THE EFFECTS OF MATERNAL DEPRIVATION ON PROBLEM BEHAVIOR IN POST-INSTITUTIONALIZED CHILDREN

by

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During the 1990's, international adoptions increased from 7,093 to 16,375 (Keck & Kupecky, 2002). Adoptions from Romania dominated from 1990 to 1992, and was followed by adoptions from Russia and the rest of the former Soviet Union. Before being adopted, the majority of these children spent time in orphanages where they were exposed to a variety of risk factors, and are therefore considered to be at-risk. Some of these risk factors include the children being malnourished, having very limited health care, and being maltreated. Also, individual care was virtually nonexistent, due to the large number of children and relatively few workers (Johnson, 2000).

The likelihood of having problems with the child post-adoption is elevated for families who adopt at-risk children from institutions. For example, Groza and Ryan (2002) report that institutionalization and a history of abuse before the adoption were predictors of children's behavior problems. It has been reported that in 15% of these at-risk adoptions the parents relinquish the child (National Committee for Adoption, 1989). These failed adoptions are devastating both to the children who desperately need a stable environment and to the adults who wish to be parents (Hoksbergen, 1991). In the families where the child is not relinquished, a high percentage experience major family stress and turmoil.

There are both social and political reasons to discover what is leading to these problems in families who adopt. The number of families adopting at-risk children is increasing and not only is it likely that many of these adoptions will be turbulent, but some will fail. By understanding reasons for these problems, we can improve theory,

research, and practice. In doing so we can understand better how to help these families who adopt post-institutionalized children.

Each child has a unique history. One child may have gone immediately to an orphanage that was clean with adequate food and care, while another child may have lived with an alcoholic mother for the first several years of his life. He may have been exposed to alcohol prenatally and been neglected by his mother as a young child, and he may have been removed from his mother and sent to an orphanage where he was dirty and preyed upon by older children. Despite the wide diversity of care in orphanages, which range from benign to unthinkably bad, one commonality is the lack of maternal care. The lack of someone to notice the child's needs and take care of the problems, someone the child knows and trusts; someone who has the child's best interest at heart. This lack of care has been termed maternal deprivation (Bowlby, 1951).

Maternal Deprivation

Maternal deprivation is a difficult topic to study in humans for a variety of reasons. The first issue to arise is the definition. In most cases, the mother is the primary caregiver for an infant, although this is not always the case. In some instances, a father, grandparent, or someone else may care for the infant. However, since the care typically falls to the mother, the term *maternal* is common. *Deprivation* is also a complex term. When using the term maternal deprivation, *deprivation* commonly refers to both privation and deprivation, a distinction elaborated upon by Gandelman (1992). Maternal privation occurs when the offspring has never had mothering and the separation between mother and child occurs soon after birth. Maternal deprivation occurs when the offspring loses its mother, with whom he has already formed an attachment. The long-term consequences of

maternal privation are more profound than those of maternal deprivation (Gandelman, 1992). It has been argued by Casler (1961) that maternal deprivation is really no more than the child lacking the sensory experience that a mother would provide. Others argue that the child needs a particular someone with which to form an enduring relationship, which is also something that a mother provides (Ainsworth, 1962; Bowlby, 1951).

Another reason that maternal deprivation is a difficult area to research is because it is extremely hard to do any kind of true experiment of maternal deprivation in humans. A child could never be ethically removed from his mother to test the effects of maternal deprivation. As a result, we are left with animal research or "natural experiments" that occur when a child is removed from his family or is abandoned (Bronfenbrenner, 1979).

Maternal Deprivation and Non-Human Primate Research

Given the difficulties with human research, non-human primate, research is helpful to inform our understanding of the effects of deprivation. Research has shown that both short and long-term separation of the infant from the mother has profound consequences. The effects of short-term separation have been demonstrated in several studies. In a study done with rhesus monkeys, Spencer-Booth and Hinde (1971) found effects of brief separations from mothers during infancy for six days when they were 21 to 32 weeks-old have effects two years later on behavior. When separated from the mother in a strange environment, they were less active and did not approach novel objects. According to Gandelman (1992), an infant monkey's physiology and behavior are modified significantly by maternal privation and deprivation. He also found that the monkeys would not approach strange objects and were less active than control monkeys.

These changes are seen immediately and long after the separation (even if the mother and infant were reunited).

Harlow studied long term separation in his well-known research with rhesus monkeys (Harlow, 1958; Harlow, Harlow, & Suomi, 1971). Harlow's work convincingly demonstrated that maternal deprivation has profound effects on young non-human primates. His work showed that the function of the mother and the effects of deprivation are similar to those found in humans infants separated from their mothers. Harlow also demonstrated that severe psychological pathology can be both induced and be somewhat alleviated in rhesus monkeys through interactions with a caregiver.

One major difference between non-human and human infant primates is that human infants are affected on a wider range of domains. According to Gunnar, Bruce, and Grotevant (2000), this difference occurs because monkeys can locomote from birth, whereas humans are totally dependent on adults for activity-dependent stimulation. An example of this is the interaction between a human infant and his mother described by Papousek and Papousek (1987). Caregivers provide an infant with social stimulation that is reciprocal, rich, and multimodal. Papousek and Papousek argue that this stimulation is intuitive and relatively universal. The human infant's behavioral and affectional state, elementary communicative skills, and visual contact are related to these tendencies of the caregiver. The infant and caregiver interaction helps the infant to integrate communicative, learning, and other cognitive processes.

Harlow's work showed that maternal deprivation is extremely harmful to infant monkeys. The effects are similar to those seen in humans, but in humans the effect can be even worse as evidenced by the high mortality rate of infants in institutions (Provence &

Lipton, 1962; Spitz, 1946). Because human infants are so dependent on caretaker-infant interaction, it is as essential to human development as other primary needs such as food, shelter, and protection. As we will discuss in the next section, even when all of a child's needs, aside from enduring relationships, are met, it still is not enough for normal development.

Maternal Deprivation and Human Infants

Studying children reared in orphanages is one way to learn about the effects of maternal deprivation in humans. Children in orphanages have lost their mothers due to separation, abandonment, or death. A major issue that must be addressed in the situation of orphanage reared children is that many of these children have not only been raised without an enduring relationship (mother), but have also experienced deprivation of food, clean environments, health care, and sensory experience (Gunnar, 2001; Johnson, 2000). Gunnar (2001) distinguishes among *global privation*, *minimal care*, and *quality care*. *Global privation* occurs when none of the child's needs for health and nutrition, sensory, motor, or cognitive stimulation, or relationships are met. In *minimal care*, a child is well fed and provided with health care but does not receive adequate sensory stimulation or experience and does not experience lasting relationships. Both of these types of situations are common in orphanages in Eastern Europe. *Quality care* is provided when the child is well fed, cared for, experiences adequate sensory experience, but has no opportunity to form lasting relationships (Gunnar, 2001).

Based in part on the research done by Tizard, Gunnar (2001) concludes that even quality care is still not sufficient for normal human development. Tizard, who conducted research in an orphanage that provided what Gunnar termed quality care, found that

physically and behaviorally, children receiving quality care but no enduring relationships were developing almost normally, and that language skills were only slightly delayed (Tizard, Cooperman & Joseph, 1972; Tizard & Joseph, 1970; Tizard & Rees, 1974). However these children did exhibit some persistent problems in domains such as the regulation of attention and emotion.

Gunnar, Bruce, and Grotevant (2000) make the distinction between the kinds of problems that institutionalized children can quickly overcome when placed in a caring family environment and those problems that tend to persist. Issues that tend to be quickly overcome in children adopted from orphanages overseas are physical problems such as sickness, malnutrition, and delayed physical development (Ames, 1997; Johnson, 2000; Rutter & ERA Study Team, 1998). Major leaps in cognitive development are also common among these children and can be seen in areas such as language skill acquisition. Other issues tend to be more resistant to catch-up, even when the children are moved to a stable family environment (Ainsworth, 1962; Gunnar, 2000; Kraemer, 1992). Persistent cognitive problems are seen in areas of executive functioning like concentration, attention regulation, and inhibitory control (Provence & Lipton, 1962; Gunnar, 2000). Children also display rigidity of thought, logical and sequential reasoning problems, very concrete thinking, and difficulty in generalizing solutions to other situations. Psychosocial problems present themselves as difficulties with emotion regulation – especially of anger and aggression, and problems reading and responding to social cues (Ames, 1997; Tizard & Hodge, 1978). Mood disorders such as depression are also present, which is supported by psychoanalytic research (Beck, Sethi, & Tuthill, 1963; Bowlby, 1961; Spitz, 1946).

The purpose of the current research is to better understand the consequences of maternal deprivation. In order to do so, we have formulated the model shown in Figure 1. On the far left is maternal deprivation, which is seen as the cause of the behavior problems. Attachment and sensory integration will be introduced as variables that mediate between maternal deprivation and behavior problems. In the remaining sections, the various components of this model as well as the links between them will be discussed.

Attachment

Bowlby formulated attachment theory based on both healthy and unhealthy parent-child relationships. He used the idea of attachment to explain the nature of the relationship between parent and child. He wrote a series of three books on his theory. The first was titled *Attachment and Loss: Attachment* (1969/1982) and was about the attachment of an infant to his caregiver. The second, titled *Attachment and Loss: Separation* (1975), discussed short-term separation from parents, and the third, titled *Attachment and Loss: Loss* (1980), dealt with a long-term or permanent separation. Collectively these three books deal with the major features of attachment theory, as well as the phenomena that the theory was designed to explain.

In his first book, Bowlby proposed four behavioral systems, which motivate infant behavior. The central behavioral system is the attachment system. It characterizes a child's behavior toward his caregiver. For example, if a child has a healthy attachment, he will protest when his primary caregiver leaves. In addition, if the parent returns after a brief absence, the child will seek proximity and physical contact in order to regulate his emotions. The goal of this system is to promote and maintain proximity to the caregiver, and it is activated when the psychological link between parent and child is disturbed.

There are three other behavioral systems – the exploratory system, the affiliative system, and the fear/wariness system. All three are affected by the health and integrity of the attachment system. The exploratory system may be activated by interesting stimuli when the infant feels safe and secure with his primary attachment figure. When this system is activated, the infant is motivated to explore his surroundings. An infant's motivations to interact socially with others are described by the affiliative system. Social behaviors can be seen even in newborns, and after two months they are especially evident. Finally, the fear/wariness system, which is closely associated with the attachment system, is activated by cues that the infant finds fearful. This system leads the infant to observe and react to perceived dangers. When the attachment figure is available, the impact of strangers on an infant is lessened, whereas in the absence of the caregiver, the fear/wariness system becomes hyper-reactive. For example, if a human infant or monkey is placed in a strange situation without an attachment figure, that infant will become terrified and immobile. When the attachment figure is available, the child will use her as a secure base to explore the environment. These systems work in tandem so that when the child is in the presence of an attachment figure the fear/wariness system will be only briefly activated.

One of Bowlby's students was Mary Ainsworth, who developed the Strange Situation to study individual differences in attachment. The Strange Situation consists of eight episodes, the most important of which are the separation and reunion episodes. These episodes are scored on proximity seeking, contact maintenance, avoidance, and resistance. Based on their scores, infants (ages 12-18 months) are classified as either secure, insecure avoidant, insecure ambivalent, or disorganized (Ainsworth, Blehar,

Waters, & Wall, 1978). Research has shown that not only are there reliable individual differences, but that these differences predict later development and in turn are predictable by early caregiving histories. Ainsworth (1984) and Mahler, Pine, and Bergman (1975) showed that sensitive responsiveness by the caregiver to the needs of the infant was an antecedent for secure attachment. The consequences of secure attachment, when compared to insecure attachment, are that it promotes emotional, cognitive, and moral development, it serves as a basis for interpersonal relationships, and it can enhance health and physical development (Egeland, Jacobvitz, & Sroufe, 1988; Gray, 2002).

In the second book, *Separation: Anxiety and Anger*, Bowlby examines how a child reacts to separation from his attachment figure. He observed children hospitalized in the 1950's when parents did not commonly stay with or visit their children during a hospital stay. He found that children at first protested being left alone and later began showing signs of depression. As a researcher with non-human primates, Harlow found that during separation, infant monkeys would spend nearly all of their time trying to get back to their parent (Harlow et al., 1971). This reaction is also a hallmark of human infants who are classified as secure in the Strange Situation. When the attachment figure leaves, the infant protests loudly and will immediately seek out the caregiver upon her return (Ainsworth et al., 1978). The strength of the infant's response to the seemingly harmless situation of a caregiver becoming temporarily unavailable demonstrates the power of attachment.

Bowlby and other psychiatrists were surprised by the depth of a child's reaction to separation and were astounded by the despair a child displayed when she lost her caregiver permanently. This reaction was unexpected given the theoretical framework of

the day. Bowlby's third book reviews what happens when a child loses his attachment figure (Bowlby, 1980). Many of Bowlby's early subjects were children who had lost a parent in World War II. Spitz and Wolf (1946) conducted some classic research in this area of loss. These children had a characteristic response which they called *Anaclitic Depression*, and which was characterized by a progression from sadness and weeping, to withdrawal and dejection, and finally to a "stuporous" state. Children who are institutionalized and/or adopted have also often lost an attachment figure, and this may underlie the depression often seen in these children.

Attachment and Maternal Deprivation

Juffer and Rosenboom (1997) did a study with children in the Netherlands who had been internationally adopted. The children were adopted from Sri Lanka, Columbia, or South Korea, and all had been adopted between three and 25 weeks of age. Although some of the children had health problems and/or were born prematurely, the percentage of securely attached babies, when scored in the strange situation at age 12 and 18 months, was no different than in a standard sample of non-adopted children. Juffer and Rosenboom conclude that without the effects of being in an institution, adoption placement does not necessarily lead to insecure parent-child attachments. One important factor in this study is that all the children were placed in the adoptive home before they were six months old. Because attachment behavior does not manifest itself until approximately seven to eight months of age, none of these children actually lost an established attachment figure.

Chisholm, Carter, Ames, and Morison (1995) hypothesized that children who did not attach to a caregiver in the first couple years of life due to orphanage care would have

a difficult time forming attachments to adoptive parents after adoption. This was predicted because parents may not interact with an older child they way they would with an infant to promote attachment. Also, when the children were initially adopted they may not have trusted adults because of the neglect in the orphanage. Three groups of children were compared in this study. The first group had spent at least eight months in an orphanage in Romania, the second had spent less than four months in a Romanian orphanage, and the control group were Canadian born children living with their biological parents. All three groups were matched for age and sex. It was found that children who had been in the orphanage more than eight months were less secure in their attachment than the children who had been in an orphanage less than 4 months or were Canadian born. Although this study gave some new insight into this topic, there were several important limitations. The questionnaire was new and had no previously established reliability or validity. Also, parental report was the only method used to measure attachment, no behavioral measure was used. Finally, the median amount of time the children had been in the families was only 11 months. It is possible that this is not enough time for the older children to form a secure attachment to their primary caregiver.

Chisholm (1998) expanded upon the Chishom et al. (1995) study in order to address some of the limitations. In this second part of the experiment, all adopted children had been with their families for a minimum of 26 months, so that each child would have had enough time to attach to their caregiver. The same attachment questionnaire was given to the parents of the same three groups of children. Attachment was also measured using a behavioral assessment involving a separation-reunion

procedure for preschoolers. Indiscriminate friendliness was also assessed in all the groups. It was hypothesized that the children who had spent over eight months in the orphanage would improve in attachment security scores since the first study, but that they would still be less secure than the other two groups, due to the amount of time they spent in the orphanage. It was also expected that indiscriminate friendliness on the part of the child in the later adopted group would decrease but still be higher than the other two groups. No differences were found between groups on the parent report measure of attachment. However, on the behavioral measure, the Romanian orphanage (>8 months) children showed more insecure attachment than the other two groups and also had more atypical insecure patterns. This group also scored higher on measures of indiscriminate friendliness than did the shorter time in orphanage and control groups.

These studies clearly suggest a link between maternal deprivation and attachment. Attachment can often be disturbed when children have spent time in orphanages. The attachment behavior systems either do not engage or do not function appropriately. There are several ways these disturbances can manifest themselves including secure-base distortions, disorders of nonattachment, and disrupted attachment disorder (Zeanah & Boris, 2000). Secure-base distortions occur when the children are attached to a caregiver but the attachment is disturbed. The child may exhibit behaviors, while interacting with the caregiver, that are endangering, clinging, inhibited, vigilant, hyper-compliant, or which demonstrate role reversal. Disorders of nonattachment occur when the child has no caregiver to whom they have attached. These children may be either emotionally withdrawn and withdraw from others or indiscriminately friendly and seek attachment to anyone in their environment. Disrupted attachment occurs when a child suddenly loses an

attachment figure. Research is needed to describe how these disturbed attachments relate to negative outcomes, such as behavior problems (Zeanah & Boris, 2000). (For a comprehensive discussion of attachment research see Cassidy & Shaver, 1999.)

Sensory Integration

The neurological process of synthesizing the information we get from our bodies and our environment for use in everyday life was termed *sensory integration* by Ayers (1979). (The term sensory integration is commonly used in occupational therapy; however, in psychology a term that might more accurately convey what is meant by sensory integration is perceptual integration because the processes implied are more central.) This process occurs in the central nervous system and involves organizing information obtained from the senses. A sense of one's body position, body movement, and coordination are important in generating adaptive responses in the environment (Ayres, 1979). There is a rich body of theory and research that supports the idea that interactive experience with the environment is necessary in order for one's senses to develop properly (see for example Provence & Lipton, 1962). A well-known example illustrating this point is the sensory deprivation literature done by Held and Hein (1963). The reader may recall that only the kittens that had active movement-produced stimulation were able to process the incoming visual sensory information, while the kittens who received passive sensory stimulation were not.

Sensory Integration Dysfunction occurs when sensory information is not processed effectively in the sensory nervous system (Ayers, 1979). It is unclear what the origin of this problem is, but it is likely that certain environmental circumstances such as inadequate sensory experience could aggravate or even cause the problem. Research has

shown that the way people process information and perceive the world when deprived of sensory experience is disorganized (Cermak, 1994). This leads to difficulties in meeting the challenges of everyday life. Sensory integration is foundational for cognitive, social, physical, and emotional development – some of the same domains that prior studies of institutionalized children have found to be delayed (Cermak & Daunhauer, 1997).

Within Sensory Integration Dysfunction, there are two specific areas that could be impaired: Sensory modulation or sensory discrimination (Cermak & Groza, 1998). Sensory modulation is the regulation of the brain's activity, and sensory modulation problems can manifest themselves when a child gets over-stimulated very quickly by sensory input and begins acting out or shuts down. Sensory discrimination is understanding and using incoming sensory information, and sensory discrimination problems can manifest themselves when sensory information cannot be harnessed in the service of various skills (Cermak & Groza, 1998). For example, a child may have poor bilateral coordination or have a hard time positioning his body in space in order to complete a task.

Sensory Integration Dysfunction is similar in many ways to another diagnostic classification, Regulatory Disorders. Sensory Integration is primary used in occupational therapy, while Regulatory Disorders are more well known in psychiatry. The concept of Regulatory Disorders was proposed by Greenspan (1992; Greenspan & Wieder, 1993) to address individual differences in self-regulation, (the ability to regulate one's own emotions) in infants and young children. The basic idea is that children process incoming information and plan motor activity differently. A Regulatory Disorder is identified when

a child has difficulties regulating sensory, physiological, motor, or attentional processes. The child will also have problems maintaining a calm, alert, or affectivity positive state.

According to Greenspan and Wieder (1993), the infant's ability to self-regulate emerges from the matrix of infant-caregiver interactions. When an infant has a need, he shows this by getting upset or disregulated. When the caregiver meets the need, the infant calms down. The infant gradually becomes able to regulate his emotional state and organize responses to situations when this interaction has occurred repeatedly. It is believed that this pattern of interaction strengthens the pathways that help the infant become self-regulated (Greenspan & Wieder, 1993).

Sensory Integration Dysfunction and Regulatory Disorders are not well known concepts in developmental psychology. However, the centrality of sensory integration and self-regulation is becoming apparent. There are several parallel lines of research converging on these domains in developmental psychology. For example, Gottlieb, Wahlsten and Lickliter (1998) discuss early intersensory development based on animal research. Their discussion has many points of overlap with sensory integration theory and practice. In addition, Porges' Polyvagal Theory is gaining widespread recognition by developmentalists. Porges has proposed that the vagus nerve plays a central role in how well an individual can adapt physiologically to his environment (Porges, 1995). Vagal tone has been shown to be a predictor for behavior, health, attention, etc. (Porges, 2003; Porges, Doussard-Roosevelt, & Portales, 1994; Suess, Porges, & Plude, 1994). Appropriate vagal tone in various situations means that the body can effectively respond to external stimuli when challenged.

Sensory Integration and Maternal Deprivation

When infants are raised in orphanages, they receive little handling and individual attention (Cermak, 1994). They are not picked up and held, they are not rocked and sung to, they don't have peoples' faces and rotating mobiles to look at. They are not driven around in cars or taken on walks in a stroller. They typically lay in cribs looking at the ceiling. Bottles are propped in their mouths for feeding. Often the mattress they lay on will form indentations of the size and shape of their body since they lay there so much and then they are not even able to turn over. These infants do not get much sensory input from their environment (Cermak, 1994).

Human infants need sensory input in order for their CNS to develop adequately (Gandelman, 1992; Hunt, 1979). They need to learn to integrate the information that comes in from all the senses in order to be able to respond to the world. When children cannot modulate the information coming in through their senses, they may respond by getting too easily aroused by very little stimulation or they may be under-responsive to high levels of stimulation. The same child may have different levels of responsiveness in the different senses or in different situations (Cermak & Groza, 1998).

Cermak and Daunhauer (1997) conducted research with post-institutionalized children adopted from Romania and control children living in their family of origin. Their purpose was to determine if the post-institutionalized children had more problems with sensory processing and in related areas such as activity and social-emotional development. They found that the adopted children demonstrated more problems in the domains of touch, seeking and avoiding movement, audition, and vision. These children

also had more problems in the related areas of activity level, organization, social-emotional development, and feeding.

Lin (2003) compared two groups of post-institutionalized children adopted from Eastern Europe. The longer-institutionalized group had spent a mean of 34 months in the orphanage, while the shorter-institutionalized group has spent a mean of 3 months in the orphanage. It was found that sensory integration problems were associated with the length of time the children spent in the orphanage, in that the longer-institutionalized group had more problems with sensory modulation and sensory discrimination. Lin also found that these sensory integration problems were a significant predictor of behavioral problems. Children who can't understand what is coming in from the senses are at-risk for a wide variety of disorders and behavioral problems including diagnoses of autism and schizophrenia (see for example, Waterhouse & Fein, 1984).

Behavior Problems

Behavior problems are common in post-institutionalized children. Much of the research done with these children uses the Child Behavior Checklist (e.g. Rosenthal and Groze, 1991; Marcovich et. al., 1997). Aside from pervasive disorders such as autism and mental retardation, this parent-report measure encompasses the full range of problem behaviors seen in children. These include both internalizing problems (withdrawn, anxious/depressed, and somatic subscales) and externalizing problems (delinquency and aggression subscales) (Achenbach, 1991a). Children who score high on internalizing problems are likely to have diagnosis of anxiety and mood disorders, and children who score high on externalizing problems are likely to have a diagnosis of Oppositional Defiant Disorder and Conduct Disorder. The other subscales of the CBCL include social

problems, thought problems, attention problems, and other problems (which includes such issues as inappropriate sexual behavior and difficulties with eating).

Most of the research with post-institutionalized children utilizing the CBCL has found elevated scores on the externalizing scale (Hoksbergen, Rijk, & Van Dijkum, 2004; Rosenthal & Groze, 1991). Some also report elevated internalizing problems, although when internalizing problems occur they are generally less severe than externalizing problems (Rosenthal & Groze, 1991). In general, children who spent more time in orphanages have more behavior problems (Lin, 2003; Marcovich et. al., 1997). As these adopted children reach adolescence, their problems may become more severe (Verhulst, 2000). Thus, there is ample evidence demonstrating that post-institutionalized children are at elevated risk for significant behavior problems. The question is whether attachment and sensory integration mediate the association between maternal deprivation and behavior problems, as is diagramed in Figure 1.

Disturbances in attachment have also been linked to behavior problems. For example, Egeland, Sroufe, and several of their students have conducted a longitudinal study of children who are considered to be in poverty (Egeland, Jacobvitz, & Sroufe, 1988; Sroufe, Egeland, & Kreutzer, 1990). The mothers of these children were recruited while pregnant and their attitude toward the unborn child was observed. These children were then followed throughout childhood. They were scored in the strange situation as infants and a subsample of the children were observed as preschoolers. It was found that children who had secure attachment histories were less aggressive, had fewer tantrums, had more healthy ways to seek attention, and were easier to manage than children with insecure attachment histories (Erickson, Sroufe, & Egeland, 1985).

These findings are corroborated by clinical psychologists working with post-institutionalized children. In her book *Attaching in Adoption*, Deborah Gray (2002) describes some of the issues she has observed in her practice. From previous experience, post-institutionalized children have learned that attaching to someone will ultimately hurt them. They don't want to attach to new parents because they feel like their stay won't be permanent. The children may display behavior problems because of fear that they will eventually be sent away, their parents will go away, or will be killed by the "bad guys." Many children also feel ashamed and may put themselves in situations where they are getting shamed the way they feel they deserve. For example, the child may deliberately break a rule because they believe they deserve to be punished. Also, because of the attention, love, or food they missed early on, these children tend to want absolutely everything they can get (Gray, 2002).

Gray (2002) observes that people in a post-institutionalized child's life who have had power and control to hurt the child, have then used that power and control to hurt the child. Therefore, the child wants the power and will employ any method possible to establish and maintain his power. The children feel that they need to take care of everything and act bolder and more aggressive when they feel scared or inadequate (Gray, 2002). The link between attachment problems and aggression is so strong that it is hard to determine is aggression is a part of attachment problems or the two are comorbid (Zeanah & Boris, 2000).

It has also been shown that sensory integration problems may lead to behavior problems. Children who have problems with sensory integration respond inappropriately to incoming sensory input because they cannot interpret it. As discussed earlier, in her

research with post-institutionalized children, Lin (2003) found that sensory modulation problems were the best predictor of behavior problems. She also found that sensory integration problems predicted of behavior problems. In research done in our lab, Purvis (2001) found a link between sensory integration and behavior problems. We have also observed this connection during our work with these children at a day camp. For example, some children respond to light touch as if they are being seriously hurt and then may turn around and give a crushing hug. Other children dissociate in response to moderate sound or being moved around.

Summary

In summary, there is correlational evidence for each of the linkages shown in Figure 1. Data has been collected on a sample of 49 post-institutionalized children and using this data we have measured each of these constructs – maternal deprivation, attachment, sensory integration, and behavior problems – in order to answer the following questions:

1. Do attachment and sensory integration mediate the impact of maternal deprivation on child behavior problems?
2. Do attachment and sensory integration make independent contributions to the prediction of behavior problems in post-institutionalized children?

Method

Participants

Data were collected as part of a therapeutic summer camp for post-institutionalized children. The camp was run for 5 weeks for each of the five years from 1999 – 2003. The current data were taken from pretesting data from each year of camp.

For children who attended camp multiple times, only the pretest data for their first year was included in the data set. Due to the nature of the camp, the sample was self-selected and primarily from the North Texas area. The children who attended camp have behavioral, social, and/or language difficulties, which interfere with normal social development – both at home and at school.

All camp participants (n = 49) were children with histories of early neglect and/or abuse. Twenty-seven participants were male and 22 were female. Most were adopted from orphanages in the Eastern European Bloc (n = 40). Two were adopted from Latin America and seven were adopted from within the United States. Table 1 shows how many children were included from each year of camp.

Measures

Maternal Deprivation

The primary measure of maternal deprivation was assessed by calculating the child's age at adoption. For most children, data on their past was incomplete and inadequate to determine how long the child had been separated from his mother. Therefore the most uniform measure was when they were introduced into the adoptive family (Age at Adoption). Three other measures were included in order to provide additional information. The age at which the child was placed in the orphanage, referred to as Age to Orphanage, was included to provide information on how young each child was when she entered the orphanage. Histories were not available on several of the children and so these data were available for only 36 children. The length of time that the child has been in the adopted family was also included and referred to as Time in Home. Finally, Survey Age was included to provide information about how the child's current

age is associated to their scores on the various measures. All four of these age variables were used in the analyses, although Age at Adoption was the primary measure of maternal deprivation.

Beech Brook Attachment Disorder Checklist (BBADC)

The Beech Brook Attachment Disorder Checklist (Moss, 1997) is a parent report measure developed to assess attachment disorders, and includes 72 questions each measured on a 5 point scale (see Appendix A). It measures both positive attachment behaviors (e.g., child expresses affection and concern for caretaker, child accepts comfort from caretaker when upset) and negative attachment behaviors (e.g., child seeks negative attention over positive, child hurts others). In the current research, we used the factors reported by Cross, Purvis, and Kellerman (2005) in their study of post-institutionalized children. In that study, principal components analysis with varimax rotation yielded three distinct factors: Negativity/Aggression (e.g. negative behavior follows close family situations), Affection/Attachment (e.g. child likes to be hugged or cuddled), and Executive Functioning (e.g. child learns from her mistakes).

Family Drawings (FD)

Family Drawings are one way to assess attachment in children and are important because they are based on self-report rather than on parent-report. In the current study, children were given a choice of paper and pencil colors and were asked to draw a picture of their family. Two sets of scores were used based on the Family Drawings: The objective measures and the global rating scales. The objective measures include a count of the number of colors used (Color) and a set of attachment-related criterion (Proximity to Father, Proximity to Mother, Presence of Father, and Presence of Mother). The global

rating scales which were scored on a three point scale with one being low and three being high. These scores were based on the subjective measures of Vitality/Creativity, Family Pride/Happiness, Vulnerability, Emotional Distance/Isolation, Tension/Anger, Role Reversal, Bizarreness/Dissociation, and Global Pathology as specified by Fury, Carlson, and Sroufe (1997). Several studies have demonstrated the validity of this measure: Fury et al. (1997) demonstrated a reliable difference between the drawings of children with differing attachment histories, and Kirsh and Cassidy (1997) showed that children remembered different attachment-relevant information and paid attention to different information based on their attachment histories.

Sensory History Questionnaire for Parents of Elementary-School-Age Children (SHQ)

The Sensory History Questionnaire is a parent report measure of children's sensory integration difficulties taken from Kranowitz (1998). It consists of 54 items and eight subscales including Touch Problems, Balance/Movement Problems, Coordination Problems, Muscle Tone Problems, Auditory Problems, Visual Problems, Olfactory Problems, and Attention/Behavior Problems (see Appendix B). The SHQ has been used clinically, but no empirical research for this measure is available. The SHQ was used only in the 1999 camp, and therefore data are only available from that year.

Sensory Profile, Caregiver Questionnaire (SP)

The Sensory Profile (Dunn & Westman, 1997) was developed to assess atypical responses to everyday sensory stimuli in children. It is made up of 125 items, which provide information in the domains of sensory processing (e.g., auditory processing, touch processing), modulation (e.g., body position and movement, activity level), and behavioral and emotional responses. The validity of nine subscales, which fall into these

three categories, has been demonstrated by the author (e.g., Dunn & Brown, 1997). These nine subscales are as follows: Sensory Seeking, Emotionally Reactive, Low Endurance/Tone, Oral Sensory Sensitivity, Inattention/Distractibility, Poor registration, Sensory Sensitivity, Sedentary, and Fine Motor/Perceptual. The SP data are available for the children who attended camp between 2000 and 2003.

Occupational Therapy Reports (OTR)

Each child was individually assessed in a standard occupational therapy evaluation that lasted approximately two hours. For the present research, the Bruininks-Oseretsky Test of Motor Proficiency, and measures of postural control were used to categorize the children into a Low, Moderate, or High risk group. High risk was operationalized as having difficulty in 75% of the areas considered, Moderate risk was operationalized as difficulties in 25 - 75% of the areas, and Low risk was operationalized as difficulties in less than 25% of the areas (see Table 2 for the number of children who were categorized into each of the three risk levels.)

Child Behavior Checklist, Parent Form (CBCL)

The CBCL (Achenbach, 1991a, 1991b) is a widely used checklist to assess behavior problems. It consists of 113 items that assess the child's degree of externalizing behaviors (e.g., hyperactivity, aggression) and internalizing behaviors (e.g., shyness, withdrawn). The CBCL yields an overall score of behavior problems, a score for each of the internalizing and externalizing problems, and nine subscales (Withdrawn, Somatic, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behaviors, Aggression, and Other Problems). A Sex Problems subscale is a sub-subscale of the CBCL, and made up of questions that deal with sex related issues.

We decided to include this as a subscale in this research because in camp, we have found that sex problems are a central issue for post-institutionalized children. The CBCL has both parent and teacher report forms, and has been thoroughly validated by its authors (Achenbach, 1991a, 1991b; Achenbach, Howell, Quay & Conners, 1991). The ranges used to classify children as borderline or clinical on the CBCL subscales were provided by the authors for boys and girls and for children from 4-11 years and from 12-18 years (see Table 3 for number of children in borderline and clinical ranges). In a sample of low-risk children, five percent of children fall in the borderline or clinical ranges in each of the CBCL subscales. However, in the current sample, the percentage of children in the borderline and clinical ranges of each subscale is between 25 and 64%.

Results

The descriptive statistics for all measures are listed in Tables 4 - 10. Referring back to Figure 1, there is one independent variable (maternal deprivation), two mediator variables (attachment and sensory integration), and one dependent variable (behavior problems). The descriptive statistics for the independent variable or age variables (including maternal deprivation) are shown in Table 4. The descriptive statistics for the first set of mediator variables (attachment) are shown in Tables 5, 6.1, and 6.2, with the Beech Brook Attachment Disorder Checklist (BBADC) subscales shown in Table 5 and Family Drawing (FD) scores shown in Tables 6.1 and 6.2. The descriptive statistics for the second set of mediator variables (sensory integration) are shown in Tables 7 - 9. Table 7 shows the descriptive statistics for the subscales of the Sensory History Questionnaire (SHQ), Table 8 shows the descriptive statistics for the subscales of the Sensory Profile (SP), and Table 9 shows the descriptive statistics for the OTR risk levels.

The descriptive statistics for the dependent variable (child behavior problems) are shown in Table 10.

First Research Question

The first research question asked whether attachment and sensory integration mediate the impact of maternal deprivation on child behavior problems. In order to evaluate this question, we used the mediational strategy described by Baron and Kenny (1986). The first step in the strategy is to determine whether the primary independent variable (Age at Adoption) predicts the dependent variable (Behavior Problems). An alpha level of .05 was used to determine statistical significance throughout this study. The CBCL subscales were used as measures of behavior problems, and correlations were computed between the age variables and the twelve CBCL subscales. This resulted in a table of 48 correlations of which 2.4 could be expected to be significant due to chance. Only five correlations were statistically significant, but four of them were concentrated in the fourth column of the table. Of all the age variables, only Survey Age and Years in Home were correlated with the CBCL subscales. No measure of maternal deprivation was correlated with the CBCL (second column in Table 11).

In order to determine whether the association between age and CBCL subscale scores differed between males and females, a regression was computed with each CBCL subscale as a dependent variable, and with quantitative (Age at Adoption, Survey Age) and qualitative (Gender) predictors and their interactions. For most subscales -- Aggressive Behavior, Withdrawn, Somatic Problems, Social Problems, Internalizing Composite, and Externalizing Composite -- there were no significant associations between the predictors and the dependent variable ($p > .05$). However, for the Delinquent

Behaviors subscale, Survey Age was a significant predictor ($F(1, 41, MSE = 11.57) = 7.51, p = .01$).

In addition, for five of the CBCL subscales (Sex Problems, Attention Problems, Thought Problems, Anxious/Depressed and Other Problems) there was a significant Gender by Age interaction. For the Sex Problems subscale, the interaction of gender and Age at Adoption was significant ($F(1, 41, MSE = 2.10) = 6.37, p = .02$), so we followed this omnibus analysis with separate regressions for males and females. The regression of Sex Problems on Age of Adoption was positive for males ($b = .13, t(25) = 1.14, p = .26, R^2 = .05$), but negative for females ($b = -.06, t(19) = .49, p = .63, R^2 = .01$). Although the individual regressions were nonsignificant, the difference was statistically significant (as indicated by the significant interaction above), such that the association between Age at Adoption and Sex Problems was positive and stronger for males. For the Attention Problems subscale, gender was a significant predictor of Attention Problems, as was the interaction of Gender and Survey Age ($F(1, 41, MSE = 19.77) = 4.39, p = .04$). The regression of Attention Problems on Survey Age was positive for females ($b = .52, t(19) = 1.36, p = .19, R^2 = .09$), but negative for males ($b = -.13, t(24) = -.43, p = .67, R^2 = .01$). Although the individual regressions are nonsignificant, the difference was statistically significant, such that the association between Survey Age and Attention Problems was positive and stronger for females. For the Thought Problems subscale, Gender was a significant predictor, as was the interaction of Gender and Survey Age ($F(1, 41, MSE = 5.76) = 10.70, p = .002$). The regression of Thought Problems on Survey Age was positive for females ($b = .41, t(19) = 1.84, p = .08, R^2 = .15$), but negative for males ($b = -.17, t(24) = -1.02, p = .32, R^2 = .04$). Although the individual regressions are

nonsignificant, the difference was once again statistically significant, such that the association between Survey Age and Thought Problems was positive and stronger for females. For the Anxious/Depressed subscale, Survey Age was a significant predictor and Gender was a marginally significant predictor, as was the interaction of Gender and Survey Age ($F(1, 41, MSE = 29.19) = 3.58$, $p = .07$). The regression of Anxious/Depressed on Survey Age was positive for both males ($b = .15$, $t(24) = .43$, $p = .67$, $R^2 = .01$) and females, but significantly so for females ($b = 1.26$, $t(24) = 2.66$, $p = .02$, $R^2 = .27$). For the Other Problems subscale, the interaction of gender and Survey Age was significant ($F(1, 41, MSE = 47.62) = 4.53$, $p = .04$). The regression of Other Problems on Survey Age was positive for females ($b = .49$, $t(19) = .76$, $p = .46$, $R^2 = .03$), but negative for males ($b = -.31$, $t(24) = -.70$, $p = .49$, $R^2 = .02$). The association between Survey Age and Other Problems was positive and stronger for females than males, and although the individual regressions are nonsignificant, the difference was statistically significant.

According to Baron and Kenny (1986), a statistically significant association must exist between the independent variable and the dependent variable in order for a mediation analysis to proceed. Thus, since Age at Adoption (our primary measure of maternal deprivation) did not predict any of the CBCL subscales, we have the answer to our first question: In this sample, attachment and sensory integration cannot mediate the association between maternal deprivation and behavior problems because no association was found between our measures of maternal deprivation and behavior problems.

For completeness, the correlations between maternal deprivation and the mediator variables (attachment and sensory integration) were also examined. The BBADC factors

and the FD scores were used as measures of attachment. In order examine the link between maternal deprivation and attachment, correlations were computed between the age variables and the BBADC factors. This resulted in a table of 12 correlations of which .6 could be expected to be significant due to chance. Four correlations were significant: the Negativity/Aggression subscale and the Affective/Attachment subscale were significantly correlated with Age at Adoption and Survey Age (see Table 12). All three BBADC subscales were at least marginally associated with the Age at Adoption and Survey Age, showing evidence of a rather weak link between attachment and maternal deprivation in this sample.

Correlations were also computed between the age variables and the FD scores. The correlations with the objective measures resulted in a table of 12 correlations of which .6 could be expected to be significant due to chance. No significant correlations were found between these two measures. The correlations with the global rating scales resulted in a table of 32 correlations of which 1.6 could be expected to be significant due to chance. Eleven correlations were statistically significant. Most of the global rating FD scores were significantly associated with both Age to Orphanage and Survey Age (columns one and four of Table 13). It is interesting to note that these global rating scales, which are clinical measures based on the child's own work, were the measures most sensitive to information captured by the Age to Orphanage variable. It is also interesting that the positively oriented global rating scales significantly increased with increases in Survey Age and the negatively oriented scores significantly decreased with increases in Survey Age. This was opposite of the CBCL subscale scores, where higher Survey Age was associated with more problem behavior.

The SHQ, SP, and OTR were used as measures of sensory integration. The SHQ was used for the children who attended camp the first year, while the SP was used for the children in the subsequent years. Because creating a standardized score across measures was not feasible for the current sample, data for these two measures were analyzed separately. In order to examine the link between maternal deprivation and sensory integration, correlations were computed between the age variables and the SHQ subscales. This resulted in a table of 32 correlations of which 1.6 could be expected to be significant due to chance. Three correlations were significant: Age at Adoption was significantly correlated with Olfactory Problems, and Survey Age was significantly correlated with Visual Problems and Attention/Behavior Problems (see Table 14). These results were consistent with the null hypothesis of no association between the age variables and the SHQ subscales.

Correlations were also computed between the age variables and the SP subscales. This resulted in a table of 36 correlations of which 1.8 could be expected to be significant due to chance. Five correlations were statistically significant. Age to Orphanage was significantly correlated with three SP subscales: Sensory Seeking, Oral Sensitivity, and Fine Motor/Perceptual. Age at Adoption and Survey Age were each significantly correlated with one SP subscale (see Table 15).

ANOVA's were computed in order to examine the association between OTR risk levels and the age variables. This was necessary because of the categorical nature of the OTR data. A statistically significant association was found between OTR risk levels and Age to Orphanage ($F(2, 27) = 4.08$, $p = .03$). A Tukey's post hoc analysis reveals that children categorized with high OTR risk were placed in the orphanage significantly

younger than children with low OTR risk ($p < .05$). No other statistically significant association was found between OTR risk and the age variables (p's > .05).

Second Research Question

The second research question asked whether attachment and sensory integration make independent contributions to the prediction of behavior problems in post-institutionalized children. In order to evaluate this question, correlations were computed between measures of attachment and behavior problems and between measures of sensory integration and behavior problems. The correlational analyses were followed by multiple regression analyses with behavior problems as the dependent variable, and attachment and sensory integration measures as the predictor variables.

The BBADC factors and FD scores were used as measures of attachment and the CBCL subscales were used as a measure of behavior problems. In order to examine the link between attachment and behavior problems, correlations were computed between the BBADC factors and subscales of the CBCL. This resulted in a table of 36 correlations of which 1.8 could be expected to be significant due to chance. Twenty-nine correlations were significant, indicating a strong association between BBADC factors and CBCL subscales in this sample. The Negativity/Aggression factor was positively correlated with most of the CBCL subscales, while the Executive Functioning factor was negatively correlated with each of the CBCL subscales. The Affective/Attachment factor was significantly correlated with six of the CBCL subscales, also in a negative direction (see Table 16).

Correlations were also computed between the both sets of the FD scores and CBCL subscales. This resulted in 132 correlations of which 6.6 could be expected to be

significant due to chance. Three correlations were found to be significant, which basically shows no association between FD scores and the CBCL subscales in this sample. This null finding raises the question of whether the FD scores are valid indicators of attachment. In other research in our lab, we have found associations between FD scores and other measures such as the Child Depression Inventory and the SHQ (Purvis, 2003). To throw further light on this issue, correlations were computed between the factors of the BBADC and the FD scores, which resulted in a 33 correlations of which 1.65 could be expected to be significant due to chance. The one significant correlation was between Distance to Father and Negativity/Aggression. In the current sample, FD scores were not significantly correlated with the BBADC factors.

Sensory integration was measured using the SHQ, SP, and OTR. In order to examine the link between sensory integration and behavior problems, correlations were computed between SHQ subscales and subscales of the CBCL. This resulted in a table of 96 correlations of which 4.8 could be expected to be significant due to chance. Twenty-one correlations were significant, with the Thought Problem and Attention Problem subscales of the CBCL negatively correlated to most SHQ subscales (see Tables 17.1 and 17.2). For this sample, the significant correlations between these two measures were concentrated primarily in two rows of the table (rows five and six), demonstrating that childhood thought and attention problems were strongly associated with high levels of sensory processing problems.

Correlations were also computed between the SP and CBCL subscales. This resulted in a table of 108 correlations of which 5.4 could be expected to be significant due to chance. Fifty-two correlations were found to be statistically significant (see Tables

18.1 and 18.2). The statistically significant correlations replicate and extend the findings with the SHQ (see Table 17). As was the case with the SHQ, Thought Problems and, especially Attention Problems, were significantly correlated with a majority of the SP subscales. However, in the case of the SP, the CBCL Somatic and Other Problem subscales were also strongly correlated with several of the SP subscales, indicating that Thought Problems, Attention Problems, Somatic Problems, and Other Problems seem to be most closely associated with sensory integration dysfunction. It was also worthwhile to examine the patterns of significant correlations in the columns of the table. The Emotional Reactive, Poor Registration, and Sensory Sensitivity subscales of the SP were strongly associated with most of the subscales of the CBCL, indicating that these aspects of sensory integration functioning were most predictive of childhood behavior problems in general. Overall, a strong and patterned association was found between the subscales of the SP and CBCL.

In order to ascertain the association between OTR risk and the CBCL subscales, ANOVA's were computed using the three levels of OTR risk: High, Moderate, and Low risk. Two ANOVA's were significant including Thought Problems ($F(2, 38) = 3.34$, $p = .05$) and Other Problems ($F(2, 38) = 3.62$, $p = .04$). Tukey's HSD post hoc analysis revealed that children with High OTR risk ($M = 3.71$, $SD = 2.09$) had significantly higher scores on Thought Problems than did children with Low OTR risk ($M = 1.67$, $SD = 2.26$), $p = .05$. A Tukey's HSD also revealed that Moderate OTR risk children ($M = 13.25$, $SD = 6.82$) had significantly higher scores on the Other Problems subscale than did children with Low OTR risk ($M = 8.2$, $SD = 3.82$), $p = .05$. Although the association between the SHQ/SP and the CBCL subscales was compelling, the association between OTR risk

levels and the CBCL subscales was weak. However, the ANOVA's replicate some of the major trends in the sensory integration – behavior problems association, namely that sensory integration dysfunction tends to associated with the Thought Problem and Other Problem subscales of the CBCL.

An hierarchical regression analysis was computed with the behavior problems (CBCL subscales) as the dependent variable and the attachment and sensory integration measures (BBADC and SP/SHQ) as independent variables (see Table 19). The purpose of this analysis was to determine which attachment and/or sensory integration measures independently predicted the CBCL subscale scores. When the BBADC factors and SP subscales were combined as predictor variables, the Executive Functioning factor of the BBADC was the best predictor of the CBCL subscales. Sensory Sensitivity, of the SP, also plays a role in predicting CBCL subscales as can be seen in the first column of Table 19. Similarly, when the SHQ replaced the SP in the analyses, the Executive Functioning factor of the BBADC remains the best predictor of CBCL subscales. The SHQ subscales of Muscle Tone and Balance/Movement tend to play a secondary role in the prediction of behavior problems (see column two in Table 19). This suggests that the attachment measure (BBADC factors) contained more of the predictive power than the sensory integration measures (SP/SHQ subscales) in predicting child behavior scores (CBCL subscales).

Discussion

The first research question asks whether attachment and sensory integration mediate the impact of maternal deprivation on child behavior problems. In this research, the approach of Baron and Kenny (1986) was utilized to do a mediational analysis. In

order for there to be mediation, the independent variable (Age at Adoption) must predict the dependent variable (Child Behavior Checklist (CBCL) subscales). In this sample of post-institutionalized children, mediation between Age at Adoption and CBCL subscale scores is not possible because there is no main effect for the age variables (specifically Age at Adoption) on the CBCL subscales.

However, this null finding may be particular to this sample. One reason that an association between maternal deprivation and behavior problems was not found could be due to the self-selected nature of our sample, which may reduce the amount of variance in the dependent variable. The families who self-selected were the families in trouble; who chose to send their children to a therapeutic day camp run by our research lab. For example, approximately 60% of the children in this sample fall into the borderline or clinical range on the Internalizing and Externalizing Composite scores of the CBCL. The sample in the current research did not include families whose post-institutionalized, adopted children are doing well in the home. Our lab has begun a meta-analysis of research on internationally adopted children and behavior problems, and this work indicates that a strong association may in fact exist between maternal deprivation and behavior problems (Pennings, Kolb, & Hawkins, 2005). We found that children who are adopted are at greater risk for externalizing behavior problems than non-adopted children, regardless of age at adoption and that children adopted at older ages appear to be at greater risk for both internalizing and externalizing behavior problems.

Fisher, Ames, Chisholm and Savoie (1997) found an association between age at adoption and behavior problems. They found that children who had spent more than eight months in a Romanian orphanage scored higher on the CBCL Total Problems and

Internalizing Composites than did children who spent less than four months in an orphanage and children who were not adopted. Smith, Howard, and Monroe (1998) also found that age at placement was associated with severity of behavior problems. However, Verhulst, Althaus, and Versluis-Den Bieman (1992) found that history of neglect and abuse, not age at placement per se, was predictive of later behavior problems. Due to the likelihood that each child in our research sample has a history of neglect and/or abuse, there may not be enough difference in the children's CBCL subscale scores to show an effect of Maternal Deprivation on Behavior Problems.

It is interesting to note the association between Survey Age and scores on the Delinquent Behavior, Somatic Problems, Anxious/Depressed, and Internalizing Composite subscales of the CBCL. This is congruent with the findings of Verhulst (2000) who found that in general, adopted children have more behavior problems as they move into adolescence. Groza, Ryan, and Cash (2003) had parents fill out the CBCL twice (with approximately four years between time one and time two) and also found that children scores on seven of the CBCL subscales significantly increased from time one to time two. Egeland (1997) found that maltreatment was strongly associated with drug and alcohol problems, school failure, and an assortment of behavior problems during adolescence, including serious psychopathology.

The second research question asked whether attachment and sensory integration make independent contributions to the prediction of behavior problems in post-institutionalized children. Although the mediational analysis cannot be done with these data, this second question can be examined by looking at the associations between the

measures of attachment and behavior problems and the associations between sensory integration and behavior problems.

There is a strong association between one of the measures of attachment (Beech Brook Attachment Disorder Checklist (BBADC) factors) and the CBCL subscales. One possible reason for the strong association between the BBADC and CBCL is that these two measures show common method variance (Cook & Campbell, 1979). Methodological similarities exist between the BBADC and the CBCL in that items on both questionnaires have the same format, and that each is a parent report measure. Also, the definitions of attachment and behavior problems overlap to a certain extent in that aggression and defiance are part of both. Finally, they are developmentally linked: Attachment is a protection factor for later behavior development (Sroufe, Egeland & Kreutzer, 1990). One way to minimize common method variance is to use another type of measure of attachment (Kazdin, 1998). In this research we used the Family Drawing (FD) scores as the child's self-report measure of attachment.

The objective measures of attachment problems in the FD scores (Presence of Father, Presence of Mother, Distance to Father, and Distance to Mother) are not related to behavior problem scores as measured with the subscales of the CBCL. This is in contrast to other work in our lab. For example, Distance to Mother is associated with the Interpersonal Relationship subscale of the Child Depression Inventory and Distance to Father is associated with the Ineffectiveness subscale of the Child Depression Inventory (Purvis, 2003). Purvis also found that the after attending camp, the children drew themselves significantly closer to their father and mother on their family drawings. The children were also significantly more likely to include their Father and Mother in their

family drawing after camp (Purvis, 2003). In the current sample, the global rating scales did not predict the CBCL subscales.

In the current sample, the association between the parent report sensory integration measures and CBCL subscales is strong and compelling, a finding that supports past work done in our lab (Purvis, 2001). The linkage between sensory integration and behavior problems is important because we have found that children who have more sensory integration problems tend also to have more behavior problems, and by targeting sensory integration issues we have seen improvement in behavior issues. To our knowledge the only other researchers who have found an empirical link between sensory integration (as traditionally defined by occupational therapists (see Ayers (1979)) and behavior problems is Cermak and her group (see Kadlec & Cermak, 2002; Lin, 2003). In the traditional occupational therapy work, little data exists on the association between sensory integration and occupational therapy. However, psychobiological work done mainly by Porges and his colleagues with vagal tone has shown that vagal tone early in life has been shown to predict behavior problems later in life (see Porges, Doussard-Roosevelt, Portales, & Greenspan, 1994).

To summarize, we did not find that maternal deprivation predicted behavior problems in this sample, but we did find that the BBADC factors the SHQ/SP subscales predicted child behavior problems. Given the centrality of maternal deprivation in this research, we also examined the impact of maternal deprivation, not only on behavior problems, but also on attachment and sensory integration. An association was not found between maternal deprivation and the parent report measure of attachment (BBADC). However, an association was found between the age variables (including Age at

Adoption) and the FD global rating scales (a measure of attachment problems). These global rating scales of the FD scores (Vitality/Creativity, Family Pride/Happiness, Vulnerability, Emotional Distance/Isolation, Tension/Anger, Role Reversal, Bizarreness/Dissociation, and Global Pathology) are strongly associated with Age to Orphanage and Survey Age. These scores are also associated with Age at Adoption, although not as strongly. These finding support the research by Fury, Carlson, and Sroufe (1997) who found that the early relationship experiences are predictive of the global rating scales of the Family Drawings. As in the current research, Chisolm (1998) did not find an association between maternal deprivation and a parent report measure of attachment. However, using a behavioral measure of attachment, Chisolm found more insecure and atypical attachment patterns in children who spent more time in an orphanage.

A strong association was not found between maternal deprivation and sensory integration. This is in contrast to other research that found an association (Cermak & Daunhauer, 1997; Lin, 2003). Lin (2003) found that children who spent more time in an orphanage had more sensory integration problems than did children who spent a shorter amount of time in an orphanage. In addition, Cermak and Daunhauer (1997) found that children adopted from Romanian orphanages had significantly more sensory processing problems than control children. The effects of maternal deprivation on attachment and sensory integration may also be influenced by the sample of participants. It is likely that a more diverse sample will show an effect of maternal deprivation in these areas.

In sum, in this sample of post-institutionalized children, a mediational analysis with attachment and sensory integration is not possible because there was no main effect

for the age variables (including Age at Adoption) on the CBCL subscales. Nevertheless, a strong association was found between an attachment measure (BBADC factors) and the measure of behavior problems (CBCL subscales), and also between the sensory integration measures (SP/SHQ subscales) and the measure of behavior problems. Both the factors of the BBADC and the subscales of the SP/SHQ play a role in predicting CBCL subscales. The effects of maternal deprivation on the attachment measures and the sensory integration measures were also assessed. We found an association between the global rating scales of the Family Drawings and the age variables, and between the BBADC factors and the age variables. Because an association was found between maternal deprivation and attachment and between attachment and behavior problems, this indicates a weak mediation of attachment on the link between maternal deprivation and behavior problems. This partially supports the first research question that attachment mediates the relationship between maternal deprivation and behavior problems.

There are several limitations associated with this study. Although age at adoption is a widely used measure of maternal deprivation, some problems are associated with using this measure. Age at adoption conveys no information about the life of the child before she was adopted nor why the child was relinquished. However, because little background information is known about many children who are adopted from overseas, age at adoption is often all that is known. A second limitation has to do with the sample. Most of the families whose children participated in this research approached the researchers because of difficulties post adoption. Consequently, the sample may not be representative of the population of internationally adopted children. The small sample size is also a concern with the current sample. A third limitation is that only a parent

report measure of behavior problems was used. We did not have an observational measure of behavior.

Preliminary meta-analysis findings indicate that in a representative sample of internationally adopted children, maternal deprivation is related to behavior problems (Pennings et al., 2005). A complete meta-analysis of relevant data would resolve the sampling issues in the current sample as well as include data from more participants. A meta-analysis which includes a more diverse sample (including children from more countries who are sampled based on a wide variety of criteria) and greater number of participants would be more likely to find a strong association between maternal deprivation and child behavior problems. If this association is found, replication of the current research including a mediation analysis with attachment and sensory integration measures would be possible.

However, a meta-analysis of research on maternal deprivation and child behavior problems would not resolve the issue of using only a parent report measure of behavior problems. It would add to our understanding of this association to use behavioral or physiological measures of behavior problems. A second issue that a meta-analysis would not address is the use of Age at Adoption as the sole measure of maternal deprivation. In his current work, Zeanah et al. (2003) is attempting to address this issue by doing longitudinal research in Romania, comparing children in institutions with children in foster care. In this research, the direct effects of institutionalization on early deprivation will be examined and it may provide insight into such issues as the timing of deprivation, the effects of early experience, and what facets of early intervention are most effective in ameliorating later problems. In this way, Zeanah's work goes beyond the current study,

which found an association between maternal deprivation and attachment problems, between attachment problems and behavior problems, and between sensory integration issues and behavior problems.

Figure 1

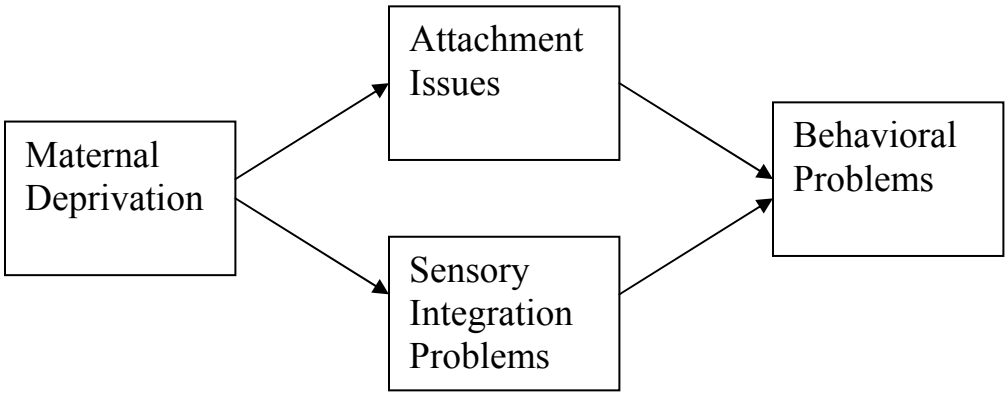

Figure 1 is a model showing the proposed relationship among maternal deprivation, attachment issues, sensory integration problems, and behavioral problems.

Table 1

Number of Children Included from Camp Per Year

Camp Year	Number of Children
1999	18
2000	13
2001	5
2002	8
2003	5
Total	49

Table 2

Number of Children in Each Level of OTR Risk

OTR Risk	Males	Females	Both
High	9	5	14
Moderate	6	7	13
Low	9	6	15
Total	24	18	42

Table 3

Number of Children in Borderline and Clinical Ranges of the CBCL

	Borderline			Clinical		
CBCL Subscales	Males (n = 27)	Females (n = 21)	Both (n = 48)	Males (n = 27)	Females (n = 21)	Both (n = 48)
Aggressive Behavior	3	4	7	10	6	16
Delinquent Behavior	2	2	4	11	7	18
Withdrawn	1	3	4	7	2	9
Somatic Problems	2	2	4	5	3	8
Anxious/Depressed	0	4	4	8	5	13
Thought Problems	2	2	4	12	6	18
Attention Problems	2	3	5	14	7	21
Internalizing	6	1	7	12	10	22
Externalizing	2	3	5	12	10	26

Table 4

Means and Standard Deviations for Age Variables

Age Variables	Males	Females	Both
Age to Orphanage	1.10	1.95	1.45
	(1.74)	(2.42)	(2.06)
	n = 21	*n* = 15	*n* = 36
Age at Adoption	3.80	5.13	4.39
	(2.67)	(3.75)	(3.23)
	n = 27	*n* = 22	*n* = 49
Years in Home	3.78	3.51	3.66
	(3.25)	(2.51)	(2.92)
	n = 26	*n* = 21	*n* = 47
Survey Age	7.67	8.79	8.17
	(2.78)	(2.78)	2.81
	n = 26	*n* = 21	*n* = 47

Table 5

Means and Standard Deviations of BB Subscales by Gender

BB Factors	Males (n = 21)	Females (n = 16)	Both (n = 37)
Negativity/ Aggression	2.03	2.28	2.14
	(.85)	(1.13)	(.97)
Affective/ Attachment	2.38	2.58	2.47
	(.92)	(.91)	(.91)
Executive Functioning	1.78	1.77	1.78
	(.75)	(.81)	(.77)

Table 6.1

Means and Standard Deviations of FD Objective Scores by Gender

FD Scores	Males	Females	Both
Proximity to Father	9.47	8.03	8.93
	(4.61)	(4.98)	(4.70)
	n = 15	*n* = 9	*n* = 24
Proximity to Mother	9.41	11.63	10.15
	(4.75)	(5.06)	(4.86)
	n = 16	*n* = 8	*n* = 24
Color	1.74	3.19	2.33
	(2.32)	(2.97)	(2.67)
	n = 23	*n* = 16	*n* = 39

Table 6.2

Means and Standard Deviations of FD Global Rating Scales by Gender

FD Scores	Males (n = 27)	Females (n = 18)	Both (n = 45)
Vitality/Creativity	1.59	1.89	1.71
	(.61)	(.68)	(.64)
Family Pride/ Happiness	1.41	1.47	1.47
	(.54)	(.70)	(.60)
Vulnerability	2.61	2.39	2.52
	(.45)	(.58)	(.51)
Emotional Distance /Isolation	2.46	2.39	2.43
	(.54)	(.47)	(.51)
Tension/Anger	2.26	2.06	2.18
	(.49)	(.48)	(.49)
Role Reversal	1.39	1.33	1.37
	(.54)	(.59)	(.56)
Bizarreness/ Dissociation	2.52	2.39	2.47
	(.43)	(.50)	(.46)
Global Pathology	2.56	2.36	2.48
	(.45)	(.61)	(.52)

Table 7

Means and Standard Deviations of SHQ Subscales by Gender

SHQ Subscales	Males[a] (n = 8)	Females[b] (n = 9)	Both[c] (n = 17)
Touch Problems	1.63	1.70	1.67
	(.16)	(.22)	(.19)
Balance/Movement Problems	1.71	1.82	1.77
	(.21)	(.28)	(.25)
Coordination Problems	1.67	1.74	1.71
	(.25)	(.25)	(.25)
Muscle Tone Problems	1.81	1.75	1.78
	(.14)	(.36)	(.26)
Auditory Problems	1.44	1.49	1.47
	(.20)	(.34)	(.28)
Visual Problems	1.71	1.69	1.70
	(.14)	(.31)	(.24)
Olfactory Problems	1.79	1.85	1.83
	(.25)	(.17)	(.21)
Attention/Behavior Problems	1.38	1.30	1.33
	(.33)	(.42)	(.37)

Note: [a] Visual subscale: n = 7;
[b] Muscle Tone: n = 8, Visual: n = 15
[c] Muscle Tone: n = 16, Visual: n = 15

Table 8

Means and Standard Deviations of SP Subscales by Gender

SP Subscales	Males[a] (n = 19)	Females (n = 9)	Both[b] (n = 28)
Sensory Seeking	3.12	3.21	3.15
	(.70)	(.70)	(.69)
Emotionally Reactive	2.75	2.70	2.73
	(.79)	(.95)	(.83)
Low Endurance	4.25	4.53	4.34
	(.85)	(.58)	(.78)
Oral Sensitivity	3.77	3.84	3.79
	(.77)	(1.25)	(.93)
Inattention/distract	2.83	2.85	2.84
	(1.01)	(.77)	(.93)
Poor Registration	4.09	4.1	4.09
	(.50)	(.59)	(.52)
Sensory Sensitivity	4.46	4.56	4.49
	(.51)	(.82)	(.61)
Sedentary	3.67	3.94	3.76
	(.97)	(.76)	(.90)
Fine Motor/Perceptual	3.35	3.30	3.33
	(.94)	(1.11)	(.98)

Note: [a] Fine Motor/Perceptual: n = 18
[b] Fine Motor/Perceptual: n = 27

Table 9

Means and Standard Deviations of the Three Levels of OTR

OTR	Age at Adoption	Age at Placement	Years in Home	Survey Age
High	3.99	.32	3.71	7.70
	(2.90)	(.73)	(3.41)	(2.48)
	n = 14	*n* = 10	*n* = 14	*n* = 14
Moderate	5.66	2.12	3.00	8.99
	(2.90)	(1.81)	(1.85)	(2.52)
	n = 13	*n* = 12	*n* = 12	*n* = 12
Low	4.04	2.84	4.65	8.87
	(3.98)	(3.01)	(2.97)	(2.87)
	n = 15	*n* = 8	*n* = 14	*n* = 14

Table 10

Means and Standard Deviations of CBCL Subscales by Gender

CBCL Subscales	Males (n = 27)	Females (n = 21)	Both (n = 48)
Aggressive Behavior	18.70	16.83	17.89
	(8.75)	(10.74)	(9.61)
Delinquent Behavior	4.89	3.95	4.48
	(3.60)	(3.75)	(3.66)
Withdrawn	4.37	3.52	4.00
	(3.54)	(2.68)	(3.19)
Somatic Problems	1.93	3.00	2.40
	(2.67)	(3.15)	(2.91)
Anxious/Depressed	8.07	8.05	8.06
	(5.57)	(6.70)	(6.02)
Thought Problems	3.00	2.91	2.96
	(2.43)	(2.95)	(2.64)
Attention Problems	10.00	8.38	9.29
	(4.22)	(4.85)	(4.53)
Social Problems	5.44	4.95	5.22
	(3.29)	(3.74)	(3.53)
Sex Problems	.78	1.24	.98
	(1.45)	(1.87)	(1.64)

Other Problems	11.93	12.00	11.96
	(6.08)	(8.00)	(6.90)
Internalizing Composite	13.63	14.05	13.81
	(8.93)	(10.47)	(9.53)
Externalizing Composite	23.59	20.79	22.37
	(11.62)	(14.09)	(12.69)

Table 11

Correlations Between Ages and CBCL Subscales

CBCL Subscales	Age to Orphanage (n = 36)	Age at Adoption (n = 48)	Years in Home (n = 47)	Survey Age (n = 47)
Aggressive Behavior	.13	.04	.13	.21
Delinquent Behavior	.21	.03	.30*	.36*
Withdrawn	.05	.18	.08	.27^{+}
Somatic Problems	.01	.11	.17	.29*
Anxious/Depressed	.23	.08	.15	.31*
Thought Problems	-.21	-.03	.09	.10
Attention Problems	-.15	-.07	.12	.06
Social Problems	-.05	.01	.06	.10
Sex Problems	-.05	.13	.05	.27^{+}
Other Problems	-.26	-.10	.13	.02
Internalizing Composite	.14	.15	.15	.35*
Externalizing Composite	.15	.04	.19	.26^{+}

* $p < .05$; $^{+}$ $p < .10$

Table 12

Correlations Between Age Variables and BBADC Factors

BBADC Factors	Age to Orphanage (*n* = 28)	Age at Adoption (*n* = 37)	Years in Home (*n* = 37)	Survey Age (*n* = 37)
Negativity/ Aggression	.24	.35*	-.07	.33*
Affective/ Attachment	-.27	-.45**	.16	-.35*
Executive Functioning	.20	$-.31^{+}$	.07	$.29^{+}$

** $p < .01$; * $p < .05$; $^{+}p < .10$

Table 13

Correlations Between Age Variables and Global Rating Scales of the Family Drawings

FD Scores	Age to Orphanage (n = 33)	Age at Adoption (n = 45)	Years in Home (n = 43)	Survey Age (n = 43)
Vitality/Creativity	.53**	.28^{+}	.11	.44**
Family Pride/ Happiness	.50**	.15	.09	.32*
Vulnerability	-.45**	-.26^{+}	-.08	-.43**
Emotional Distance /Isolation	-.07	-.12	-.05	-.24
Tension/Anger	-.30^{+}	-.13	-.24	-.42**
Role Reversal	.12	.17	-.17	.03
Bizarreness/ Dissociation	-.45**	-.05	.00	-.11
Global Pathology	-.49**	-.31*	-.09	-.46**

** $p < .01$; * $p < .05$; $^{+}p < .10$

Table 14

Correlations Between Age Variables and SHQ Subscales

SHQ Subscales	Age to Orphanage[a] (n = 14)	Age at Adoption[b] (n = 17)	Years in Home[b] (n = 17)	Survey Age[b] (n = 17)
Touch Problems	-.10	-.05	-.02	-.07
Balance/Movement Problems	.32	-.02	-.07	-.08
Coordination Problems	.37	-.07	.38	.30
Muscle Tone Problems	-.19	-.40	.04	-.40
Auditory Problems	.40	-.12	.27	.13
Visual Problems	.14	-.48^{+}	.05	-.51*
Olfactory Problems	-.14	-.57*	.46^{+}	-.17
Attention/Behavior Problems	-.33	-.30	-.20	-.52*

Note: [a] Muscle Tone: n = 13, Visual: n = 12
[b] Muscle Tone: n = 16, Visual: n = 15
* $p < .05$; $^{+}$ $p < .10$

Table 15

Correlations Between Age Variables and SP Subscales

SP Subscales	Age to Orphanage (n = 20)	Age at Adoption (n = 28)	Years in Home (n = 27)	Survey Age (n = 27)
Sensory Seeking	.48*	.30*	-.23	.08
Emotional Reactivity	.32	-.01	-.27	-.32
Low endurance	.30	-.08	-.15	-.23
Oral Sensitivity	.62**	.13	-.24	-.11
Inattention/ Distractibility	.41	.18	-.33^{+}	-.19
Poor registration	.23	-.25	-.13	-.40*
Sensory Sensitivity	.26	.02	-.19	-.19
Sedentary	-.03	-.14	-.08	-.23
Fine Motor/ Perceptual	.60**	.04	-.11	-.10

** $p < .01$; * $p < .05$; $^{+}p < .10$

Table 16

Correlations Between BBADC Factors and CBCL Subscales (n = 37)

	BBADC Factors		
CBCL Subscales	Negativity/ Aggression	Affective/ Attachment	Executive Functioning
Aggressive Behavior	.70**	-.40**	-.76**
Delinquent Behavior	.60**	-.49**	-.72**
Withdrawn	.57**	-.51**	-.58**
Somatic Problems	.36*	-.02	-.40**
Anxious/Depressed	.63**	-.31^{+}	-.53**
Thought Problems	.44**	-.33*	-.44**
Attention Problems	.44**	-.29^{+}	-.52**
Social Problems	.40*	-.13	-.52**
Sex Problems	.31^{+}	-.14	-.33*
Other Problems	.47**	-.31^{+}	-.52**
Internalizing Composite	.68**	-.37*	-.64**
Externalizing Composite	.70**	-.45**	-.78**

** $p < .01$; * $p < .05$; $^{+}p < .10$

Table 17.1

Correlations Between SHQ Subscales and CBCL Subscales

	SHQ Subscales				
CBCL Subscales	Touch Problems (n = 17)	Balance/ Movement Problems (n = 17)	Coordination Problems (n = 17)	Muscle Tone Problems (n = 16)	Auditory Problems (n = 17)
Aggressive Behavior	-.24	-.15	-.21	-.12	-.01
Delinquent Behavior	-.46^{+}	-.09	-.02	-.03	-.19
Withdrawn	-.45^{+}	-.38	-.18	-.57*	-.33
Somatic Problems	-.04	.02	-.13	-.45^{+}	-.47^{+}
Anxious/Depressed	-.59**	-.26	.14	-.51*	-.14
Thought Problems	-.48*	-.71**	-.57*	-.72**	-.56*
Attention Problems	-.52*	-.73**	-.65**	-.69**	-.56*
Social Problems	-.34	-.29	-.50*	-.20	-.36
Sex Problems	-.07	-.62**	-.38	-.38	-.31
Other Problems	-.36	-.45^{+}	-.47^{+}	-.39	-.44^{+}
Internalizing Composite	-.57*	-.31	-.03	-.64**	-.31
Externalizing Composite	-.31	-.14	-.17	-.10	-.13

** $p < .01$; * $p < .05$; $^{+}p < .10$

Table 17.2

Correlations Between SHQ Subscales and CBCL Subscales, continued

	SHQ Subscales continued		
CBCL Subscales	Visual Problems (n = 15)	Olfactory Problems (n = 17)	Attention/ Behavior Problems (n = 17)
Aggressive Behavior	.00	-.22	-.35
Delinquent Behavior	-.07	-.08	-.19
Withdrawn	-.05	-.11	.12
Somatic Problems	-.32	-.24	.00
Anxious/Depressed	-.16	-.05	-.27
Thought Problems	-.43	-.48*	.02
Attention Problems	-.49^{+}	-.66**	-.38
Social Problems	-.41	-.39	-.54*
Sex Problems	-.22	-.58*	.19
Other Problems	-.20	-.32	.14
Internalizing Composite	-.20	-.14	-.11
Externalizing Composite	-.02	-.19	-.32

** $p < .01$; * $p < .05$; $^{+}p < .10$

Table 18.1

Correlations Between SP and CBCL Subscales (n = 28)

	SP Subscales				
CBCL Subscales	Sensory Seeking	Emotional Reactivity	Low endurance	Oral Sensitivity	Inattention/ Distractibility
Aggressive Behavior	-.38*	-.66**	-.22	-.23	-.30
Delinquent Behavior	-.18	-.48**	-.22	-.16	-.19
Withdrawn	-.14	-.41*	-.55**	-.21	-.40*
Somatic Problems	-.32^{+}	-.51**	-.55**	-.24	-.44*
Anxious/Depressed	-.32^{+}	-.57**	-.16	-.15	-.31
Thought Problems	-.40*	-.60**	-.17	-.34^{+}	-.52**
Attention Problems	-.52**	-.63**	-.42*	-.48**	-.63**
Social Problems	-.36^{+}	-.54**	-.28	-.26	-.35^{+}
Sex Problems	-.31	-.40*	-.01	-.29	-.22
Other Problems	-.53**	-.72**	-.31	-.44*	-.42*
Internalizing Composite	-.34^{+}	-.63**	-.43*	-.22	-.43*
Externalizing Composite	-.34^{+}	-.64**	-.23	-.22	-.28

** $p < .01$; * $p < .05$; $^{+}p < .10$

Table 18.2

Correlations Between SP and CBCL Subscales (n = 28), continued

	SP Subscales continued			
CBCL Subscales	Poor Registration	Sensory Sensitivity	Sedentary	Fine Motor/ Perceptual[a]
Aggressive Behavior	-.45*	-.31	.11	-.31
Delinquent Behavior	-.47**	-.39*	-.12	-.10
Withdrawn	-.54**	-.34^{+}	-.16	-.31
Somatic Problems	-.37*	-.59**	-.26	-.47**
Anxious/Depressed	-.30	-45*	.11	-.32
Thought Problems	-.21	-.63**	-.10	-.58**
Attention Problems	-.45*	-.59**	.00	-.66**
Social Problems	-.44*	-.51**	.19	-.37^{+}
Sex Problems	-.43*	-.45*	-.19	-.34^{+}
Other Problems	-.58**	-.54**	-.02	-.47**
Internalizing Composite	-.44*	-.55**	-.06	-.43*
Externalizing Composite	-.49**	-.35^{+}	.04	-.26

Note: [a] Fine Motor/Perceptual: $n = 27$
** $p < .01$; * $p < .05$; $^{+}p < .10$

Table 19

Hierarchical Regression with CBCL Subscales as Dependent Variable and with BBADC Factors and SP/SHQ Subscales as Predictor Variables

CBCL Subscales	BBADC/SP	BBADC/SHQ
Aggressive Behavior	Executive Functioning*** (R^2 = .57)	Executive Functioning** (R^2 = .59) Touch$^+$
Delinquent Behavior	Executive Functioning*** (R^2 = .51)	Executive Functioning*** (R^2 = .51)
Withdrawn	Executive Functioning*** (R^2 = .34)	Executive Functioning*** (R^2 = .34)
Somatic Problems	Low Endurance** (R^2 = .44) Sensory Sensitivity*	Auditory$^+$ (R^2 = .22)
Anxious/Depressed	Sensory Sensitivity*** (R^2 = .32)	Negativity/Aggression*** (R^2 = .39)
Thought Problems	Sensory sensitivity** (R^2 = .36)	Muscle Tone** (R^2 = .51)
Attention Problems	Fine motor/perceptual** (R^2 = .23)	Executive Functioning** (R^2 = .71) Balance/Movement*
Social Problems	Executive Functioning*** (R^2 = .27)	Coordination* (R^2 = .51) Attention/behavior*
Sex Problems	Executive Functioning* (R^2 = .11)	Balance/movement** (R^2 = .38)
Other Problems	Poor Registration ** (R^2 = .52) Executive Functioning*	Executive Functioning*** (R^2 = .27)
Internalizing Composite	Sensory sensitivity*** (R^2 = .39)	Negativity/Aggression*** (R^2 = .83) Muscle tone*
Externalizing Composite	Executive Functioning*** (R^2 = .61)	Executive Functioning*** (R^2 = .61)

*** $p < .001$; ** $p < .01$; * $p < .05$; $^+p < .10$

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APPENDIX A
Beech Brook Attachment Disorder Checklist

Direction: Read each of the items below and circle the number that BEST describes how often your child does that behavior. If he/she usually does it (90% or more of the time), circle the 5. If he/she often does it (75% of the time), circle the 4. If he/she does it about half the time, circle the 3. If it is occasionally present (25% of the time), circle the 2. If it is rarely or never present (less than 10% of the time), circle the 1. DO NOT circle more than one number for each item, and make sure you circle a number for each item. DO NOT mark between the numbers. Please rate your child's behavior over the past two years, unless specifically asked to do otherwise for research purposes.

(0) never (1) rarely (2) occasionally (3) frequently (4) very frequently

1. The child seems to trust that his or her caretaker really cares for him or her.	0 1 2 3 4
2. The child seems to feel that his/her caretaker will continue to care for him/her no matter what.	0 1 2 3 4
3. The child typically hugs only when it is his/her idea, or when he/she has something to gain.	0 1 2 3 4
4. The child expresses affection, concern, or closeness to a family member or caretaker.	0 1 2 3 4
5. The child initiates positive interactions.	0 1 2 3 4
6. The child only acts affectionate if he/she is trying to avoid punishment or gain something (e.g., a privilege or a gift or permission to do something).	0 1 2 3 4
7. The child holds back and/or seems awkward when hugging (e.g., uses one arm or holds body stiff).	0 1 2 3 4
8. The child naturally sits close to a caretaker or a family member, or shows signs of affection.	0 1 2 3 4
9. Child clings to caretaker.	0 1 2 3 4
10. No matter what caretaker does for the child it is never enough.	0 1 2 3 4
11. The child demands attention when the caretaker is busy or paying attention to someone else.	0 1 2 3 4

12. The child steals outside the home.	0 1 2 3 4
13. The child asks for or accepts help or comfort from caretaker when ill, injured, frightened, or upset.	0 1 2 3 4
14. The child is fearful in new or strange situations.	0 1 2 3 4
15. The child is usually worried when separated from caretaker.	0 1 2 3 4
16. The child likes to be cuddled or hugged by caretaker or family members.	0 1 2 3 4
17. Caretaker feels "used" and is wary of the child's motives if affection is expressed.	0 1 2 3 4
18. The child has the "give and take" skills in a relationship (e.g., smiling in response to smiles, or matching mood, behavior, or rhythm to that of someone he/she is close to).	0 1 2 3 4
19. The child engages in persistent, meaningless chatter, or asks many nonsense questions, especially when the person he/she is talking to is busy.	0 1 2 3 4
20. The child makes eye contact during normal conversation.	0 1 2 3 4
21. The child tries to be the boss even when it may get him/ her in trouble.	0 1 2 3 4
22. The child lies even when the truth is obvious; not just to out of trouble.	0 1 2 3 4
23. The child seeks negative attention over positive.	0 1 2 3 4
24. The child steals from home or from household members.	0 1 2 3 4
25. The child sets fires.	0 1 2 3 4
26. The child openly destroys property of other household members.	0 1 2 3 4
27. The child hurts others.	0 1 2 3 4
28. The child seems unusually interested in themes of danger, violence, and death.	0 1 2 3 4

29. The child is cruel to animals.	0 1 2 3 4
30. The child can turn on the charm for strangers.	0 1 2 3 4
31. The child is friendly and affectionate with strangers.	0 1 2 3 4
32. The child creates special struggles over food.	0 1 2 3 4
33. The child threatens others.	0 1 2 3 4
34. The child makes eye contact when he/she is lying.	0 1 2 3 4
35. The child hurts himself/herself.	0 1 2 3 4
36. The child has an unusually high tolerance for pain.	0 1 2 3 4
37. Caretakers find themselves feeling more angry and frustrated with this child than with other children.	0 1 2 3 4
38. The child seriously hurts or kills animals.	0 1 2 3 4
39. The child destroys his/her own things.	0 1 2 3 4
40. The child learns from his/her mistakes.	0 1 2 3 4
41. The child increases aggravating behavior until it is dangerous or cannot be ignored.	0 1 2 3 4
42. Caretaker finds that things that work with other children in the household don't work with this child.	0 1 2 3 4
43. Household members become worried when things are going well with this child, knowing it is the "calm before the storm."	0 1 2 3 4
44. The child destroys property of other household members secretly when no one is looking.	0 1 2 3 4
45. The child is able to put himself/herself in someone else's shoes (see from another person's point of view).	0 1 2 3 4
46. The child is learning at the expected level.	0 1 2 3 4
47. The child's speech is odd or immature.	0 1 2 3 4

48. The child gets excessively angry or has temper tantrums over seemingly small things.	0 1 2 3 4
49. The child goes from one extreme to another in his/her view of others, thinking they are good (perfect) to thinking that they are bad (hateful).	0 1 2 3 4
50. The child avoids being alone.	0 1 2 3 4
51. The child draws pictures or tells stories in which he/she is left out or seems alone.	0 1 2 3 4
52. The child is more upset by change than other children his/her age.	0 1 2 3 4
53. The child expresses normal feeling like other children his/her age (e.g., smiling, crying).	0 1 2 3 4
54. The child gets into physical fights.	0 1 2 3 4
55. The child follows the caretaker's reasonable rules and requests.	0 1 2 3 4
56. The child seems to know what is right and wrong.	0 1 2 3 4
57. The child gets very upset when he/she cannot do things his/her own way.	0 1 2 3 4
58. the child distances himself/herself from others in relationships where closeness is expected (such as in a family).	0 1 2 3 4
59. Ignoring negative or aggravating helps the child stop doing them.	0 1 2 3 4
60. The child realizes that negative behaviors generally bring about unpleasant consequences.	0 1 2 3 4
61. The child seems to know exactly the negative behaviors the caretaker cannot stand ("button pushing").	0 1 2 3 4
62. The child admits fault when he/she makes a mistake.	0 1 2 3 4
63. Intense emotional or physical reactions are generated between caretaker and child during negative interactions (e.g., yelling or spanking).	0 1 2 3 4

64. After a negative interaction, a period of emotional distance, non-communication or avoidance of contact occurs.	0 1 2 3 4
65. How often do well-laid plans about how to handle chronic problems go out the window?	0 1 2 3 4
66. Patterns of difficult behavior are easily interrupted by improved communication or parenting techniques within the household.	0 1 2 3 4
67. Child blames the caretaker for a negative interaction rather than take responsibility for his/her own behavior.	0 1 2 3 4
68. Negative behaviors by the child follow situations where people usually feel close (like family parties).	0 1 2 3 4
69. The child takes credit when he/she does something well.	0 1 2 3 4
70. The child expresses sorrow or guilt after he/she has damaged property or he/she has hurt people or animals.	0 1 2 3 4
71. Caretaker feels intensely rejected by this child.	0 1 2 3 4
72. The child can maintain friendships over time.	0 1 2 3 4

APPENDIX B

Sensorimotor History Questionnaire for Parents of
Elementary-School-Age Children

I. Touch (Tactile)

1. Overreacts to physically painful experiences. Yes____ No____

2. Under reacts to physically painful experiences. Yes____ No____

3. Avoids messy activities. Yes____ No____

4. Craves messy activities. Yes____ No____

5. Dislikes being touched especially unexpectedly; becomes irritated when crowded and isolates self from others. Yes____ No____

6. Craves being touched. Yes____ No____

7. Seeks out physically aggressive contact (roughhousing, crashing into walls or people). Yes____ No____

8. Is excessively ticklish. Yes____ No____

9. Avoids using hands for prolonged periods of time or for examining objects thoroughly. Yes____ No____

II. Balance and Movement (Vestibular/Proprioceptive)

1. Has poor balance. Yes____ No____

2. Has difficulty going up and down stairs or hills. Yes____ No____

3. Often rocks in chair or assumes an upside-down position. Yes____ No____

4. Often props head in hands while reading or writing. Yes____ No____

5. Seems fearful in space (e.g., swing, seesaw, heights). Yes____ No____

6. Is afraid of, or avoids, vigorous, fast-moving activities at the playground (bouncing, swinging, balancing, or spinning). Yes____ No____

7. Seems sensitive to movement, getting dizzy or seasick. Yes____ No____

8. Prefers fast-moving or spinning activities, perhaps not getting dizzy or seeming less sensitive than most children to the effects. Yes____ No____

III. Coordination

1. Has difficulty with manual skills (scissors, crayons, pencils, buttons) and/or with handwriting. Yes____ No____

2. Seems clumsy and accident-prone, frequently falling and tripping, perhaps not catching self easily. Yes____ No____

3. Has difficulty learning new movement activities and/or dislikes trying them. Yes____ No____

4. Was slow to show a clear hand preference or is not yet clearly right-or left- handed. Yes____ No____

5. Must be reminded to hold paper while writing. Yes____ No____

6. Uses extraneous movements during physical activity (e.g., sticks out tongue, moves jaw, clenches fists). Yes____ No____

IV. Muscle Tone

1. Appears stiff and rigid. Yes____ No____

2. Appears loose and floppy. Yes____ No____

3. Has poor standing and/or sitting posture. Yes____ No____

4. Grasps objects too tightly. Yes____ No____

5. Grasps objects too loosely. Yes____ No____

6. Tires easily. Yes____ No____

IV. Hearing (Auditory)

1. Is frightened or irritated by loud noises. Yes____ No____
2. Is very sensitive to background sounds. Yes____ No____
2. Has difficulty paying attention amid surrounding noise. Yes____ No____
4. Often shouts or speaks in a loud voice. Yes____ No____
5. Frequently makes repetitive noises or sounds. Yes____ No____
6. Fails to follow through on verbal requests. Yes____ No____
7. Needs directions repeated. Yes____ No____
8. Confuses spoken words (e.g., bear/ hair). Yes____ No____
9. Misses some sounds. Yes____ No____

VI. Sight (Visual)

1. Appears sensitive to light, preferring dark or dim lighting. Yes____ No____
2. Has difficulty discriminating shapes or colors. Yes____ No____
3. Has difficulty keeping eyes on objects. Yes____ No____
4. Cannot follow a moving object or line of print smoothly with eyes; loses place. Yes____ No____
5. Often squints, rubs eyes, gets headaches or watery eyes after reading. Yes____ No____
6. Becomes excited with a lot of visual stimuli. Yes____ No____
7. Resists having vision blocked. Yes____ No____
8. Reverses or confuses numbers, letters, or whole words. Yes____ No____

9. Has difficulty with written instructions. Yes____ No____

10. Has difficulty copying from blackboard or books. Yes____ No____

VII. Smell (Olfactory)

1. Is overly sensitive to certain smells. Yes____ No____

2. Ignores noxious odors. Yes____ No____

3. Has difficulty discriminating odors. Yes____ No____

VIII. Attention and Behavior

1. Is restless or fidgety. Yes____ No____

2. Is impulsive, often jumping up before instructions are given. Yes____ No____

3. Has difficulty organizing or structuring activities. Yes____ No____

VITA

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ABSTRACT

THE EFFECTS OF MATERNAL DEPRIVATION
ON PROBLEM BEHAVIOR IN POST-INSTITUTIONALIZED CHILDREN

by Jacquelyn Sue Pennings, M.S., 2005
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Children adopted from institutions may experience serious behavior problems once placed with their adoptive families. The current research seeks to illuminate this process by addressing two questions: 1) Do attachment and sensory integration mediate the impact of maternal deprivation on child behavior problems? and 2) Do attachment and sensory integration make independent contributions to the prediction of behavior problems in post-institutionalized children? Data were collected as part of a therapeutic summer camp for children (N = 49) adopted from institutions in other countries. Results indicate that attachment did weakly mediate the impact of maternal deprivation on child behavior problems. Further, we found attachment and sensory integration problems independently predicted child behavior problems. Mechanisms, limitations and ideas for future research are discussed.