC)</em> (Briere, 1995) (\text{(Child)}) \n- Anxiety – \n- Depression – \n- Anger – \n- Post-traumatic Stress – \n- Total Dissociation – \n- Total Sexual Problems –</td>
<td>(d = .49) (\text{TSCC Total (I)}) (d = .29) (\text{TSCC Total (C)}) (d = .52) (I) (d = .56) (C) (d = .91) (I) (d = .23) (I) (d = .66) (I) (d = .34) (I) (d = .10) (C) (d = .30) (C) (d = .31) (C)</td>
<td>Study Total: (d = .39) (small)</td>
</tr>
</tbody>
</table>
| | | CBCL Total (C) $d = .81$
| | | Internalizing T-score – $d = 1.54$ (I)
| | | $d = 1.47$ (C)
| | | Externalizing T-score – $d = .60$ (I)
| | | $d = 1.25$ (C)
| | | Withdrawn – $d = .67$ (I)
| | | $d = 2.5$ (C)
| | | Somatic Complaints – $d = .49$ (I)
| | | $d = .65$ (C)
| | | Anxious/Depressed – $d = .66$ (I)
| | | $d = 5.7$ (C)
| | | Social problems – $d = .39$ (I)
| | | $d = .62$ (C)
| | | Thought Problems – $d = .75$ (I)
| | | $d = .17$ (C)
| | | Attention Problems – $d = .72$ (I)
| | | $d = 2.7$ (C)
| | | Delinquent Problems – $d = .25$ (I)
| | | $d = 2.5$ (C)
| | | Aggressive Behaviors – $d = .39$ (I)
| | | $d = .89$ (C)
| | 4. Youth Self Report Form (YSR) (Achenbach & Edelbrock, 1983) | $d = .00$ (C)
| | | $d = .00$ (I)
<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention(s)</th>
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<th>Outcome Measure(s) (Response Perspective)</th>
<th>Mean Effect Size(s)</th>
<th>Study Total: d = 1.09 (large)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perez (1987)</td>
<td>1. Individual play therapy (n = 18) OR 2. Group play therapy (n = 21) OR 3. No treatment (n = 16)</td>
<td>N = 55</td>
<td>1. Primary Self Concept Inventory (PSCI) (Muller &amp; Leonetti, 1974) (Child) 2. Locus of Control Scale (LCS) (Johnson, 1976) (Child)</td>
<td>d = .64 d = 1.55</td>
<td>Note: Group and Individual play therapy groups were not statistically different from each other, but were statistically stronger on outcome measures than the control group</td>
</tr>
<tr>
<td>Study</td>
<td>Intervention(s)</td>
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<tr>
<td>Reams &amp; Friedrich (1994)</td>
<td>Individual play therapy (structured) AND Mileu therapy (n = 16) OR Milieu therapy only (n = 15)</td>
<td>N = 36 Age: 3.5 - 5 yrs. Gender: 17% Girls 83% Boys</td>
<td>1. <em>Peabody Picture Vocabulary Test-Revised</em> (Dunn &amp; Dunn, 1981) (Clinician)</td>
<td>PPVT-R d = .35</td>
<td>Study Total: d = .14 (small)</td>
</tr>
<tr>
<td></td>
<td>Sessions: 50 minutes x 1/week Duration: 15 weeks (Contact time: 12.5 hours)</td>
<td></td>
<td>2. <em>Draw a Person (DAP)</em> (McCarthy, 1972) (Clinician)</td>
<td>DAP d = 0.0</td>
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<td>3. <em>Eyberg Child Behavior Inventory (ECBI)</em> (Robinson, Eyberg, &amp; Ross, 1980) (Parent)</td>
<td>ECBI total d = .10</td>
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<td></td>
<td></td>
<td></td>
<td>- Problems – d = .15</td>
<td></td>
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<td></td>
<td></td>
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<td>- Intensity – d = .05</td>
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<td>4. <em>Preschool Behavior Questionnaire (PBQ)</em> (Behar &amp; Stringfield, 1974)</td>
<td>PBQ d = 0.11</td>
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<td></td>
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<td>- Aggression – d = 0.13</td>
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<td></td>
<td></td>
<td>- Hyperactivity – d = 0.09</td>
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</table>

Note: No statistically significant differences on outcome measures were observed between the play therapy and the comparison group.
<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention(s)</th>
<th>Participants</th>
<th>Outcome Measure(s) (Response Perspective)</th>
<th>Measure Effect Size(s)</th>
<th>Mean Effect Size(s)</th>
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</thead>
<tbody>
<tr>
<td>Rust &amp; Troupe (1991)</td>
<td>Group therapy AND Individual therapy (n = 25) AND Separate perpetrator and parent therapy groups OR No treatment (n = 25)</td>
<td>(N = 50)</td>
<td>1. <strong>Stanford Achievement Test (SAT) Form F, Intermediate level</strong> (Gardner et al., 1982) (Clinician)</td>
<td>SAT total (d = .73)</td>
<td>(d = .89) (large)</td>
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<tr>
<td></td>
<td>Sessions: 1/week Duration: ≥ 6 months (Contact time: &gt; 24 hours)</td>
<td>Age: 9 – 18 ys. (M = 12.5)</td>
<td>Math – (d = .68)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Gender: 100% girls</td>
<td>Reading – (d = .56)</td>
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<td></td>
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<td>Inclusion criteria: Hx of sexual abuse</td>
<td>2. <strong>Piers-Harris Self-Concept Scale</strong> (Piers &amp; Harris, 1984) (Child)</td>
<td>PHSCS (d = 1.06)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Ethnicity: 96% Caucasian 4% African American</td>
<td>Note: The treatment group had statistically significantly higher scores on outcome measures as compared to the comparison group</td>
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<tr>
<td>Study</td>
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</table>
Children's ages: 2 - 6 ys. ($M = 4.21$)  
2. *The Child Sexual Behavior Inventory (CSBI)* (Friedrich et al., 1991) (Parent) | $d = .30$  
$d = .73$ | $d = .52$ (medium) |
| Design: Single group Repeated measures                               | Sessions: 2 hours/week (for both parent and child groups)  
Duration: 11 weeks | Inclusion criteria: Hx of abuse and/or neglect  
Ethnicity: 84% Caucasian 16% African American  
SES: n/a | Study Total: $d = .52$ (medium) |
<table>
<thead>
<tr>
<th>Study</th>
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<th>Mean Effect Size(s)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Sessions: 3 hr x 5 days/wk</td>
<td>Age: 2.8 - 5.6 ys. ($M = 3.8$)</td>
<td></td>
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<tr>
<td></td>
<td>Duration: ≥ 12 wks</td>
<td>Gender: 48% girls 52% boys</td>
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<tr>
<td></td>
<td></td>
<td>Inclusion criteria: Hx of maltreatment</td>
<td></td>
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<tr>
<td></td>
<td>(Contact time: &gt; 180 hours)</td>
<td>Ethnicity: 60% African American</td>
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<tr>
<td></td>
<td></td>
<td>34% Caucasian</td>
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<td>6% Bi-racial</td>
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<td></td>
<td></td>
<td>SES: n/a</td>
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<td>2. American Guidance Service Early Screening Profile (ESP) (Harrison, 1990) (Teacher)</td>
<td>$d = 1.17$</td>
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<td>Note: Both treatment groups were combined for the present analysis</td>
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<tr>
<td>Study</td>
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</tbody>
</table>
| Sullivan, Scanlan, Brookhouser & Schulte (1992) | 1. Individual psychotherapy (in sign language) ($n = 35$)  
OR  
2. No treatment ($n = 37$)  
Sessions: 2 x 2 hr/week  
Duration: 36 weeks  
(Contact time: 144 hours)                                                                                       | $N = 72$  
Age: 5.2 -17.4 ys. ($M = 11.5$)  
Gender: 29% girls 71% boys  
Inclusion criteria: Sexual abuse Hx by staff or older students while at residential school  
Ethnicity: n/a  
SES: n/a                                                                 | Child Behavior Checklist (CBCL) (Achenbach & Edelbrock, 1983) (Houseparent) | d = 1.54  
External – d = .94  
Anxiety – d = .47  
Depressed – d = .50  
Somatic – d = 1.0  
Schizoid – d = 1.0  
Uncommunicative – d = .75  
Immature – d = .94  
Obsessive – d = .72  
Hostile – d = 1.6  
Delinquent – d = .75  
Aggressive – d = .93  
Cruel – d = .65  
Hyperactive – d = .72 | Study Total: $d = .89$ (large)  

<table>
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<tr>
<th>Study</th>
<th>Intervention(s)</th>
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</thead>
<tbody>
<tr>
<td><strong>Thun, Sims, Adams &amp; Webb (2002)</strong></td>
<td>Group therapy (structured) (n = 4)</td>
<td>(N = 11)</td>
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<tr>
<td></td>
<td>OR</td>
<td>Age: 16 – 18 ys.</td>
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<tr>
<td>Treatment</td>
<td>No treatment (n = 7)</td>
<td>Gender: 100% girls</td>
</tr>
<tr>
<td>Setting</td>
<td>Sessions: 1.5 hr/week</td>
<td>Inclusion criteria: Hx of sexual abuse, Hx of high school drop-out</td>
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<tr>
<td></td>
<td>Duration: 12 weeks</td>
<td>Ethnicity: n/a</td>
</tr>
<tr>
<td></td>
<td>(Contact time: 18 hours)</td>
<td>SES: n/a</td>
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<tr>
<td></td>
<td></td>
<td><strong>Outcome Measure(s)</strong> (Response Perspective)</td>
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<tr>
<td></td>
<td></td>
<td><em>The Offer Self-Image Questionnaire, Revised (OSIQ-R)</em> (offer, Ostrov, Howard, &amp; Dolan, 1992) (Child)</td>
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<tr>
<td></td>
<td></td>
<td>Impulse Control – (d = .56)</td>
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<td></td>
<td></td>
<td>Self Confidence – (d = .12)</td>
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<tr>
<td></td>
<td></td>
<td>Self Reliance – (d = .02)</td>
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<tr>
<td></td>
<td></td>
<td>Body Image – (d = .17)</td>
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<td></td>
<td></td>
<td><strong>Mean Effect Size(s)</strong></td>
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<td></td>
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<td><em>Total study (d = .23)</em> (small)</td>
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</table>

Note: There were no meaningful statistical difference observed between the control and experimental groups.
<table>
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<th>Mean Effect Size(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tucker (2006)</strong></td>
<td><strong>Outdoor Adventure groups (n = ~8)</strong>&lt;br&gt;Sessions: ~ 18 outdoor after-school day trips&lt;br&gt;Duration: 9 weeks</td>
<td><strong>N = 103</strong>&lt;br&gt;Age: 9-15 ys. <em>(M = 11.71)</em>&lt;br&gt;Gender: 33% Girls 67% Boys&lt;br&gt;Inclusion criteria: Massachusetts Dept. of Social Services referral for maltreatment, Removal from home&lt;br&gt;Ethnicity: 85% Caucasian 3% African American 12% Latina/o Asian <em>(n = 1)</em>&lt;br&gt;SES: n/a</td>
<td><strong>1. Social Skills Rating System (Gresham &amp; Elliot, 1990)</strong> <em>(Child)</em>&lt;br&gt;Total –&lt;br&gt;Cooperation –&lt;br&gt;Assertion –&lt;br&gt;Empathy –&lt;br&gt;Self-Control –</td>
<td><strong>d = .006</strong>&lt;br&gt;<strong>d = .03</strong>&lt;br&gt;<strong>d = .15</strong>&lt;br&gt;<strong>d = .09</strong>&lt;br&gt;<strong>d = .06</strong></td>
<td><strong>Study Total: d = .08 (negligible)</strong></td>
</tr>
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<td></td>
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<td><strong>2. Norwicki-Strickland Locus of Control Scale for Children (N-SLCS)</strong> <em>(Child)</em></td>
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<tr>
<td>Study</td>
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<td>Outcome Measure(s) (Response Perspective)</td>
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<tr>
<td>Verleur, Hughes &amp; Dobkin de Rios (1986)</td>
<td>Group therapy WITH sex education ( (n = 15) ) OR No treatment ( (n = 15) ) Sessions: 1/week Duration: 6 months (Contact time: 24 hours)</td>
<td>( N = 30 ) Age: 13 - 17 ys. Gender: 100% girls Inclusion criteria: Hx of intrafamilial sexual abuse, CPS/court referral Ethnicity: n/a SES: n/a</td>
<td>1. Coopersmith Self-Esteem Inventory (CSI) (Coopersmith, 1981) (Child) 2. Anatomy/Physiology Sexual Awareness Scale (APSAS) (Verleur, 1986) (Child) Anatomy/physiology – Venereal Disease – Birth Control – Anatomy Education –</td>
<td>CSI ( d = 1.54 ) APSAS total ( d = .98 ) Anatomy/physiology – ( d = .82 ) Venereal Disease – ( d = 1.04 ) Birth Control – ( d = .95 ) Anatomy Education – ( d = 1.10 )</td>
<td>( d = 1.24 ) (very large)</td>
</tr>
</tbody>
</table>

Note: Experimental group scored statistically significantly higher than control group on outcome measures.
<table>
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<tr>
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<th>Mean Effect Size(s)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Age: 6 – 18 ys.</td>
<td></td>
<td>Internal –</td>
<td>$d = .59$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gender: 29% girls 71% boys</td>
<td></td>
<td>External –</td>
<td>$d = .12$</td>
<td></td>
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<tr>
<td></td>
<td>Session: n/a</td>
<td></td>
<td>2. <em>Child Report of Treatment Issue Resolution (CRTIR)</em> (Nelson-Gardell, 1995) (Child)</td>
<td></td>
<td>CRTIR total $d = .31$</td>
</tr>
<tr>
<td></td>
<td>Duration: ~ 20 weeks</td>
<td></td>
<td>Social Buffering –</td>
<td>$d = .02$</td>
<td>Study Total: $d = .33$</td>
</tr>
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<td></td>
<td></td>
<td>Self-Protection –</td>
<td>$d = .24$</td>
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<td></td>
<td></td>
<td></td>
<td>Self-Blame –</td>
<td>$d = .70$</td>
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<td>Stigma/Shame/Fear –</td>
<td>$d = .31$</td>
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<td>(Contact time: ~ 40 hours)</td>
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<td>Study</td>
<td>Intervention(s)</td>
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<td>Outcome Measure(s)</td>
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<tr>
<td>Zion (1999)</td>
<td>Individual client-centered play therapy</td>
<td>N = 26</td>
<td>1. Abuse Behavior Checklist (ABC)</td>
<td>d = .17</td>
<td>Study Total: d = .24 (small)</td>
</tr>
<tr>
<td></td>
<td>Design: Single group Repeated measures</td>
<td>Age: 3 - 9 ys.</td>
<td>(Chaffin &amp; Wherry, 1993) (Clinician)</td>
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<td></td>
<td>Treatment Setting: Catholic Charities community mental health</td>
<td>Gender: 73% Girls 27% Boys</td>
<td>2. Joseph Preschool and Primary Self-Concept Screening Test (JPPSCS) (Joseph, 1979) (Clinician)</td>
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<td></td>
<td></td>
<td>Inclusion criteria: Hx of sexual abuse in past year, Referral from Division of Child and Family Services</td>
<td>Global Scale–</td>
<td>d = .25</td>
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<tr>
<td></td>
<td></td>
<td>Ethnicity: All Caucasian with 1 Native American</td>
<td>Competence Scale –</td>
<td>d = .11</td>
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<td>SES: n/a</td>
<td>3. Behavior Assessment System for Children – Parents Rating Scale (BASC-PRS) Behavioral Index Score (Reynolds &amp; Kamphaus, 1992) (Parents)</td>
<td>d = .43</td>
<td></td>
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<td>(Contact time: 12 hours)</td>
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REFERENCES


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