ATTACHMENT DISTURBANCES AND ATTACHMENT REPRESENTATIONS

IN AT-RISK ADOPTED CHILDREN

by

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According to attachment theory (Bowlby, 1969/1982, 1973, 1980), in a secure

parent-infant dyad, the parent responds to the child's needs in a consistent, sensitive manner.

Through these interaction patterns, the child develops expectations about the attachment

figure and generalizes these expectations onto future relationships. Children with a history

of institutionalization or maltreatment could be deprived of these essential early interaction

patterns with a consistent caregiver (Gunnar, 2001; Zeanah, 2000). This might lead to

attachment disturbances as reflected in both attachment disordered behavior and internal

representations of attachment. However, although children with a history of maternal

deprivation are thought to be at-risk for difficulties in attachment behavior, there is debate

over how to assess potential attachment disorders (O'Connor & Zeanah, 2003; Zeanah &

Boris, 2000). In addition, little is known about these children's underlying representational

models of attachment.

Attachment Disturbances in Maternally Deprived Children

Adopted children who have a history of institutionalization or deprivation are at

increased risk for attachment-related disturbances that can persist long after placement with

an adoptive family (Gunnar, 2001). Attachment disturbances in maternally deprived children

have been documented using both a developmental perspective and a clinical perspective

(Zeanah, 2000). Studies approaching attachment from a developmental perspective typically

look at classification type (secure, insecure/avoidant, insecure/ambivalent, disorganized) as

formulated by Ainsworth and as commonly assessed using the Strange Situation (Ainsworth,

Blehar, Waters, & Wall, 1978). As might be expected, using this developmental framework,

maternally deprived children are at risk for insecure attachment. Chisholm and colleagues (Chisholm, 1998; Chisholm, Carter, Ames, & Morison, 1995) reported that children adopted from Romanian orphanages exhibited more insecure patterns of attachment and significantly more atypical attachment behavior, thought to reflect more serious attachment disturbances. In a study of currently-institutionalized children in Romania, only 18.9 percent were rated as securely attached using Ainsworth's Strange Situation with a "favorite" caregiver, compared to 74 percent of non-institutionalized children in a comparison group (Zeanah, Smyke, Koga, Carlson, & the Bucharest Early Intervention Project Core Group, 2005). Overall, only 22 percent of institutionalized children had an organized attachment pattern of behavior (i.e. secure, insecure/avoidant, insecure/ambivalent), compared to 78 percent of non-institutionalized children. Disturbingly, 12.6 percent of the institutionalized children engaged in behavior so unrecognizable in terms of attachment that it could not even be classified as disorganized attachment style and was instead coded as unclassifiable. Similarly, Marcovitch et al. (1997) found a much lower incidence of secure attachment in post-institutionalized Romanian children adopted into Canadian families than in a comparison group (30 percent versus 42 percent in the comparison group). Surprisingly, avoidant attachment, the most common type of insecure attachment seen in most normative samples, was not observed at all.

Of potentially greater consequence, children with histories of maternal deprivation are at very high risk for disorders of attachment, especially disorders of nonattachment (Chisholm, 1998; O'Connor, Bredenkamp, Rutter, & the English and Romanian Adoptees Study Team, 1999; Tizard & Rees, 1975; Zeanah, 2000; Zeanah & Boris, 2000). Using clinical diagnostic criteria, two types of Reactive Attachment Disorder (RAD) can be

identified, Disinhibited and Inhibited (Diagnostic and Statistical Manual of Mental Disorders 4th ed. [DSM-IV], American Psychiatric Association, 1994; International Classification of Diseases 10th ed. [ICD-10], World Health Organization, 1992). Children with Disinhibited Type show diffuse attachments characterized by indiscriminate sociability or failure to show selectivity in attachment figures. Children with Inhibited Type persistently fail to initiate and respond to social interactions in appropriate ways. Institutionally-reared children appear to be at risk for both types of RAD (Zeanah et al., 2005). Disinhibited seems to be much more common, but this could reflect a limitation with the manner in which the two types are typically measured (O'Connor, Rutter, and the English and Romanian Adoptees Study Team, 2000; Zeanah, 2000).

Indiscriminate sociability, a central feature of disinhibited attachment disordered behavior in which the child seeks comfort and social interaction from any person without preference for a specific caregiver, is widely reported in post-institutionalized children (Groark, Muhamedrahimov, Palmov, Nikiforova, & McCall, 2005; O'Connor et al., 1999; Tizard & Rees, 1975). However, Chisholm (1998) reported that although indiscriminate sociability was more common in children with insecure attachments, it also occurred in securely attached children. Marcovitch et al. (1997) also reported indiscriminate sociability in children otherwise classified as secure. In addition, Zeanah (2000) suggests that after adoption, indiscriminate sociability and attachment might follow different trajectories, which could indicate that indiscriminate sociability is not a reflection of disordered attachment as previously thought. Thus, there is evidence to suggest that, at least in post-institutionalized children, indiscriminate sociability does not fit into the clinical schema of RAD.

Because of questions regarding the place of indiscriminate sociability in attachment disorder and other discrepancies between clinical critieria and developmental findings, there has been substantial debate regarding the nosology of attachment disorder. Zeanah and colleages have proposed an alterative classification scheme to the clinical criteria found in the DSM-IV and ICD-10 (Lieberman & Zeanah, 1995; O'Connor & Zeanah, 2003; Zeanah, 1996; Zeanah & Boris, 2000; Zeanah, Smyke, & Dumitrescu, 2002). The alternative criteria, which consist of three types of attachment disorder, relies more heavily on findings from developmental literature rather than on clinical literature. Zeanah's alternative classification system maintains disorders of nonattachment similar to the DSM-IV and ICD-10 criteria, in which the first type is nonattachment with emotional withdrawal and the second type is nonattachment with indiscriminate sociability. However, Zeanah adds a second type of disordered attachment, secure-base distortions, in which the child has a preferred attachment figure, but the relationship with this attachment figure is seriously disturbed in ways specific to this relationship. Types of secure-base distortions include self-endangerment, clinging/inhibited exploration, vigilance/hypercompliance, and role reversal. Finally, Zeanah adds a third type of attachment disorder, disrupted attachment disorder, in which the child experiences the sudden loss of the attachment figure. Despite debate over the appropriate criteria for attachment disorder, there is generally a consensus that disordered attachment behavior exists and is likely linked to maltreatment (O'Connor et al., 2000; Zeanah, 2000).

A limitation commonly cited in both clinical and developmental studies of attachment disorder in post-institutionalized children is the lack of a sensitive, standardized measure of attachment disorder (e.g., O'Connor et al., 1999; Zeanah & Boris, 2000). Although a few of the widely-used measures of attachment classification have been adapted

to evaluate attachment disorder (e.g., the Strange Situation [Ainsworth et al., 1978] in infants and the Adult Attachment Interview [Main, Kaplan, & Cassidy, 1985] in adults), few measures have been designed for the specific purpose of assessing attachment disturbances. Those designed for assessing attachment disturbances include the Randolph Attachment Disorder Questionnaire (RADQ; Randolph, 1997), The Reactive Attachment Disorder (RAD) Scale (Minnis, Rabe-Hesketh, & Wolkind, 2002), and the Beech Brook Attachment Disorder Checklist (BBADC; Hussey, Moss, Weinland, & Lester, 1997). Although commonly used, the validity of the RADQ has come under question (Cappelletty, Brown, & Shumate, 2005). The RAD Scale, though efficient and appropriate for a wide age range, is not widely used and does not appear to sufficiently differentiate between attachment-related symptoms (Minnis et al., 2002). The BBADC is efficient and appropriate for a wide age range, and although it appears promising, little is known about its validity.

Attachment Representations

Although the case for disturbances in attachment behavior in maternally deprived children is strong, little is known about these children's underlying representational models of attachment. A central tenet of attachment theory involves what Bowlby (1969/1982, 1973, 1980) termed the "inner working model." According to Bowlby, a child's early experiences with key attachment figures contribute to an increasingly complex working model of the world and of the self within it. These representations guide behavior and cognitive and affective processes, influencing future expectations and experiences and shaping later socio-emotional interactions (Bowlby, 1980; Bretherton, 1985; Kirsh & Cassidy, 1997; Main et al., 1985).

Early maternal separation, deprivation, and maltreatment are likely to severely disrupt the ongoing development of the young child's attachment representations (Bowlby, 1973; Bretherton, 1992; O'Connor et al., 1999). Although this conclusion might seem readily apparent and is supported by research demonstrating problems in attachment-related behaviors (Chisholm, 1998), there is a dearth of empirical studies that actually assess representations of attachment in children with histories of deprivation. Differentiating between attachment behavior and attachment representations is not just an issue for this population. Rather, many attachment researchers have stressed the importance of looking beyond observable attachment behavior to the underlying mental representations (Bretherton, 1985; Main et al., 1985). This is especially important in studies with older children, in which mental representations can be assessed more easily than in younger children. In addition, as attachment becomes increasingly internalized with age and attachment behavior becomes less readily apparent, attachment representations could provide more valuable information than attachment behavior (Oppenheim & Waters, 1995).

Despite a shortage of studies examining attachment representations in maternally deprived children, much can be learned from studies with maltreated children. Not surprisingly, children's narratives reveal that maltreated children have more negative representations of maternal figures and of self (Toth, Cicchetti, Macfie, & Emde, 1997) and fewer positive representations of parents and of self (Toth, Cicchetti, Macfie, Maughan, & Vanmeenen, 2000) than non-maltreated children. Representations also seem to vary by the type of maltreatment children experience, with physically abused children showing the most negative maternal representations and neglected children showing the least positive self-representation when compared with non-maltreated children, physically abused children,

and sexually abused children (Toth et al., 1997). Interestingly, Toth and colleagues (2000) found that maltreated children not only had more negative self representations but more representations of a grandiose self, suggesting multiple, incompatible representations of the self and a possible link to disorganized attachment behavior. Thus, the representations of maltreated children, and possibly other at-risk adopted children, might not only be more negative than those of other children, but more complex.

Children with a history of maltreatment might carry their negative representational model of self and others into future relationships, thus increasing the likelihood of future maladaptive relationships (Toth et al., 1997). The potential for children to generalize negative representations onto other relationships can be seen in the representations previously maltreated children have of their adoptive parents. Hodges and Steele (2000) reported that, in play narratives, children with a history of maltreatment were more likely to show thematic elements of parents unaware of children's distress than were comparison children. For children adopted after maltreatment, many negative themes, such as extreme aggression and adult injury or death, actually increased from the initial assessment soon after placement with an adoptive family to the follow-up one year later. This could suggest an increase in coherence reflecting the children's developing ability to mentally represent these negative events, whereas during the initial assessment many of these children refused to engage in play narratives at all. Encouragingly, though, positive themes, such as children seeking help and adults providing help, also increased during the first year. Thus, it appears that negative internal representations do not disappear, but that alternative, positive internal working models can develop and eventually dominate the earlier negative representations.

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Most measures of attachment rely on observations of behavior, such as Ainsworth's Strange Situation (Ainsworth et al., 1978) or the Attachment Q-Sort (Waters & Deane, 1985). However, as attachment research shifts focus to periods of development beyond infancy and to conceptualizations of attachment beyond behavior, the need for assessments that capture internal working models become necessary. By middle childhood, observable attachment behavior might be less evident and attachment representations might be more relevant. However, children could still be too young for techniques measuring adult attachment representations, such as the Adult Attachment Interview (Main et al., 1985). Asking direct questions about attachment experiences could cause too much anxiety, especially in children with a history of negative caregiver interactions. Self report measures could be limited by the cognitive capacity or social experiences of the child (Toth et al., 2000). Thus, innovative assessments are necessary in order to access children's mental representations. Many of these are narrative in nature (Oppenheim & Waters, 1995) and can take the form of a conversation between parent and child (Main et al., 1985), an interview (Steele & Steele, 2005), or a story completion task (Green, Stanley, Smith, & Goldwyn, 2000; Page, 2001). Narratives, however, can be limited by the verbal abilities of the child (Oppenheim & Waters, 1995). In addition, procedures such as doll-play might be more developmentally appropriate for pre-school-aged children than for older children (Ammaniti, van Ijzendoorn, Speranza, & Tambelli, 2000).

Drawings provide an alternative method of assessing attachment representations (Fury, Carlson, & Sroufe, 1997). Children might be able to express emotions through drawings that they are unable to communicate or feel uncomfortable expressing verbally (Furth, 1988; Fury et al., 1997). Drawings can provide an outlet for the unconscious and for

emotional memory (Furth, 1988). Children's drawings have long been used in clinical

settings as a projective measure thought to represent the psychological state and subjective

experiences of the artist (Malchiodi, 1998). Children's drawings have been used to assess

personality and intelligence (Koppitz, 1968), psychopathology (Wester, 1967), emotional

disturbances (DiLeo, 1983; Koppitz, 1968), perceptions of interpersonal relationships

(Burns & Kaufman, 1972), as evidence of trauma and maltreatment (Veltman & Browne,

2002), and as a therapeutic intervention for emotional problems (Malchiodi, 1998).

However, less is known about the use of drawings to shed light on children's inner working

model.

Kaplan and Main were the first to suggest that children's drawings could be useful

for assessing attachment representations (as cited in Fury et al., 1997). In 1985, Kaplan and

Main constructed a coding system that could classify family drawings for the purpose of

assessing attachment representations, but did not publish the classification system. An

analysis of the psychometric properties of Kaplan and Main's unpublished family drawing

classification system conducted with 200 kindergarteners provided preliminary support for

the reliability and validity of the system (Pianta, Longmaid, & Ferguson, 1999). In addition,

Pianta and colleagues' study found relationships between drawings and concurrent measures

of social-emotional and behavior functioning. However, the study did not examine Family

Drawings with attachment behavior.

Using a modified version of Kaplan and Main's scoring system, Fury et al. (1997)

found a significant association between attachment classification in Ainsworth's Strange

Situation at 12 and 18 months and attachment classification on Family Drawings at eight

years of age. Though drawings were assessed using individual signs, such as omission of

mother and exaggeration of heads, aggregates of these signs yielded the most significant results in terms of attachment classification based on the drawings. Even independent of IQ, emotional functioning, and stress, attachment history predicted negative drawings among a group of high-risk, racially diversified children.

Using Fury and colleagues' (1997) coding schema, Madigan, Ladd, and Goldberg (2003) found an association between infant attachment style and later attachment representations in a sample of low-to-moderate-risk children. The subjective, global ratings from Fury and colleagues' schema distinguished attachment groups, but few specific markers from Fury et al. or from a clinical coding schema distinguished attachment groups, thus providing support for the efficacy of global ratings over specific markers. Further supporting the association between attachment behavior and Family Drawings, Madigan, Goldberg, Moran, and Pederson (2004) demonstrated that even naïve observers were able to distinguish Family Drawings produced by children with disorganized attachment history from drawings produced by children with organized (secure, insecure/ambivalent, and insecure/avoidant) attachment histories. In particular, the drawings of children with a history of disorganized attachment evoked fewer positive emotion labels and more negative emotion labels than the drawings of children with a history of organized attachment. In addition, the drawings of children with disorganized attachment histories were given higher ratings for disorganization, carelessness, family chaos, bizarreness, uneasiness, and dysfunction, suggesting that Family Drawings are not only valuable in predicting attachment style, but that global features of the drawings can distinguish children with a disorganized attachment history, even in the absence of trained coders.

A recent study utilizing a modified version of Fury and colleagues' coding schema revealed that certain specific markers (known as Quantitative Indicators) and global ratings differentiated at-risk adopted children from a comparison sample of non-adopted children (Purvis, Cross, Razuri, et al., 2006). The Quantitative Indicators found to distinguish between the two groups included presence/absence of self, presence/absence of mother, number of colors used, proximity between self and mother, mother's facial details, mother's body details, self facial details, and self body details. In addition, seven global ratings scales differed significantly between at-risk adopted and non-adopted comparison children. These global ratings included two positive scales (Vitality/Creativity and Family Pride/Happiness) and five negative scales (Vulnerability, Emotional Distance/Isolation, Tension/Anger, Bizarreness/Dissociation, and Global Pathology).

Attachment-Based Interventions

Because children with histories of deprivation and/or maltreatment are at-risk for attachment-related problems, attachment-based interventions are often necessary. Although there is a paucity of research regarding effective interventions, research on interventions is becoming increasingly necessary (Gunnar, Bruce, & Grotevant, 2000; Zeanah & Boris, 2000). A unique attachment-based intervention targeted caregivers in Russian orphanages (Groark et al., 2005). Before intervention, the caregivers were detached from the children, engaged in little social interaction, and were not responsive to children's behaviors. The children, in turn, showed little interest in visitors and frequently exhibited aggression, avoidant behaviors, or indiscriminant friendliness. After an intervention designed (1) to train caregivers to be warm and responsive to children and (2) to change the structure of the orphanage to promote relationships between children and caregivers, caregiver interactions

with the children were characterized by smiling, talking, responsivity, and sensitivity to children's needs. Children engaged in fewer aggressive interactions, laughed more, and were more affectionate towards caregivers. Older children engaged in more positive attachment behaviors, such as making eye contact and a decrease in indiscriminate friendliness.

In addition, work from our lab has yielded promising findings suggesting that adopted children with histories of deprivation or maltreatment might respond to attachment-based intervention. In particular, our lab has documented spontaneous emergence of attachment behavior (Purvis & Cross, 2006) and improvements in socio-emotional functioning (Cross, Razuri, Herbert, & Purvis, 2006; Purvis & Cross, in press), after participation in a therapeutic summer camp. Thus, although future study is needed, data thus far suggest that attachment behavior in institutionalized and at-risk adopted children can improve after appropriate intervention.

Perhaps because the efficacy of an intervention is typically evaluated by observable behavior, there is a lack of research examining the effects of intervention on representational models of attachment in at-risk adopted children. However, Toth and colleagues (2002) suggest that, for maltreated children, instability in children's representations of their caregivers following adoption might provide a "window of opportunity" for intervention. Support for this potential opportunity for intervention can be seen in Toth's finding that maltreated children exposed to an attachment-based intervention showed decreases in maladaptive representations of the mother and negative representations of the self and increases in positive maternal representations. When compared to maltreated children exposed to other, non-attachment-based interventions and to non-maltreated children not

exposed to intervention, children exposed to attachment-based interventions made the most progress.

Purpose

Given that there is a paucity of information regarding effective assessments of attachment disordered behavior and attachment representations in at-risk adopted children, the first purpose of the current study is to assess the validity of the BBADC and Family Drawings in order to evaluate the use of these measures for assessing attachment representations and attachment disordered behavior, respectively. This study provides a valuable evaluation of the BBADC, a measure about which little is known. In addition, to our knowledge, this is the first study evaluating the use of Family Drawings as attachment representations in a sample of at-risk adopted children. This study also appears to be the first study associating Family Drawings with a concurrent measure of attachment in any sample. Given that previous work has shown that Family Drawings are related to attachment behavior during infancy (Fury et al., 1997; Madigan et al., 2003), it is expected that Family Drawings will correlate with scores on the BBADC. In particular, it is expected that markers on Family Drawings previously found to distinguish between at-risk adopted and non-adopted children (Purvis, Cross, Razuri, et al., 2006) will correlate with the four factors previously identified on the BBADC (Howard, Cross, Purvis, Schwalm, & Razuri, 2006) such that: (1) positive Quantitative Indicators (e.g. use of color, short proximity between self and mother) will correlate with the positive factors on the BBADC (i.e. Executive Functioning, Affection/Attachment), (2) negative Quantitative Indicators (e.g. lack of detail) will correlate with the negative factors on the BBADC (i.e. Machiavellianism, Aggression/Anxiety), (3) positive Global Ratings (i.e. Family Pride, Vitality) will correlate

with the positive factor on the BBADC, and (4) negative Global Ratings (e.g. Global Pathology, Bizarreness) will correlate with the negative factors on the BBADC.

The current study will further evaluate Family Drawings and the BBADC by validating both against the CBCL, a widely used and well-validated measure of childhood behavior (Achenbach, 1991). Given that the BBADC and the CBCL are both parent-report measures of children's behavior and that previous research has linked attachment histories with behavioral problems (Erickson, Sroufe, & Egeland, 1985), scores on the BBADC and CBCL are expected to correlate such that (1) positive BBADC factors will correlate negatively with CBCL subscales and (2) negative BBADC factors will correlate positively with CBCL subscales. Given that Family Drawings are expected to capture underlying mental representations of attachment that manifest in behavior, Family Drawings and the CBCL are also expected to correlate such that (1) positive Global Ratings and Quantitative Indicators will correlate negatively with CBCL subscales and (2) negative Global Ratings and Quantitative Indicators will correlate positively with CBCL subscales.

The second purpose of the current study is to examine the efficacy of a therapeutic summer camp on changing representations of attachment as measured by Family Drawings and on changing attachment disordered behavior as measured by the BBADC. To our knowledge, the effectiveness of intervention on changing scores on Family Drawings and the BBADC has not been reported. In addition, the effectiveness of intervention on changing representational models of attachment in at-risk adopted children in general has not been studied. Given that the camp intervention has previously demonstrated efficacy in improving a range of socio-emotional functioning (Cross et al., 2006; Purvis & Cross, 2006; Purvis & Cross, in press), it is expected that negative attachment behavior will decrease after camp

and positive attachment behavior will increase after camp. However, given that Family

Drawings should assess the underlying mental representations associated with attachment

behavior, and that these representations are thought to be a relatively stable construct

resistant to change (Ammaniti et al., 2000; Bowlby, 1969/1982), it is unknown whether a

relatively short intervention will be sufficient to change attachment representations.

Method

Participants

Participants consisted of 48 adopted children attending a therapeutic summer camp for

special needs adopted children and their mothers. Beginning in 1999, data were collected for

five years. The range of ages was 4 to 13 years with a mean age of 8 years. Participants

included 25 males and 23 females. Among these, 39 of the children were adopted

internationally and had spent time in institutions and 9 of the children were adopted

domestically. All of the children had histories of neglect and/or abuse and were considered

at risk for serious behavior disorders.

Summer Camp

Participants attended camp daily from 8:30 a.m. to 4:00 p.m. Monday through Friday for

three to five weeks during the summer. The daily schedule was organized around the goals

of creating an attachment-rich, behaviorally-structured, and sensory-rich environment.

Attachment-based principles such as responsiveness and warmth were at the core of the

intervention. Therapeutic activities related to attachment included daily "attachment rituals"

between children, parents, and camp buddies, "stranger practice" scripts designed to

reinforce the attachment ritual by giving children the opportunity to operationalize and

internalize behavioral scripts for dealing with strangers, and a nurture group designed to

build trust in the context of playful interaction. Camps were held for five consecutive summers. The camp activities and child-to-staff ratio remained consistent across the five years of camp. However, because the number of children participating in camp varied from year to year, the amount of time each child spent with the head facilitator also varied from year to year. The camp program has been described in further detail elsewhere (e.g. Purvis, 2003; Purvis & Cross, 2002).

Procedure

For the BBADC, mothers of children attending the summer camp were asked to fill out the questionnaire, which requires the mother to think about how this child compares to other children his/her age and check the frequency that most applies to the child's behavior during the past three months. Similarly, mothers filled out the CBCL regarding children's behavior over the past six months. For Family Drawings, children attending the summer camp were individually tested in a testing room of a speech and hearing clinic. The experimenter gave each child a variety of colored paper and pencils to choose from, then invited the child to draw a picture of her family in any way and take as much time as needed. Tests were administered by a trained doctoral student with whom the children were already familiar. Testing was done approximately 10 days before camp started and repeated within 4 weeks of the end of the summer camp. For children attending camp for more than one summer, only data from their first summer were used.

Assessments

BBADC. Attachment disturbances were assessed using the BBADC, a 72-item caregiver-report measure of childhood attachment (Hussey et al., 1997). The BBADC measures both positive and negative aspects of attachment. For example, a positive

attachment item is, "the child likes to be cuddled or hugged by caretaker or family members." An example of a negative attachment item is, "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)." Frequency choices range from (0) "never" to (4) "very frequently" on a five-point scale. The current study utilized the four factors (Machiavellianism, Affection/Attachment, Aggression/Anxiety, and Executive Functioning) previously identified on the BBADC (Howard et al., 2006). The Machiavellianism factor includes items such as, "the child can turn on the charm for strangers." The Affection/Attachment factor includes items such as, "the child naturally sits close to a caretaker or a family member, or shows signs of affection." The Aggression/Anxiety factor includes items such as, "the child is more upset by change than other children his/her age." The Executive Functioning factor appears to capture executive functioning mainly in social contexts and includes items such as, "the child is able to put himself/herself in someone else's shoes (see from another person's point of view)." A complete list of BBADC items that loaded onto each factor is found in Appendix A.

 Family Drawings. Drawings in the current study were scored using a modified version of Fury and colleagues' (1997) coding system that included objective scoring based on specific features of the drawing and subjective ratings based on global characteristics of the drawing. The Fury et al. system has been used successfully in other studies (e.g., Madigan et al., 2003; Pianta et al., 1999). Two experimenters scored each drawing and one in five drawings was checked to ensure reliability. For the purposes of the current study, only those Quantitative Indicators and Global Ratings previously shown to differentiate

between at-risk adopted and non-adopted children were used (Purvis, Cross, Razuri, et al., 2006).

Quantitative Indicators refer to objective, discrete markers thought to differentiate the drawings of children with different attachment histories. The current study used a modified version of the checklist of specific drawing signs used by Fury et al. (1997). Guidelines for scoring Quantitative Indicators are specific and objective. For example, for color, the coder counts the total number of colors used on the drawing. For proximity, the coder records the distance between self and mother in centimeters. A complete description of Quantitative Indicators used in the current study is found in Appendix B.

Global Ratings take into account the raters' overall impression of the drawing, with a focus on context and the aggregation of specific signs. The use of Global Ratings has been well supported in the literature and is thought to provide more valuable information than the use of specific signs alone (Fury et al., 1997; Madigan et al., 2003; Pianta et al., 1999.). A rating scale made up of seven global features in Family Drawings was adapted from Fury et al. The global features used in the current study consist of two positive scales: Vitality/Creativity (e.g. embellishment demonstrating child's emotional investment) and Family Pride/Happiness (e.g. drawing reflects child's sense of belonging within the family) and five negative scales: Vulnerability (e.g. child draws self very small in relation to other figures), Emotional Distance/Isolation (e.g. disguised expressions of negative affect), Tension/Anger (e.g. scratch-outs, scribbles), Bizarreness/Dissociation (e.g. hollow eyes, floating heads or bodies), and Global Pathology (e.g. overall negativity as seen in organization, completeness, use of color). In the current study, each drawing was rated on a

three-point scale for each global feature, from (1) "no evidence of the feature," to (2) "moderate evidence of the feature," to (3) "significant evidence of the feature."

CBCL. Behavior was assessed using the CBCL, a 113-item other-report (caregiver or teacher) measure of behavioral and psychological problems in children (Achenbach, 1991; Achenbach & Dumenci, 2001; Achenbach, Howell, Quay, & Conners, 1991). The CBCL measures both internalizing and externalizing behavior. Internalizing behavior is captured with three subscales: Withdrawn Behavior (e.g. would rather be alone), Somatic Complaints (e.g. nausea), and Anxious/Depressed Behavior (e.g. loneliness). Externalizing behavior is captured with two subscales: Delinquent Behavior (e.g. cheating) and Aggressive Behavior (e.g. teasing). Four remaining subscales consist of Social Problems (e.g. clingy), Thought Problems (e.g. repeats behavior), Attention Problems (e.g. daydreams), and Other Problems (e.g. wets the bed, does not eat). The assessment yields a total score, a composite score for Internalizing and Externalizing scales, and scores for each of the subscales. Ratings are given on a three-point scale ranging from (0) "not true (as far as you know)" to (1) "somewhat or sometimes true" to (2) "very true or often true" The CBCL is appropriate for use with children aged 4 to 18 years (Achenbach, 1991; Heflinger, Simpkins, & Combs-Orme, 2000).

<div align="center">Results</div>

The results are presented in two parts, corresponding to the two research purposes previously listed. In the first part, descriptive statistics and correlations are presented in order to examine the validity of the BBADC and Family Drawings. In the second part, changes in scores and predictors of these changes on the BBADC and Family Drawings from pre-test to post-test are presented in order to examine the effects of the camp

intervention. Because not every parent and child completed every measure at both Time 1 and Time 2, each analysis includes the total number of participants who completed the particular assessment(s) of interest. Thus, not all analyses include all 48 parent/child pairs who took part in this study. In addition, sample sizes on many of the Family Drawings Quantitative Indicators are reduced because not all drawings could be coded for every sign. For example, if a child omitted his mother on his drawing, the drawing cannot be included in analyses examining detail on the mother's face. The actual samples sizes are listed in the appropriate tables.

Descriptive Statistics. Before the camp intervention, the mean scores on the four factors of the BBADC suggest that children in the current sample are at-risk for disturbances in attachment-related behavior. In particular, the mean score for Machiavellianism suggests that children engage in this type of negative behavior "occasionally" to "frequently." The mean score for Executive Functioning suggests that children only display behavior indicative of executive functioning "rarely" to "occasionally". Sample means and standard deviations for all BBADC factors are found in Table 1.

Table 1

Mean BBADC Factor Scores

Factor	Pre-Test	Post-Test
Machiavellianism	2.31	1.91
n = 31	(.97)	(.81)
Affection	2.39	2.73
n = 34	(.91)	(.72)
Aggression	1.14	.90
n = 34	(.78)	(.54)
Executive Functioning	1.76	2.18
n = 34	(.67)	(.71)

Note: Standard deviations are in parentheses.

Mean scores on the Global Ratings scales at Time 1 suggest that children in the current sample have high occurrences of negative global features and low occurrences of positive global features in their drawings. Scores for the negative global features suggest that children in the current sample display "moderate" to "significant" evidence of each of these features. Correspondingly, mean scores on the positive global features suggest that children display "none" to "moderate" evidence of these features. Although the Quantitative Indicators do not have corresponding anchor points, comparison of the current group of children with a sample of participants not at risk for attachment related disturbances who were evaluated in a previous study (Purvis, Cross, Razuri, et al., 2006) suggests that the drawings of children in the current sample had less color and detail, more proximity between

self and mother, and more frequent omissions of self and mother than the drawings of other children. Descriptive statistics for Global Ratings and Quantitative Indicators are found in Tables 2, 3, and 4.

Table 2

Mean Family Drawings Global Ratings Scale Scores (n = 37)

Scale	Pre-Test	Post-Test
Vitality	1.84	1.58
	(.64)	(.61)
Family Pride	1.60	1.62
	(.61)	(.55)
Vulnerability	2.50	2.43
	(.52)	(.53)
Isolation	2.34	2.32
	(.53)	(.50)
Anger	2.14	2.22
	(.48)	(.49)
Bizarreness	2.39	2.45
	(.46)	(.44)
Global Pathology	2.37	2.60
	(.52)	(.44)

Note: Standard deviations are in parentheses.

Table 3

Mean Family Drawings Quantitative Indicators Scores

Indicator	Pre-Test	Post-Test
Mother Face Detail	2.89	3.89
n = 27	(1.31)	(1.05)
Self Face Detail	2.93	3.93
n = 29	(1.33)	(1.0)
Mother Body Detail	4.12	3.42
n = 26	(2.27)	(2.01)
Self Body Detail	3.93	3.67
n = 29	(2.10)	(1.97)
Color	2.08	1.30
n = 37	(2.60)	(1.85)
Mother Proximity	8.41	8.10
n = 22	(4.68)	(4.62)

Note: Standard deviations are in parentheses.

Table 4

Frequency of Presence of Mother and Self in Family Drawings (n = 37)

Indicator	Pre-Test	Post-Test
Mother Present	27	28
Self Present	29	29

Pre-camp scores on the CBCL suggest that children in the current sample are at-risk for behavioral problems. Overall, 58.3 percent of the children had Internalizing behaviors in the borderline or clinical range. Even more striking, 72.2 percent of the children had Externalizing behaviors in the borderline or clinical range. Table 5 shows the number of children in the normal, borderline, and clinical range for all CBCL subscales.

Table 5

Number of Children in CBCL Normal, Borderline, and Clinical Range (n = 36)

Subscale	Normal	Borderline	Clinical
Withdrawn	28	2	6
Somatic	28	2	6
Anxious/Depressed	24	4	8
Social Problems	20	6	10
Thought Problems	19	4	13
Attention Problems	16	4	16
Delinquency	19	3	14
Aggression	17	6	13
Internalizing	15	3	18
Externalizing	10	5	21

Part I: Validity

        Correlations within Measures. Pearson correlations were used to assess the associations within BBADC factors. As can be seen in Table 6, all BBADC factors were significantly correlated at Time 1 and all but one were significantly correlated at Time 2. As expected, the two factors capturing negative behavior (Machiavellianism and Aggression/Anxiety) were positively correlated at both Time 1 and at Time 2, suggesting that Machiavellianism and Aggression/Anxiety are comorbid in the current sample of children. The two factors capturing positive behavior (Affection/Attachment and Executive Functioning) were also positively correlated at both Time 1 and at Time 2, suggesting that behaviors indicative of Affection/Attachment and Executive Functioning seem to occur together. In addition, each 'negative' factor was inversely correlated with each 'positive' factor. Thus, the factors on the BBADC appear to capture different but related constructs. Interestingly, Aggression/Anxiety and Affection/Attachment are negatively correlated at Time 1 but are not significantly correlated at Time 2.

Table 6

Pearson Correlations within BBADC Factors at Time 1 and Time 2

Factor	1	2	3	4
1. Machiavellianism		-.41**	.76***	-.53***
	--	(*n* = 39)	(*n* = 39)	(*n* = 39)
2. Attachment	-.66***		-.24	.51***
	(*n* = 36)	--	(*n* = 39)	(*n* = 39)
3. Aggression	.67***	-.36*		-.39*
	(*n* = 36)	(*n* = 39)	--	(*n* = 39)
4. Executive Function	-.65***	.70***	-.45**	
	(*n* = 36)	(*n* = 39)	(*n* = 39)	--

Note: Time 1 correlations are listed below the diagonal and Time 2 correlations are listed above the diagonal. *p<.05, **p<.01, ***p<.001.

Pearson correlations within Family Drawings reveal that all Global Ratings were significantly correlated at Time 1 (see Table 7). In addition, Global Ratings were related such that the two positive ratings scales, Vitality and Family Pride, were positively correlated with each other and inversely correlated with the five negative ratings scales . In addition, the five negative scales were all positively correlated. Thus, the global features are related in predictable ways such that positive global features seem to co-occur, as do negative global features. At Time 2, most of the Global Ratings are still significantly correlated. However, Vitality is no longer associated with Vulnerability, Isolation, or Bizarreness and Anger is no longer associated with Vulnerability.

Table 7

Pearson Correlations for Family Drawings Global Ratings Scales at Time 1 (n =48) and Time 2 (n = 38)

Scale	1	2	3	4	5	6	7
1. Vitality	--	.37*	-.21	-.24	-.46**	-.21	-.63***
2. Family Pride	.60***	--	-.54***	-.64***	-.33*	-.47**	-.35*
3. Vulner.	-.57***	-.68***	--	.41**	.26	.64***	.55***
4. Isolation	-.39**	-.58***	.44**	--	.52***	.42**	.44**
5. Anger	-.60***	-.40**	.51***	.43**	--	.40*	.49**
6. Bizarre	-.57***	-.61***	.53***	.41**	.56***	--	.63***
7. Global Path.	-.80***	-.69***	.69***	.53***	.62***	.63***	--

Note: Time 1 correlations are listed below the diagonal and Time 2 correlations are listed above the diagonal. *p<.05, **p<.01, ***p<.001.

Correlations between Quantitative Indicators at Time 1 do not show as many associations between indicators as do Global Ratings, but do suggest that all indicators recording amount of detail (i.e. detail on face of mother, detail on face of self, detail on body of mother, detail on body of self) seem to be related. The same pattern of relationships holds at Time 2. Correlations for all Quantitative Indicators are found in Table 8. In addition, as seen in Tables 9 and 10, a strong pattern of correlations between Global Ratings and Quantitative Indicators both at Time 1 and at Time 2 suggests that assessments conducted at different levels of coding within the drawing yield corresponding results.

Table 8

Pearson Correlations for Family Drawings Quantitative Indicators at Time 1 and Time 2

Indicator	1	2	3	4	5	6
1. Mother Face Detail	--	.85***	.12	.64***	.57**	-.07
		(*n* = 25)	(*n* = 29)	(*n* = 29)	(*n* = 25)	(*n* = 26)
2. Self Face Detail	.75***	--	.12	.65***	.61***	-.08
	(*n* = 30)		(*n* = 28)	(*n* = 25)	(*n* = 28)	(*n* = 25)
3. Color	.22	.10	--	.13	.06	-.17
	(*n* = 33)	(*n* = 38)		(*n* = 33)	(*n* = 31)	(*n* = 27)
4. Mother Body Detail	.86***	.60***	.10	--	.99***	-.05
	(*n* = 32	(*n* = 29)	(*n* = 32)		(*n* = 28)	(*n* = 27)
5. Self Body Detail	.73***	.89***	-.02	.75***	--	-.00
	(n = 30)	(n = 38)	(n = 38)	(n = 29)		(*n* = 26)
6. Proximity	.13	.11	.15	-.04	-.06	--
	(*n* = 28)	(*n* = 28)	(*n* = 28)	(*n* = 27)	(*n* = 28)	

Note: Time 1 correlations are listed below the diagonal and Time 2 correlations are listed above the diagonal. *p<.05, **p<.01, ***p<.001.

Table 9

Pearson Correlations between Family Drawings Quantitative Indicators (columns) and Global Ratings Scales (rows) at Time 1

Global Ratings	Quantitative Indicators					
	Mother Face Detail (*n* = 33)	Self Face Detail (*n* = 38)	Color (*n* = 48)	Mother Body Detail (*n* = 32)	Self Body Detail (*n* = 38)	Mother Proximity (*n* = 28)
Vitality	.53**	.45**	.42**	.51**	.44**	.03
Family Pride	.45**	.37*	.14	.52**	.41**	-.30
Vulnerability	-.43*	-.47**	-.19	-.54***	-.44**	.28
Isolation	-.14	.02	-.22	-.27	-.12	.64***
Anger	-.43*	-.42*	-.42**	-.38*	-.41*	-.07
Bizarreness	-.53**	-.45**	-.24	-.52**	-.52***	.39*
Global Path.	-.63***	-.54***	-.39**	-.73***	-.59***	.17

Note: *p<.05, **p<.01, ***p<.001.

Table 10

Pearson Correlations between Family Drawings Quantitative Indicators (columns) and Global Ratings Scales (rows) at Time 2

Global Ratings	Quantitative Indicators					
	Mother Face Detail (n = 29)	Self Face Detail (n = 28)	Color (n = 39)	Mother Body Detail (n = 33)	Self Body Detail (n = 31)	Mother Proximity (n = 27)
Vitality	.41*	.44*	.59***	.61***	.49**	-.11
Family Pride	.49**	.37	.10	.60***	.49**	-.44*
Vulnerability	-.08	.06	-.18	-.45**	-.43*	.00
Isolation	-.30	-.15	-.27	-.34	-.23	.53**
Anger	-.38*	-.43*	-.40*	-.37*	-.37*	.20
Bizarreness	-.28	-.24	-.23	-.65***	-.64***	.22
Global Path.	-.31	-.22	-.68***	-.56***	-.55***	-.02

Note: *p<.05, **p<.01, ***p<.001.

Finally, Pearson correlations within CBCL subscales reveal that all CBCL subscales were at least moderately positively correlated (see Table 11). Thus, in the current sample of children, different kinds of problematic behaviors seem to co-occur.

Table 11

Pearson Correlations within CBCL Subscales (n = 36)

Subscale	1	2	3	4	5	6	7	8	9	10	11
1. Withdrawn	--										
2. Somatic.	.46*	--									
3. Anx/Dep	.56***	.50***	--								
4.Social	.32*	.52***	.49***	--							
5. Thought	.62***	.63***	.62***	.40*	--						
6. Attention	.54***	.63***	.66***	.69***	.64***	--					
7. Delinquency	.60***	.55***	.51***	.58***	.45**	.45**	--				
8. Aggression	.43**	.45**	.50***	.76***	.40*	.54***	.78***	--			
9. Other	.54***	.70***	.59***	.50***	.82***	.62***	.65***	.53***	--		
10. Internal	.78***	.75***	.91***	.55***	.75***	.75***	.65***	.57***	.73***	--	
11. External	.51***	.51***	.50***	.72***	.40***	.54*	.89***	.97***	.58***	.62***	--

Note: *p<.05, **p<.01, ***p<.001.

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Associations between the BBADC and Family Drawings. Bivariate correlations reveal that, contrary to expectations, Family Drawings were almost completely unrelated to BBADC factors. No Global Ratings were significantly correlated with BBADC factors at either Time 1 or Time 2. Likewise, no Quantitative Indicators were significantly correlated with BBADC factors at Time 1 or Time 2.

Associations between the BBADC and the CBCL. In the current sample, most of the CBCL subscales were correlated with the BBADC factors. Pearson correlations for all CBCL subscales and BBADC factors are found in Table 12. Machiavellianism correlated positively with each of the CBCL subscales with the exception of Somatic Problems. The Aggression/Anxiety Factor also correlated positively with each of the CBCL subscales. Executive Functioning correlated negatively with nine of the CBCL subscales but was not significantly related to Somatic Problems or Anxiety/Depression. The Affection/Attachment Factor correlated negatively with the Withdrawn, Delinquency, and Externalizing Subscales but was unrelated to the remaining eight subscales, suggesting that the Affection/Attachment Factor might capture different behaviors than those captured by the CBCL.

Table 12

Pearson Correlations between BBADC Factors (columns) and CBCL Subscales (rows)

CBCL	BBADC Factors			
	Machiavellianism $n = 36$	Affection/ Attachment $n = 39$	Aggression/ Anxiety $n = 39$	Executive Function $n = 39$
Withdrawn	.60***	-.44**	.55***	-.52***
Somatic	.26	.06	.49***	-.23
Anx/Dep	.61***	-.18	.54***	-.21
Social	.34*	-.05	.54***	-.43**
Thought	.44**	-.21	.62***	-.35*
Attention	.49**	-.20	.58***	-.41**
Delinquency	.58***	-.37*	.53***	-.54***
Aggression	.68***	-.31	.64***	-.50***
Other	.38*	-.14	.62***	-.32*
Internal	.63***	-.22	.64***	-.36*
External	.67***	-.34*	.63***	-.53***

Note: *p<.05, **p<.01, ***p<.001

Associations between Family Drawings and the CBCL. Contrary to expectations, Family Drawings were almost completely unrelated to CBCL subscales. No Quantitative Indicators were correlated with CBCL subscale scores and only one Global Rating was correlated with CBCL subscale scores, which is consistent with the null hypothesis of no association.

Part II: Treatment Effects

  Changes from Pre-Camp to Post-Camp. Paired t-tests were used to examine the mean differences in BBADC factor scores from pre-camp to post-camp. Because preliminary analyses revealed no significant differences between males and females in BBADC factor scores, gender was collapsed for the following analyses. Paired t-tests revealed significant differences between pre-camp and post-camp BBADC scores on all four factors. That is, scores on Machiavellianism decreased from pre-camp ($M = 2.31$) to post-camp ($M = 1.90$), $t(31) = -2.83$, $p = .008$, scores on Affection/Attachment increased from pre-camp ($M = 2.39$) to post-camp ($M = 2.73$), $t(34) = -2.97$, $p = .006$, scores on Aggression/Anxiety decreased from pre-camp ($M = 1.14$) to post-camp ($M = 0.90$), $t(34) = -2.53$, $p = -.016$, and scores on Executive Functioning increased from pre-camp ($M = 1.76$) to post-camp ($M = 2.18$), $t(34) = 4.05$, $p = .000$. Thus, all BBADC factor scores improved, suggesting a significant camp effect on this parent-report measure.

  Paired t-tests were used to examine mean differences in both Family Drawings Global Ratings and Quantitative Indicators. As with the BBADC, there were no significant gender differences on Family Drawings scores. Paired t-tests on the Global Ratings reveal a significant difference in Vitality scores from pre-camp to post-camp. However, this difference was in an unanticipated direction, such that scores decreased from pre-camp ($M = 1.84$) to post-camp ($M = 1.58$), $t(37) = -2.44$, $p = .02$. Paired t-tests also reveal a significant difference in Global Pathology from pre-camp to post-camp. Again, this difference was in an unexpected direction, with Global Pathology scores increasing from pre-camp ($M = 2.37$) to post-camp ($M = 2.60$), $t(37) = 3.22$, $p = .003$. No significant differences emerged from pre-camp to post-camp on the other Global Ratings scales.

Paired t-tests on the Quantitative Indicators showed a number of significant changes from before camp to after camp. The amount of detail drawn on the mother's face significantly increased from pre-camp ($M = 3.22$) to post-camp ($M = 3.96$), $t(23) = 3.51$, $p = .002$. Similarly, the amount of detail drawn on the face of the self significantly increased from pre-camp ($M = 3.26$) to post-camp ($M = 3.96$), $t(23) = 2.34$, $p = .029$. However, there are marginally significant decreases in both color ($M_1 = 2.08$, $M_2 = 1.30$), $t(37) = -1.75$, $p = .088$, and detail on the mother's body ($M_1 = 3.96$, $M_2 = 3.52$), $t(25) = -1.79$, $p = .086$ from pre-camp to post-camp. No significant differences were found from pre-camp to post-camp on other Quantitative Indicators. In addition, chi-square analyses revealed no significant differences from pre-camp to post-camp in inclusion of mother, $\chi^2(1) = 0.14$, $p = .705$, or in inclusion of self, $\chi^2(1) = 0.00$, $p = 1.00$, using McNemar Symmetry Chi-Square.

Predictors of Change. Correlations between pre-camp scores and change scores (achieved by subtracting pre-camp scores from post-camp scores) were used to identify pre-camp scores that are predictive of change. All pre-camp BBADC factor scores were negatively correlated with the change scores of that factor. For example, Machiavellianism pre-camp scores were negatively correlated with change in Machiavellianism. Scatterplots show that most Machiavellianism change scores are negative, suggesting that most children had a decrease in score from pre-camp to post-camp. Thus, the negative correlation between pre-camp Machiavellianism and change in Machiavellianism indicates that children with higher Machiavellianism before camp had greater decreases in Machiavellianism from pre-camp to post-camp. This finding is not unexpected, since, in line with the law of initial values (Jamieson, 1995), children with average Machiavellianism scores at Time 1 have

more room to raise or lower their scores than do children with Machiavellianism scores that are already high or low, due to ceiling or floor effects.

What is interesting, however, is that Machiavellianism scores at Time 1 were also significantly correlated with change scores for the other three factors. Machiavellianism pre-test scores were negatively correlated with change in Aggression/Anxiety and positively correlated with change in Affection/Attachment and change in Executive Functioning. An examination of the scatterplot for pre-camp Machivellianism and changes in Anxiety/Aggression shows that children with higher Machiavellianism scores before camp tended to have greater decreases in Anxiety/Aggression from pre-camp to post-camp. The scatterplot between Machiavellianism pre-camp scores and Affection/Attachment change scores reveal that children with higher Machiavellianism scores before camp had higher change scores, or tended to have greater increases in Attachment from pre-camp to post-camp. Finally, examination of the scatterplot between pre-camp Machiavellianism and change in Executive Functioning indicates that change scores for Executive Functioning were almost all positive, suggesting that almost all children's scores increased after camp. Thus, the positive correlation between Machiavellianism and change in Executive Functioning suggests that children with higher Machiavellianism scores before camp had greater increases in Executive Functioning from pre-camp to post-camp. Thus, children with high Machiavellianism scores before camp showed the greatest improvement on all four factors, suggesting that pre-camp Machiavellianism scores predict children's degree of change not only in Machiavellianism, but in Aggression/Anxiety, Affection/Attachment, and Executive Functioning. Correlations between pre-camp BBADC factor scores and BBADC change scores are found in Table 13.

Table 13

Pearson Correlations between BBADC Factor Pre-Camp Scores (rows) and Change Scores (columns)

Pre-Camp Scores	Change Scores			
	Machiavellianism	Affection/ Attachment	Aggression/ Anxiety	Executive Functioning
Machiavellianism	-.65***	.46*	-.59**	.63***
	(*n* = 24)	(*n* = 24)	(*n* = 24)	(*n* = 24)
Affection/ Attachment	.38	-.61***	.37	-.56**
	(*n* = 24)	(*n* = 25)	(*n* = 25)	(*n* = 25)
Aggression/ Anxiety	-.27	.32	-.75***	.32
	(*n* = 24)	(*n* = 25)	(*n* = 25)	(*n* = 25)
Executive Functioning	.37	-.28	.32	-.51**
	(*n* = 24)	(*n* = 25)	(*n* = 25)	(*n* = 25)

Note: *p<.05, **p<.01, ***p<.001.

Interestingly, use of color on pre-camp Family Drawing Quantitative Indicator also significantly predicts change in BBADC factor scores. Pre-camp color is significantly correlated with changes in Machiavellianism $r(24) = -.42$, $p = -.043$, changes in Affection/Attachment $r(25) = .52$, $p = .008$, changes in Anxiety/Aggression $r(25) = -.46$, $p = .02$, and changes in Executive Functioning $r(25) = .40$, $p = .047$. Overall, investigation of the scatterplots and correlations between pre-camp color and BBADC factor change scores appears to suggest that children who use more color before camp show greater increases in positive BBADC factors and greater decreases in negative BBADC factors. Thus, color appears to predict ability to improve on BBADC scores.

Discussion

Pre-camp scores on both parent-report measures of behavior and children's drawings suggest that, in general, children in the current sample are at-risk for attachment-related and behavioral disturbances. On the BBADC, for example, children in general scored high in Machiavellianism and low in Executive Functioning. Children also showed evidence of negative drawing features such as Bizarreness and lack of color and detail. Finally, children exhibited a range of problem behaviors on the CBCL, with well over half of the sample falling in the borderline or clinical range for both Internalizing and Externalizing behaviors.

Validity of the BBADC and Family Drawings

The first research objective was to examine the validity of Family Drawings and the BBADC. Analyses revealed significant correlations within Family Drawings, the BBADC, and the CBCL. That is, most Family Drawings Global Ratings scales are correlated with the other Global Ratings scales, most Quantitative Indicators are correlated with the other indicators, each BBADC factor is correlated with the other three factors, and each CBCL subscale is correlated with every other subscale. Overall, these correlations suggest that the different subscales within each measure capture different but related constructs and that the items relate in expected ways. On the CBCL, correlations between subscales suggest that behavioral problems, both Externalizing and Internalizing, are comorbid in the current sample of children. This is in line with previous research suggesting that children with a history of deprivation and/or maltreatment exhibit a range of behavioral problems (Fisher, Ames, Chisholm, & Savoie, 1997; Hoksbergen, Rijk, & Van Dijkum, 2004; Marcovitch et al., 1997; Rosenthal & Groze, 1991).

On the BBADC, correlations between factors indicate that the 'negative' factors (Aggression/Anxiety and Machiavellianism) occur together, as do the 'positive' factors (Affection/Attachment and Executive Functioning). Thus, it appears that children with higher executive functioning exhibit more positive attachment behaviors. This is consistent with research suggesting a link between attachment security and the development of executive functioning (Carlson, 2003; Gunnar, 2001; van Bakel & Riksen-Walraven, 2004). The correlation between Machiavellianism and Aggression/Anxiety on the BBADC suggests that children who utilize Machiavellianistic strategies (e.g. manipulation) could have higher levels of aggression and anxiety. This is supportive of research linking aggressive behavior to proactive prosocial behavior (i.e. instrumental prosocial behavior designed to "get what I want") (Boxer, Tisak, & Goldstein, 2004). It is likely that aggressive and Machiavellianistic behavior are both adaptive strategies for children suffering from deprivation or maltreatment and these strategies persist after adoption. The current study also suggests that the negative factors of the BBADC are inversely correlated with the positive factors. Previous research would support current findings that attachment is inversely related to aggression (van Ijzendoorn, 1997; Simons, Paternite, & Schore, 2001) and anxiety (Papini & Roggman, 1992). Previous findings also support the link between attachment and indiscriminately friendly or manipulating behavior such as that seen in Machiavellianism (Chisholm, 1998; Luke, Maio, & Carnelley, 2004). In addition, the inverse relationship between executive functioning and aggression/anxiety is in line with other research (Seguin, Boulerice, Harden, Tremblay, & Pihl, 1999). However, it is somewhat surprising that Executive Functioning is inversely related to Machiavellianism, since Machiavellianism appears to require some

degree of self awareness and awareness of social situations that are indicative of high levels of Executive Functioning.

On Family Drawings, correlations within Global Ratings and Quantitative Indicators suggest that negative features occur together in a drawing, as do positive features. Thus, children do not usually have one negative feature, such as Bizarreness, without a number of other negative features. Furthermore, correlations between the Global Ratings and the Quantitative Indicators suggest that Family Drawings can be assessed on both a global level and a specific level (i.e. examining individual features) with similar conclusions. While correlations within each measure are necessary conditions for adequate validity, correlations with other related measures are needed in order for the BBADC and Family Drawings to be sufficient assessments of attachment. Thus, the central analyses focus on relationships between measures.

As expected, most scores on the CBCL subscales and the BBADC factors correlated. As these are both parent-report measures of behavior, this is not surprising. In addition, this is in line with previous research suggesting that children with secure attachment histories exhibit fewer behavioral problems than do children with insecure attachment histories (Erickson et al., 1985). The positive correlations between the CBCL subscales and Machiavellianism and Anxiety/Aggression on the BBADC suggest that these BBADC factors capture a range of behavioral problems. The negative correlations between Executive Functioning on the BBADC and the CBCL subscales suggest that Executive Functioning is inversely related to problem behavior, a finding supported by other literature (Gunnar, 2001). The negative correlation between the Affection/Attachment factor on the BBADC and the Withdrawn subscale on the CBCL is expected given that affectionate and

attachment-based behavior is fundamentally social behavior. However, the failure of the Affection/Attachment factor to correlate with most of the remaining CBCL subscales suggests that, as intended, this factor captures attachment-related behavior not assessed by other measures of childhood behavior.

Contrary to expectations, Family Drawings did not correlate with either the BBADC or the CBCL. Although previous studies have supported the use of Family Drawings as an assessment of attachment representations, these studies have only related Family Drawings during childhood to previous attachment security during infancy (Fury et al., 1997; Madigan, et al., 2003). In fact, Madigan and colleagues (2003) note that no study thus far has linked Family Drawings to concurrent measures of attachment and that, without this data, Family Drawings should not be used as indicators of current attachment status. Thus, in what appears to be the first study attempting to associate Family Drawings to a concurrent measure of attachment, our results are puzzling and warrant further examination. The following discussion will address both methodological and theoretical implications of these unexpected findings.

The current study failed to show a relationship between family drawings and measures of attachment behavior or problem behavior. Methodologically, there are three possibilities for this puzzling finding. First, Family Drawings might not correlate with the BBADC or CBCL because of method variance. The CBCL and BBADC are both parent-report measures, whereas the Family Drawings are a child performance task. It is a well-known fact in the measurement literature that measures can covary simply because they have common methodology (e.g., see Cook & Campbell, 1979). Method variance is a likely possibility for explaining why these measures do not correlate, but is probably not the only

explanation. A second possibility for why the attachment measures do not correlate is that the BBADC might not be a valid measure of attachment behavior. However, given that attachment is, in essence, approach behavior and withdrawal is avoidance behavior, the negative correlations between the Affection/Attachment factor on the BBADC and the Withdrawn subscale on the CBCL suggest that this factor indeed captures attachment behavior. In addition, the failure of the Attachment/Affection factor to correlate with most of the remaining CBCL subscales suggest that the Attachment/Affection factor on the BBADC captures behavior outside of the range of behaviors captured by the CBCL. Further, the items on the Attachment/Affection factor have good face validity, seeming to capture essential features of secure attachments. Thus, it seems unlikely that the lack of correlations between Family Drawings and the BBADC are due to the BBADC being invalid.

A third possibility is that Family Drawings are not a valid measure of attachment representations. However, previous studies have shown that Family Drawings are related to attachment classification style in infancy (Fury et al., 1997; Madigan et al., 2003) and concurrent socio-emotional functioning (Pianta et al., 1999). In addition, the Family Drawings of adopted children at-risk for attachment-related disturbances are significantly different than drawings of a non-adopted comparison group of children (Purvis, Cross, Razuri, et al., 2006). Finally, data from these at-risk adopted children suggests that Family Drawings are correlated with parent's communication strategies on the Adult Attachment Interview (Purvis, 2003), which in turn are known to predict infant security in the strange situation (George, Kaplan, & Main, 1985; van Ijzendoorn, 1995). Thus, there is evidence to suggest that the Family Drawings are not invalid as a measure of attachment, so, in all, the evidence is mixed.

An important methodological implication is the need to utilize multiple methods of assessment. Utilizing Family Drawings or the BBADC alone would have yielded similar conclusions regarding the link between attachment and contemporaneous behavior, as neither Family Drawings nor the Attachment/Affection factor on the BBADC correlated with the CBCL. However, gathering data from both parent-report and a child performance task provided information that would have otherwise been left uncovered. Triangulating parent-report, behavioral, and physiological measures might strengthen future studies (Levenson & Gottman, 1983).

The puzzling findings that Family Drawings do not correlate with the BBADC or CBCL have not only methodological implications, but theoretical implications as well. That is, if the measures used in the current study are adequate, why would they not correlate? As previously discussed, children in the current study likely experienced discontinuity and/or disruption in early attachment relationships. Because Bowlby's original conception of the internal working model was based upon the assumption that attachment relationships are relatively stable, uncertainty remains as to how the inner working model functions in children without stability in attachment and have led to a number of theoretical questions (Ainsworth, 1990; Bretherton, 1985; Hodges & Steele, 2000; Main, Kaplan & Cassidy, 1985; Weinfield, Sroufe, & Egeland, 2000). For example, do children develop different attachment representations for each attachment figure, or do children have an overall schema of attachment figures in general? What happens when there is a dramatic change in attachment relationships, as with children adopted after maltreatment or deprivation? Are previous, negative attachment representations replaced by new, positive attachment representations? Do multiple attachment representations co-exist? Or do early negative

attachment representations override later positive representations, such that children with a history of negative attachment experiences fail to incorporate positive attachment experiences into their internal working model, thus leading to persistent and stable negative attachment representations despite current, more positive, circumstances?

In the current study, it would appear that attachment representations and parental report of attachment behavior are out-of-sync. This could be due to attachment representations and behavior following different timelines. For example, evidence from our lab suggests that positive changes in children's attachment behavior can be seen within days of the camp intervention (Purvis & Cross, 2006). Given that attachment representations are thought to be relatively stable and resistant to change, however, it is reasonable to expect change in representations to take longer than changes in behavior. An alternative explanation for why representations and behavior appear out-of-sync is that they follow different courses altogether. That is, rather than following the same path at different speeds, representations and behaviors could diverge. It is possible that children can change their behavior in response to intervention without changing the underlying attachment representations. For example, a child could learn to make eye contact or give hugs while still feeling uncomfortable around attachment figures.

The Effect of the Camp Intervention

The second research objective was to examine changes in Family Drawings and the BBADC from pre-camp to post-camp. Paired t-tests revealed significant differences in each BBADC factor from pre-camp to post-camp. Thus, Machiavellianism, Aggression/Anxiety, Affection/Attachment, and Executive Functioning all improved after participation in the camp intervention. These findings are encouraging and suggest that a short-term

intervention rich in attachment principles such as nurturing, sensitive, and consistent interactions is effective in improving attachment behavior in children with a history of negative attachment experiences. These findings reinforce other research on the efficacy of attachment-based interventions (Jernberg & Booth, 1998; Lieberman & Zeanah, 1999).

Findings regarding the effect of camp on Family Drawings are less conclusive. Two of the seven Global Ratings scales, Vitality and Global Pathology, showed significant changes from pre-camp to post-camp. However, both of these changes were in unexpected directions, such that Vitality in Family Drawings decreased and Global Pathology increased. In addition, marginally significant decreases in color and detail on the mother's body from pre-camp to post-camp were unanticipated. However, not all Family Drawings changes were in negative directions, as the amount of detail on both the face of the mother and the face of the self significantly increased after camp. Positive changes in amount of detail in general, however, would seem to be more indicative of corresponding improvement of executive functioning rather than an attachment-based improvement.

Consistent with the previously-discussed findings that Family Drawings fail to correlate with the BBADC and CBCL, failure of Family Drawings to improve after camp might reflect the complexities of representational models of attachment. It is likely that representational models of attachment do not follow an increasingly positive trajectory in response to intervention. That is, rather than showing consistent improvement, representations could get worse before they get better. This is consistent with Hodges and Steele (2000), who found that the narratives of adopted maltreated children were more negative one year after adoption than they were immediately after placement. The attachment experiences of these children should be more positive one year after placement

than before adoption (due to the change in attachment figure), but the attachment representations of the children do not appear to reflect recent attachment experiences. Rather, the authors suggest that the more negative representations one year after adoption reflect the children's improving ability to process their negative attachment histories. Compared to the narratives given immediately after adoption, the narratives given one year after adoption are thought to be more accurate interpretations of the children's negative early experiences. Thus, with intervention, one would not assume that attachment representations of children with a history of negative attachment experiences would immediately improve, but would become more closely related to reality as children begin to integrate previous caregiver interactions into their inner working model.

In addition to examining changes from pre-camp to post-camp, the current study attempted to identify pre-camp variables that predict these changes. Interestingly, pre-camp Machiavellianism predicts not only changes in Machiavellianism, but changes in Aggression/Anxiety, Affection/Attachment, and Executive Functioning as well. Thus, it appears that children who initially score high in Machiavellianistic behavior exhibit greater improvements across all domains captured by the BBADC and might respond better to the camp experience. Although this could be interpreted in a number of ways, it is possible that high levels of Machiavellianism indicate that a child has a high level of self and social awareness and could be flexible in adapting behavior to social situations in order to meet their needs (Hawley, 2003). For children in fearful environments, this could manifest in ways such as lying or acting charming. However, if these children are indeed flexible, they could be more receptive to alternative strategies offered in the camp intervention, resulting in changes in other types of behavior as well.

Surprisingly, the other pre-test variable that predicted change in BBADC factor scores was color on the Family Drawings. Overall, children who used more color on their pre-test drawing had greater increases in Affection/Attachment and Executive Functioning and greater decreases in Aggression/Anxiety and Machiavellianism. This finding is unexpected and, to our awareness, unprecedented. Therefore, future research is needed to understand the implications of this relationship.

Limitations and Future Research

A limitation of the current study is the sample. Children in the current sample were attending camp because parents had sought intervention for problematic behavior. Consequently, this sample might not be representative of all children with histories of deprivation or maltreatment. Of related concern, little is known about the pre-adoption background of many of the children. As is often the case with post-institutionalized children, information is limited regarding past abuse, neglect, substance abuse in the caregivers (especially during pregnancy), and whether developmental issues are the result of time spent in the orphanage or other factors, such as genetic and prenatal factors (Marcovitch & Cesaroni, 1995). Access to this information would allow the researcher to assess generalizability to other at-risk children. In addition, a larger sample size would have been beneficial, especially given that not all mother/child pairs completed all measures and therefore could not be included in all analyses.

A sample of adopted children with histories of deprivation and/or maltreatment might not be the ideal group of participants for a validity study. Assessing children with a range of attachment histories, including those with more typical attachment relationships with caregivers, might yield a stronger association between attachment representations and

attachment behavior. As stated earlier, this study appears to be the first to examine the relationship between Family Drawings and concurrent measures of attachment. Attachment representations are thought to develop early in life, but be relatively stable and resistant to change (Bowlby, 1969/1982, 1973, 1980). Thus, it is more reasonable to expect a relationship between attachment style in infancy and later attachment representations in typically-developing children than in children with discontinuities and/or disruptions in attachment. The current attempt to relate attachment behavior and attachment representations was unsuccessful, which suggests the relationship between current attachment representations and attachment behavior could be complex and not easily captured. However, this might be exacerbated in the current study by assessing children with histories of disturbances in attachment relationships. Children with unstable and unusual attachment histories, while valuable for addressing certain theoretical questions about attachment, might be of limited use in attempts to validate attachment measures. Thus, future studies should attempt to correlate Family Drawings with concurrent measures of attachment in typically-developing children with stable attachment histories.

Perhaps even more important than conducting further research to validate the use of Family Drawings, more research is needed regarding the attachment representations in general of at-risk adopted children with histories of deprivation or maltreatment. As noted earlier, although many researchers have reported on attachment-disturbances in the behavior of this population, the current study appears to be the only research specifically examining representational models of attachment in these children. Although the results of the study do not yield conclusive evidence regarding attachment representations in at-risk adopted children, the results do suggest that attachment representations in this particular population

could be complex. Given these children's unusual attachment histories, this is not surprising. Many questions need to be addressed, such as how potentially positive attachment representations after adoption are integrated into the child's internal working model with existing negative attachment relationships (Hodges & Steele, 2000). Examining attachment representations in children removed from severe early adverse environments can give insight into the duration and strength of early representations on later development (Ainsworth, 1990; Hodges & Steele, 2000). However, not only will studying attachment representations in these children be valuable in learning about the complexities of the internal working model in general, but this research could prove invaluable in providing appropriate and effective attachment-based interventions to children at-risk for attachment disturbances.

APPENDIX A

Principal Component Analysis of BBADC Items

(adapted from Howard, Cross, Purvis, Schwalm, & Razuri, 2006)

Item Number	Item
	Factor 1: Machiavellianism
10	No matter what caretaker does for the child it is never enough.
30	The child can turn on the charm for strangers.
34	The child makes eye contact when he/she is lying.
21	The child tries to be the boss even when it may get him/ her in trouble.
31	The child is friendly and affectionate with strangers.
61	The child seems to know exactly the negative behaviors the caretaker cannot stand ("button pushing").
23	The child seeks negative attention over positive.
67	Child blames the caretaker for a negative interaction rather than take. responsibility for his/her own behavior.
49	The child goes from one extreme to another in his/her view of others, from thinking they are good to thinking they are bad.
17	The caretaker feels "used" and is wary of the child's motives if affection is expressed.
41	The child increases aggravating behavior until it is dangerous or cannot be ignored.
43	Household members become worried when things are going well with this child, knowing it is the "calm before the storm."
57	The child gets very upset when he/she cannot do things his/her own way.
65	How often do well-laid plans about how to handle chronic problems go out the window?
6	The child only acts affectionate if he/she is trying to avoid punishment or gain something.
22	The child lies even when the truth is obvious; not just to get out of trouble.
48	The child gets excessively angry or has temper tantrums over seemingly small

things. (Aggression/Anxiety)

68 Negative behaviors by the child follow situations where people usually feel close (like family parties).

Factor 2: Affection/ Attachment

8 The child naturally sits close to a caretaker or a family member, or shows signs of affection.

16 The child likes to be cuddled or hugged by caretaker or family members.

4 The child expresses affection, concern, or closeness to a family member or caretaker.

58R The child distances him/herself from others in relationships where closeness is expected.

13 The child asks for or accepts help or comfort from caretaker when ill, injured, frightened, or upset.

5 The child initiates positive interactions.

1 The child seems to trust that his or her caretaker really cares for him or her.

7R The child holds back and/or seems awkward when hugging (e.g., uses one arm or holds body stiff).

9 Child clings to caretaker.

71R Caretaker feels intensely rejected by this child.

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).

3R The child typically hugs only when it is his/her idea, or when he/she has something to gain.

Factor 3: Aggression/Anxiety

52 The child is more upset by change than other children his/her age.

54 The child gets into physical fights.

27 The child hurts others.

15 The child is usually worried when separated from caretaker.

33 The child threatens others.

26 The child openly destroys property of other household members.

44 The child destroys property of other household members secretly when no one is looking.

39	The child destroys his/her things.
35	The child hurts him or herself.
51	The child draws pictures or tells stories in which he or she is left out or seems alone.
29	The child is cruel to animals.

Factor 4: Executive Functioning

45	The child is able to put himself/herself in someone else's shoes (see from another person's point of view).
62	The child admits fault when he/she makes a mistake.
70	The child expresses sorrow or guilt after he/she has damaged property or he/she has hurt people or animals.
40	The child learns from his/her mistakes.
60	The child realizes that negative behaviors generally bring about unpleasant consequences.
55	The child follows the caretaker's reasonable rules and requests.
72	The child can maintain friendships over time.
56	The child seems to know what is right or wrong.
66	Patterns of difficult behavior are easily interrupted by improved.
46	The child is learning at the expected level.
42R	Caretaker finds that things that work with other children in the household do not work with this child.

Note: Items are listed in the order in which they loaded; R = reversed factor; Factor name in parentheses indicates that item also loaded on this factor.

APPENDIX B

Descriptions of Family Drawings Quantitative Indicators

Quantitative Indicator	Description
Color	Paper scored as either colored or neutral. The total number of colors used for figures and background recorded; pencil use and the use of black recorded as no color or neutral.
Faces/Feature	Smile, hair, eyes, nose, mouth, fingers, hands, and feet recorded as either present or not present for mother and self. Total number of colors used for individual figures was noted. Total number of details (hair, eyes, nose, mouth, fingers, hands, and feet) recorded for each figure.
Presence/Absence	Presence or absence of self and/or mother scored. Number of siblings drawn compared to actual number of siblings in family noted.
Proximity of Self	Distance the child drew him/herself from mother measured in centimeters from mid-torso to mid-torso of each figure.

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ABSTRACT

ATTACHMENT DISTURBANCES AND ATTACHMENT REPRESENTATIONS
IN AT-RISK ADOPTED CHILDREN

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Although children adopted after deprivation or maltreatment are thought to be at-risk for

attachment-related problems, little is known about the attachment representations thought to

underlie attachment behavior. Further, methods of assessing attachment representations and

attachment disturbances are needed. The current study examined the use of Family

Drawings and the Beech Brook Attachment Disorder Checklist (BBADC) as assessments of

attachment representations and attachment disordered behavior, respectively, in a sample of

adopted children at-risk for behavior disturbances. The BBADC was correlated with the

Child Behavior Checklist (CBCL), but contrary to expectations, Family Drawings were not

related to scores on either the BBADC or CBCL. Scores on the BBADC improved after

participation in a therapeutic camp. In addition, children who had higher Machiavellianism

scores and those who used more color on their Family Drawings before camp had greater

improvements in all BBADC factors after camp. Methodological and theoretical

implications are discussed.