THESIS

BECOMING RELATIONALLY EFFECTIVE: HIGH-RISK BOYS IN ANIMAL-

ASSISTED THERAPY

Submitted by

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ABSTRACT

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This study was conducted to formally evaluate the effectiveness of the Human

Animal Bond in Colorado (HABIC, 2010), an animal-assisted therapy (AAT) intervention

based in 23 elementary schools in the Front Range; these terms are used interchangeably in

this report. Previous research on the benefits of human and dog relationships has provided

support for using measures of attachment to rate the quality of connection within this dyad

(Kurdek, 2008; Melson, 2003; Triebenbacher, 1998). The Emotional Availability (EA)

Scales 4th Edition (Biringen, 2008), an attachment-derived system, were used to objectively

evaluate the interactions in the human-animal team, representing the first use of the EA

system to assess the quality of the human-animal bond. In addition, the Bonding Scale

(Angle, Blumentritt, & Swank, 1994) was used to assess the child's report of bonding to the

dog, the Child Behavior Checklist and the Teacher Report Form (Achenbach, 1991) were

used to assess behavior problems, and school records yielded information about attendance

and disciplinary referrals. All of the participants in this study were boys considered to be at

high-risk for internalizing and externalizing behaviors. Paired-sample t-tests revealed that EA

(child-dog and child-adult) significantly increased from pre- to post-test. (Child-adult EA

scores apply to the child's display of EA towards both the adult dog trainer and the school professional on the HABIC team.) In addition, a significant decrease was seen in student disciplinary referrals from pre- to post-test.

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INTRODUCTION

The established Human Animal Bond in Colorado (HABIC) treatment model has emerged from 15 years of implementation in schools; its mission is to "improve the quality of life for people of all ages through the therapeutic use of companion animals" (HABIC, 2009, p. 3). This specific animal-assisted therapy (AAT) intervention aims to foster a secure relationship between a trained dog and a child exhibiting emotional or behavioral challenges. Challenging behaviors could be in the form of externalizing (e.g., aggression, inattentiveness, or hyperactivity) or internalizing (e.g., anxiety, depression/suicidal acts, or helplessness) symptoms.

In elementary school, children displaying such concerning tendencies frequently receive an Individualized Education Plan (IEP) as a way to maximize their potential in academic and social contexts. School professionals refer students to participate in HABIC when a child is expected to benefit from more intensive interventions than traditionally offered through the schools. HABIC professionals then strive to increase participants' emotional, behavioral, and academic competence by allowing the child to form a positive relationship with the therapy dog (HABIC, 2009).

School-Wide Positive Behavior Support

Positive Behavioral Support (PBS) is a strength-based educational model aimed at preventing behavioral or socio-emotional issues through evidence-based interventions for all children in a school (Lewis, Jones, Horner, & Sugai, 2010). Each school district decides

whether it chooses to implement the model, although when PBS is deemed insufficient for a particular child, 23 school districts in Colorado offer HABIC as a supplemental treatment modality (HABIC, 2009). Traditional PBS modalities include Check-in/Check-out, Why Try? Curriculum, and referrals to mental health professionals. All students included in this pilot study continued to receive traditional PBS at the same time as HABIC.

Randomized trials and observations have shown correlations between PBS and reductions in behavior problems, increases in teaching and learning time, and overall greater academic achievement (Bradshaw, Reinke, Brown, Bevans, & Leaf, 2006). Although PBS is a highly individualized program, 5 to 20% of students do not respond to initial attempts at intervention and need to receive more one-on-one or tertiary-tier treatment. HABIC is suggested as a more intensive intervention when the PBS interventions are not successfully decreasing behavioral or relational problems.

Animal-Assisted Therapy (AAT) versus Animal-Assisted Activities (AAA)

The relatively new field of animal-assisted therapy has lacked consistent definitions, methods, or practice, which makes empirical validation difficult. Including animals in therapy has been called animal/pet-facilitated therapy, pet-oriented psychotherapy, or pet co-therapy (Hines, 2003; Mallon, 1992; Walsh, 2009b). Promising anecdotal evidence for the use of animals in therapy calls for complementary research with rigorous scientific standards; our aim is to contribute to this area.

According to the definitions presented by Granger and Kogan (2006), HABIC is considered an AAT intervention as opposed to an Animal Assisted Activity (AAA) intervention. AAT must incorporate direct human-animal contact as a primary component for making progress towards a treatment goal. Key elements that make HABIC a form of

therapy are the use of highly trained professionals from health/human services who work towards specific behavioral and emotional goals that can be measured objectively. Most often, this professional is a school counselor, special education specialist, or occupational therapist. Regardless of the professional's title, each had significant knowledge about the child's specific behavioral or emotional challenges. The use of formally trained owners and their dogs that have passed extensive screening procedures also distinguishes HABIC from AAA models (Granger & Kogan, 2006).

Previous AAT Research

Extensive amounts of descriptive and anecdotal reports have been made about the benefits of including animals into therapy, but the number of quantitative studies is limited (Dashnaw-Stiles, 2001; Mallon, 1992; Nimer & Lundahl, 2007). Unfortunately, most of these articles are theoretical in nature and have less of an empirical foundation than is necessary to support the effectiveness of AAT. However, the dramatic increase in animal-based interventions has fueled researchers' curiosities to further understand the direct link responsible for the reported therapeutic benefits of the human-animal bond (Melson, 2003; Nimer & Lundahl, 2007). For this reason, this study applied the empirically validated Emotional Availability (EA) Scales 4th Edition to measure the outcomes of HABIC, as well as several other standardized measures, as reported by mothers or teachers, as well as school records.

Research on the Human-Animal Bond

Most of the studies on the human-animal bond have been based on self-report measures, rather than using dyadic or observable methods such as EA. For example, Serpell (1996) showed the importance of taking both the dog and the child's behaviors into account.

Participants in Serpell's study were asked to self-report both their attachment to their pet and their pet's typical attachment-relevant behaviors. Results showed that behaviors indicative of more secure attachments (such as seeking out the owner, playfulness with the dog) were linked to reports of higher satisfaction with a pet's behaviors.

Triebenbacher (1998) interviewed 174 children from preschool to fifth grade and found children exhibit attachment-like behaviors with their pets. Behaviors included proximity seeking, playing, expressing love, and thinking about the pet during times of physical unavailability. These children described their pets as a source of social interaction, emotional support, and love; as well as members of their families. Similar to the attachment behaviors children display toward their pets, animals undeniably respond to children with attachment behaviors of a similar kind (Archer, 1997; McConnel, 2007).

Based on EA's dyadic approach, it is impossible to assess how emotionally available an individual is without looking at the demeanor of the other individual in the dyad (Biringen, 2009). Originally created as a measure to evaluate relationship quality in humans, EA provides principles of how two individuals should treat each other to ensure a mutually enjoyable relationship (Biringen, 2008; Biringen, 2009). Rooted heavily in attachment theory (Bowlby, 1969/1980), EA espouses the importance of an "emotional connection" and emotional involvement. Well over 100 peer-reviewed publications in independent national and international laboratories indicate the universal application of the EA system in human caregiver-child relationships. We ask an important methodological question: can EA be observed in human-animal relationships and is it sensitive to change through intervention?

Secure Attachment and Emotional Availability within the Child-Dog Relationship

Researchers have applied attachment theory and Bowlby's construct of the internal

working model (IWM) to understand the nature of the human-animal bond (Beck &

Madresh, 2008; Endenburg, 1995; Kurdek, 2008; Melson, 1990; 2002; 2003; Sable, 1995;

Serpell, 1996; Triebenbacher, 1998). IWMs are relational templates or schemas that people

use to understand the world around them. Safe, nurturing caregivers will create safe,

nurturing IWMs for children, while punitive or avoidant caregivers will create unsafe IWMs

for children. In AAT, the dog is theorized to be a safe, nurturing attachment figure or

transitional 'object' that helps the child create more secure views towards self and others

(Triebenbacher, 1998).

Similar to Bowlby's internal working model, Levinson believed dogs serve as

transitional objects that increase feelings of self-worth and positive view of others. Levinson

(1970) proposed that proximity seeking of the dog eases children's anxiety in the same way

children learn to depend on their mother's physical presence in moments of distress

(Ainsworth, 1989). Increasing a child's awareness and availability for relational connection

with the dog is described as a link to improvements in human relationships in a child's life.

This developmental task is reportedly seen and played out through the process of therapy.

Over time, the child is described as relying less and less on the animal for emotional security

and turning instead towards a human (e.g., the therapist or teacher) for support (Levinson,

1970; Sable, 1995; Triebenbacher, 1998).

IWMs are continuously being shaped by new experiences that either confirm or

challenge schemas. Thus, a child who feels safe and loved with a dog may carry these

subconscious beliefs into other contexts and behave accordingly, creating a cascade of

adaptive thoughts and behaviors (Biringen, 2009). Attachment security and positive IWMs are central to socio-emotional development and have the power to significantly alter developmental outcomes for children.

HABIC's human-animal team model gives the child opportunities to naturally connect with his/her therapy dog, and the dog has several unique relational qualities that foster secure connections. For example, the dog provides the structure and serenity of a relationship that is non-judgmental, does not rely on verbal abilities, and provides sufficient touch and uninhibited expression of love. Time spent with an animal that is non-judgmental by nature may allow a child to explore new behaviors without being questioned or feeling inferior (Levinson, 1970; Walsh, 2009a). Thus, positive interactions with the dog may expand a child's emotional availability and desire to enact pro-social behaviors that impact behavioral, emotional, and academic outcomes (Biringen, 2009).

Quantitative and qualitative data on the effectiveness of the HABIC/AAT are available through a 3-year outcome report, conducted by The Social Work Research Center in The College of Applied Human Sciences at Colorado State University (HABIC, 2010). Significant increases were noted on 11 out of 12 questions on the Bonding Scale (Angle, Blumentritt, & Swank, 1994) for the 62 male and female children that completed the self-report pertaining to their HABIC experience during the years of 2007-2010. These results (using the child's self-report of bonding) suggest HABIC is successful at promoting motivation to come to school, feeling responsible for something important, and feeling a close connection with the dog (HABIC, 2010). However, a multi-informant approach that includes objective observations and reports by mothers and teachers, as well as school records is likely to enhance our understanding of the efficacy of HABIC.

Purpose of Study

The current empirical evaluation of HABIC was conducted for three reasons. First, formally assessing HABIC research outcomes will increase empirical understanding of AAT, more specifically, the effect of using it in schools with boys who are classified as at-risk for poor developmental outcomes. Data from this study will serve as a preliminary round of testing for continued program evaluation.

The second reason for the evaluation is to contribute to the large gaps in the theoretical and empirical literature on the human-animal relationship. A lack of consistent, reliable, and objective measures that are based in theory has previously plagued human-animal bond research (Hines, 2003; Melson, 1990; 2002; Serpell, 1996; Walsh, 2009a). Looking at the human-animal bond through an attachment/emotional relationships lens gives a theoretical foundation for understanding and measuring the reported benefits of AAT (Melson, 2003).

Third, applying the EA Scales to assess the human-animal bond represents a methodological contribution, the first time objective observations have been used to assess a human relationship with any type of animal. For over 20 years, researchers and clinicians have contributed to the scientific evidence that EA can be used to observe the quality of relationships. For example, EA in mother-child relationships is linked with attachment security in that relationship (Biringen & Easterbrooks, 2008; Easterbrooks, Biesecker, Lyons-Ruth, 2000) and EA with a child care professional is linked to attachment security with that professional (Biringen et al., 2008).

The system has been utilized in over 20 countries, with demonstrated inter-lab and inter-rater reliability, and linked with positive child and adult outcomes in all countries where

it has been utilized (Bornstein, Gini, Suwalsky, Putnick, & Haynes, 2006). Consistent

reliability and positive relational outcomes suggests that EA may capture universality of

emotional connection--at least in human adult-child relationships. By using the concept and

system in human-animal interaction, the question being asked is whether the system also can

describe other types of emotional relationships.

Research Questions

1. Can the EA Scales be reliably applied to the human-animal bond?

2. Is EA related to the child's behavior problems, bonding to the dog, and school
   attendance/referrals?

3. Are there pre- to -post changes in child-dog and child-adult scores of emotional
   availability?

4. Are there pre- to- post-changes in parent and teacher reports of child behavior
   problems, child bonding to the dog, and school attendance/disciplinary referrals?

Hypotheses

1. Coders will successfully achieve reliability when using the EA Scales to describe the
   human-animal bond.

2. Child EA scores will be significantly related to behavior problems, child bonding to
   the dog, and school attendance/referrals.

3. Pre-to-post changes will be documented in child-dog and child-adult scores of
   emotional availability.

4. Pre-to-post changes will be documented in parent and teacher reports of child
   behavior problems, child bonding to the dog, and school attendance/disciplinary
   referrals.

METHODS

Participants

Three schools from the Thompson school District agreed to participate in the study. A total of 9 (male) children out of 11 total participants were able to receive the full dosage of HABIC, between 10 to 12 sessions. Two of the participants moved to new school districts and, therefore, were unable to continue the intervention or complete post-test data. All of the participants in this study were male students considered to be at high-risk for internalizing and externalizing behaviors. A school professional/counselor from each school worked closely with the research team and HABIC director to identify students in need of more individualized interventions than the school was currently offering. Identification was based on concern for a child's progress on an IEP and higher than average number of school absences or disciplinary referrals. Specific diagnoses were not the focus of this study; however, initial screening done by teachers' reports, indicated close to half of the participants (44%) were within the clinical range for a hyperactivity or inattentiveness diagnosis and numerous children were reported to show indicators of harm to self or other.

Boys ranged from 5 to 11 years of age ($M = 8.80$, $SD = 2.17$), and over half of the participants were Caucasian (5 participants), 1 participant was African American, and 3 did not report this information. Additional demographic information was collected from the mothers of 6 participants ($n = 9$), including mothers' ages ($M = 35.00$, $SD = 5.10$), education and income levels. The average level of education for mothers was graduation from high school ($M = 1.78$, $SD = 2.04$) in which 1 represents completion of high school and 2

represents some college credits. Levels of education ranged from not completing high school to completing a four-year degree. The average income was less than 20,000 dollars annually, coded as 1 ($M = 1.58$, $SD = 2.00$). The other 2 mothers from whom demographic information was obtained reported 'unknown' for their annual incomes. The percentage of mothers who were married and currently living with their spouse was 33%. The majority of the students (66%) were receiving mental health services when the program began, and nearly half (44%) were on medication.

Measures

      Emotional Availability Scales (EA) 4th Edition. The Emotional Availability (EA) Scales were originally created as a tool to examine global relationship quality by assessing six major dimensions; four are specific to the adult and two are child-focused (Biringen, 2008). The adult scales include 7-point rating systems for the following observable dimensions/characteristics: sensitivity, structuring, non-intrusiveness, and non-hostility. The child scales include ratings for amount of responsiveness or involvement towards the adult. When a relationship is described as more emotionally available, one would expect to see a higher quantitative frequency of these behaviors in both individuals (Biringen, 2009).

      For this study, instead of using the four adult scales, the child and the dog each were coded using the two child scales of involvement and responsiveness (child responsiveness to the dog, child involvement of the dog, dog responsiveness to the child, and dog involvement of the child). Furthermore, the child was scored in relation to both of the adults in the room (child responsiveness to the adults and child involvement of the adults). The global nature of EA allowed these two dimensions to be applied in this flexible way; however, establishing

inter-rater reliability was crucial to ensure the reliability of the scale in a new context (Biringen, 2009).

To increase chances of having similar styles of coding, several factors were theorized to be indicators of the dog's display of EA. Temple Grandin, a researcher of animal behavior and author of *Animals in Translation* (2005) advised the research team on what factors to take into account when coding the dog's emotions, mainly the dog's voluntary proximity to the child and body language (T. Grandin, personal communication, March 22nd, 2011). More specifically, coders were instructed to look closely at the height and motion of the dog's tail and the amount of visible white area in his or her eyes during interactions with the child. Coders also assessed whether the dog's mouth was open (indicating a relaxed stance) or closed tightly (indicating tension). Such animal behaviors are known to be associated with the dog's level of comfort or feelings of anxiety (McConnell, 2007).

Reliability. Reliability was established between two independent coders on the involvement and responsiveness subscales for both the child-dog and child-professional dyads. The primary coder was completely blind to information about whether session films were from the first, second, or third filming time as well as background information on the child. The other coder was not blind to such information.

Inter-rater reliability was established using Cohen's kappas for 9 cases (within 1 point was deemed agreement), and yielded kappas between .83 and 1.00, with the exception of "child responsiveness to the dog", which yielded a kappa of .67. The decision to accept these levels of agreement was made since these values are all close to the kappa $\geq$ .70 value that is acceptable (Morgan, Leech, Gloeckner, & Barrett, 2006).

In addition, after all the 27 filmed sessions were coded by both scorers, 6 potential disagreements out of the 27 were noted. Disagreement was noted when scores were more than 1.5 points apart. These scores were not included in the initial inter-rater reliability. The primary coder was asked to take a second look at these discrepant sessions, but without knowledge of the direction of disagreement. Then, these sessions were conferenced, and the "conferenced" score was used in data analysis. Except for these 6 conferenced codes, only the primary coders' scores were used in data analysis. Overall, two independent coders were able to reliably apply EA to the human-animal bond, suggesting that EA measures may be useful in future research in this area.

Parent and Teacher Questionnaires. The Child Behavior Checklist/6-18 (CBCL) and the Teacher Report Form/6-18 (TRF) are self-administered questionnaires with 20 competency questions and 120 questions regarding a child's behavior within the past 6 months. Externalizing composites, Internalizing composites, and Inattentiveness/ hyperactivity composites were utilized in analyses (Achenbach, 1991).

The Bonding Scale. This measure is a modified version of The Pet Bonding Scale originally developed by Angle, Blumentritt, and Swank (1994). The child is asked to answer 'never', 'sometimes', or 'always' to 12 questions pertaining to how much they look forward to seeing their dog, if they know what their dog likes, and feelings when they are away from their dog. Questions on the Bonding Scale tap the child's attachment feelings with respect to the dog.

School Attendance/Disciplinary Referrals. Exact dates of each child's school attendance and disciplinary referrals were acquired from the schools. Total number of days

missed (both unexcused and excused) and total number of disciplinary referrals (since beginning HABIC) were collected.

Procedures

As part of the IRB approval, permission to conduct the study was obtained from the principals at each of the three participating schools. One contact person at each school was identified to coordinate with the research team. This person also worked with the director of HABIC to identify appropriate trainer-dog matches for the child and session times. Parent and teacher permission was obtained for each participant as well as appropriate child assent.

Parents and teachers completed the pre-test questionnaires (CBCL/TRF) and a demographic sheet at the time of consent, approximately 1 week before the intervention began. Parents were asked to provide history about children's experiences with pet ownership; 6 participants' families currently owned some form of pet, averaging between 2 to 10 years' duration. Information regarding past, current, or on-going school-based services or interventions/medications were also obtained.

Once consent was obtained, participants began a series of 10-12 sessions of the HABIC intervention; weekly sessions were approximately a half hour long. Participants were asked to complete the Bonding Scale at the end of the first and last sessions. Testing consistency was maintained by using similar treatment environments and the same duration of sessions for each child. Sessions were videotaped at the first, middle, and last sessions. The second filming time was approximately a month, or halfway, into the intervention. Videotaping was used for the scoring of the EA Scales. Post-test assessments were collected within 2 weeks of the last session and consisted of the same assessments.

HABIC/AAT Protocol. In this team approach model, two adults were present in each session (a school professional and the trained/credentialed owner), along with the trained dog and child. The school professional was most knowledgeable on the child's behavior and, therefore, chose what presenting problems needed to be addressed each week. Before and during each session, the owner of the dog was responsible for monitoring the dog's fatigue, stress levels, and overall ability to participate.

Since the human-animal bond is expected to be the primary mechanism for change in AAT, it was crucial to monitor the dog's ability to interact in a way that would promote positive behavioral changes in the child. Similarly, the dog and child were strategically matched (performed prior to the study's inception, by HABIC personnel) to maximize the possibility of a strong emotional attachment between the child and dog. The breed, size, or shape of the dog reportedly does not affect the therapeutic outcomes as much as their trainability, willingness and ability to work with a variety of clients and in an array of settings (Granger & Kogan, 2006), qualities similar to the description of higher EA.

Sessions began with an informal child-dog greeting; oftentimes this involved the child petting the dog while conversing with the HABIC adults. The initial greeting was followed by an active 'work time' in which the child spent the majority of the session helping the dog learn commands through more structured play. During this time the child also practiced effectively initiating the commands the dog already understood. Students were often given some type of caretaking tasks such as grooming their dog or taking it on a walk (HABIC, 2009).

The work time varied based on trainer and child interests but at the core of the HABIC program is the desire to build self-confidence, self-esteem, and rapport between the

child, the professionals, and the dog. These activities are hypothesized to enable the formation of attachment between the two interactive partners (HABIC, 2009). However, the amount of time each team would spend engaged in the various tasks varied dramatically from child to child and session-to-session.

RESULTS

Descriptive statistics were calculated for pre-to-post-test EA scores, pre-to-post-test

parent and teacher measures of child behavior as well as school attendance/referrals. These

statistics can be found in Tables 1-4, Appendix B. Given the a priori hypotheses and the

exploratory nature of this project, one-tailed tests were used.

Child-Dog EA and Child-Adult EA Composites

Although child responsiveness and child involvement were scored separately for both

the dog and the child with one another, a composite "child-dog EA" score was created, as the

constructs are conceptually and statistically related (Biringen, 2008). Referring again to the

dyadic nature of EA, the quality of the connection between the two is highly dependent on

their abilities to appropriately 'match' the other's style of interaction. For similar reasons and

statistical consistency, a composite score was also created for the child's responsiveness and

involvement with the adults on the team called "child-adult EA".

Factor analysis of the six EA Scales (child responsiveness to the dog, child

involvement of the dog, dog responsiveness to the child, dog involvement of the child, child

responsiveness to the adults, and child involvement of the adults) supported coders'

observations—two factors accounted for 93-96% of the variance in child EA scores at

filming times 1 and 2. The two factors were the child-dog scores and the child-adult scores.

Cronbach's alpha of the four child-dog subscales at each time ranged from $\alpha =$.96 to $\alpha =$.98,

supporting the results that the scales were reliably measuring one factor, which in this case

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implies the overall emotional availability within the child-dog relationship. The two child-adult scores (i.e., the child's scores of involvement and responsiveness towards the adults) were significantly correlated at each time point as well, ranging from $\alpha =.92$ to $\alpha = .99$, suggestive of a second composite. Therefore, two composites (child-dog and child-adult) were created (averages were used in analyses).

Correlations of EA (with dog and with adult) with Behavior Problems, Bonding, and School Attendance/Referrals

Pearson correlations were performed to assess the link between child EA (with dog and then with the adult) and parent/teacher reported internalizing behaviors, externalizing behaviors, and hyperactivity/ inattentiveness at pre/post-tests. There was a negative relationship (on the border of significance) for child EA towards the adults at time 1 and teacher pre-test scores of inattentiveness, $r(8) = -.57, p = .053$. In other words, lower teacher scores of inattentiveness were associated with higher scores of child EA towards the adult in the first session. However, this finding is non-significant when partial correlations were performed to control for age of the child.

No significant negative correlations were found between parent or teacher post-test reports and EA scores at time 3. Curiously, significant positive correlations were noted for parents' post-test reports of internalizing and child-adult EA at time 3, $r(8) = .71, p < .05$. Correlations were also significant between parent internalizing post-test reports and the amount of change in child-dog EA scores between time 1 to 3, $r(8) = .59 p < .05$, and the amount of change in child-adult EA between time 1 to 3, $r(8) = .63 p < .05$.[1] No significant

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[1] These correlations were recalculated, controlling for child age, and the results were virtually unchanged.

associations were noted for school behavior referrals or attendance and EA scores. Correlations were assessed for EA and total number of absences (both unexcused and excused) before and after the time the child started HABIC, but no significant results were found.

Significant positive correlations were noted between child-adult EA Scores at time 3 and the Bonding Scale at post-test, r (8) = .61, p < .05, meaning as children became more emotionally available to the adults in HABIC, they reported higher levels of bonding with the dog. However, this finding was non-significant when partial correlations were performed to control for age of the child. Correlations were also performed for the amount of change in child-dog EA scores between time 1 to 3 and post-test Bonding Scales. Significant positive relationships were found, r (8) = .83, p < .05, thus indicating higher levels of change in the child's EA scores are related to higher self-reports of bonding. [1] Curiously, there were significant negative correlations between child-dog EA scores at time 1 and the Bonding Scale at pre-test, r (8) = -.67, p < .05, and post-test, r (8) = -.70, p < .05, suggesting the possibility of spurious relations.[1]

Pre/post Changes

Emotional Availability. A paired sample *t*-test was conducted to assess changes in *child-dog EA* from time 1 to time 3. A significant increase was noted in EA scores from time 1 (M= 3.58, SD=.80) to time 3 (M= 4.59, SD=.93); t (8) = -2.35, p < .05 (figure 1). The effect size of this difference was d = -1.16, which is large according to Cohen (1988). Substantively, this finding indicates children's EA towards their therapy dog (and vice versa)

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[1] These correlations were recalculated, controlling for child age, and the results were virtually unchanged.

increased over the course of HABIC. [2] This finding highlights the increase in a child's EA toward the dog over the course of receiving HABIC. Given the composite nature of the child-dog EA, this increase indicates the dog's ability to be emotionally available and perhaps enjoyment of interaction with the child grew over the course of the sessions as well.

A paired sample *t*-test was conducted to assess *child-to-adult EA* from time 1 to time 3. A significant increase was noted in EA scores from time 1 (M= 3.69, SD=. 77) to time 3 (M= 4.72, SD=.81); $t(8)$= -3.41, $p < .05$.[2] This finding solidifies the gradual increase in a child's EA towards the professionals over the course of receiving HABIC. Taken together, results suggest that children are able to create more secure relationships with both animals and adults over the course of the intervention. Interestingly, no significant changes were observed on the Bonding Scale self-report measure.

Behavior Problems. Paired-sample *t*-tests were conducted to assess the pre/post-test changes on teacher and parent behavioral reports of internalizing symptoms, externalizing symptoms, hyperactivity and inattentiveness. No significant decreases in child behavior problems were found on either parent or teacher reports. However, a significant increase was observed for teacher reports of inattentiveness between pre (*M*= 10.63, *SD*= 4.21) to post (*M*= 14.11, *SD*= 5.37) testing times; $t(8)$= -2.16, $p < .05$. This finding suggests some students actually showed greater difficulty focusing in the classroom according to their teachers. These results are in contrast to parent reports that indicated a negative trend in inattentiveness. A significant increase was also observed between teacher internalizing reports at pre (*M*= 7.00, *SD*= 5.50) to post (*M*= 9.78, *SD*= 6.72) testing times; $t(8)$= -1.82, *p* = .053. This finding is in contrast to parent reports of internalizing behaviors, which virtually stayed the same from pre to post-test.

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[2] *T*-tests also found child-dog and child-adult EA significantly increased between filming times two and three.

School Records. Paired-sample *t*-tests were conducted to assess changes in school absences and disciplinary referrals over the course of the intervention. No significant decreases in either unexcused or excused absences were found, but the number of disciplinary referrals dropped significantly between pretest (*M*= 11.38, *SD*= 9.00) and posttest (*M*= 6.13, *SD*=3.55); *t* (8)=-1.98, *p* < .05, with a medium effect size of *d* = .76 (Cohen, 1988). This result suggests children were significantly less likely to receive referrals after participating in the HABIC intervention.

DISCUSSION

In support of the first hypothesis, independent coders were able to reliably assess the extent of child-dog responsiveness and involvement. Significant inter-rater reliability highlights the flexibility of the EA Scales and their potential for human-animal bond research. These findings expand previous research on EA that primarily focused on the child-caregiver dyad. One purpose of this research was to apply the EA Scales in this new context. As the EA Scales continue to be applied in the context of human-animal interaction, we will have more information on the psychometric properties of this measure in this context.

Consultation with animal behavior specialist, Temple Grandin, enhanced the coders' abilities to determine the emotional responsiveness and voluntary versus mandated involvement of the dog. Grandin is known for her contribution to the field of animal welfare as well as her personal ability to decode the emotions of animals. Using her expert knowledge in this area allowed us to better understand the dog's experience in HABIC. In future studies, such awareness could be used to ensure that the dog is also benefiting from the relationship with the child.

EA was significantly related to the Bonding Scale, a measure used in previous human-animal research. This highlights the link between EA observational methods and the child's self-report, strengthening the study's findings. However, our results did not entirely support the hypothesis that higher EA would be associated with lower levels of teacher and parent behavior problem reports. It is possible that this study emphasized the inherent discrepancies in these two methods of collecting data (coder observation versus parent and

teacher reports). The child's EA towards both the dog and adult increased during HABIC. Yet, these observed improvements were not reflected in reports of changed behavior by others.

The intensity and duration of a child's specific challenges may have contributed to the null findings. For instance, although a child's EA may rise over the course of 3 months, it may be difficult for teachers and parents to change their perceptions of a child who has been displaying behavioral and emotional difficulties long-term. Indeed, research has shown that perceptions and attitudes in the classroom setting can be both capricious and difficult to change. Pianta (1999) coined the term "filters" to explain teachers' perceptions and how they can distort interpretations of student behavior. Our study did not address teacher or parent perceptions of the identified student, which could have influenced both behavioral reports and students' interpersonal experiences with adults. Attribution bias may be an important element to address in future intervention research; it may have played a role in our null findings. In the future, perhaps one can report to teachers and parents about the power of reputation, and the need for them to score as objectively as possible. Such a precaution might increase the likelihood of teachers and parents reporting the actual behavior they have observed versus relying on old perceptions of the child.

Observational research is less prone to attribution bias, and this study's observational measure revealed clear findings of improvement over the course of the intervention. Both dyads increased from mean scores within the 3 to the 4 ranges on the EA Scales. Substantively, this represents the difference in a relationship that is disconnected and relatively non-emotionally available (3 range) to a relationship that although may show some signs on anxiousness or over-involvement, appears to look good to the average observer (4

range). A child with an EA score around 3 often appears to have flat affect, looks disinterested in what the dog or adult is doing, and at times, actively avoids interacting with others. Such a detached child appears dramatically different from a child scoring around 4 who shows less avoidance and a desire to engage but who also struggles to respond to others' attachment cues (Biringen, 2008).

Pertaining to participants in this study, increasing to a 4, or in some cases 5 in EA, would mean that the child is more open to becoming emotionally connected to others, but still needing more guidance as how to appropriately interact in a way that can lead to more satisfying moments for each individual. These findings are extremely promising for professionals aiming to increase the quality of relationships a child experiences in his or her life. Increasing a child's ability to use appropriate social skills through instruction is something that clinicians are relatively easily accomplished. Yet, increasing a child's desire to voluntarily engage with others is more difficult to coach.

In partial support of Hypothesis 4, the number of school disciplinary referrals significantly decreased over the course of HABIC, reinforcing the school-related benefits of implementing this program. More specifically, this finding suggests that once students start forming an emotional connection with the dog, they are less likely to be sent to the principal's office. This finding, in combination with the non-significant changes on parent/teacher reports, shows that although participants had fewer severe behavioral problems at school, the smaller, every-day challenges still remained or were perceived to remain. It is possible that increasing the number of HABIC sessions per school year could lead to more dramatic changes for the child.

Limitations

First and foremost, this study is limited by the small sample size. Additional data collection on this project should ensure sufficient power to detect differences and decrease the likelihood of spurious findings. Furthermore, all participants were male, and including females in future studies would be important, to increase generalizability.

All of the participants in the study were currently receiving school wide implementation of PBS as part of their IEP plans. Several of the students also received outside treatment in the form of counseling or medication during HABIC. The small sample size makes it especially difficult to control for these variables and identify specific changes that are due to the AAT intervention versus outside support. In addition, given the school-based nature of this program, there was limited communication with the families, making it more difficult to have a cohesive understanding of what changes the child was experiencing in each context of his life. Future studies could benefit from contact with parents at each filming or testing time to have a more well-rounded understanding of what is happening in the child's life at that time.

In addition, HABIC teams varied in their session approaches. The variability of methods was often due to each child's individual goals and HABIC teams' style of guiding sessions. When session format among HABIC teams vary substantially, however, it is challenging to establish treatment fidelity. For instance, some teams allowed less amount of time for the child and dog to engage in unstructured playtime. At least for some children, the observational data indicate that the amount of structured activities (i.e., the amount of time a child spends doing commands with the dog) may be related to increases in EA.

Without adequate time in sessions for unstructured interaction, the child and dog may have more difficulty forming an emotional connection.

Lastly, future studies should attempt to utilize all of the EA Scales, as well as to code child-adult EA for each adult professional in the room. For example, the two adults on the team should each be scored using the adult subscales to directly address the amount of 'structuring' in sessions. Further, 'sensitivity','non- intrusiveness', and'non-hostility' could also be scored in this context, both for the adult as well as the child in relation to the dog (with the child being viewed as the adult leader). Overall, the EA Scales have the potential for application in the context of the human-animal bond, and this study brings us closer to this goal.

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Table 1

Combined Child/Dog and Child/Adult EA Descriptive Statistics

	N	Mean	SD
Child-Dog EA Pretest	9	3.58	.80
Child-Dog EA Posttest	9	4.60	.93
Child-Adult EA Pretest	9	3.70	.77
Child-Adult EA Posttest	9	4.72	.27

Table 2

Results from Parent Child Behavior Checklist t-Test

	N	Mean	SD	*T*
Internalizing	9	9.14	6.26	
				-.12
Internalizing X[a]	9	9.33	6.59	
Externalizing	9	19.65	15.58	
				1.41
Externalizing X[a]	9	15.07	12.15	
Inattention	9	8.74	5.01	
				1.01
Inattention X[a]	9	7.22	4.12	

[a] Refers to CBCL posttest scores after HABIC intervention

Table 3

Results from Teacher Report Form t-Test

	N	Mean	SD	*T*
Internalizing	9	7.00	5.50	
				-1.82
Internalizing X[a]	9	9.77	6.72	
Externalizing	9	17.61	9.12	
				-1.75
Externalizing X[a]	9	23.11	14.33	
Inattention	9	10.63	4.21	
				-2.16*
Inattention X[a]	9	14.11	5.37	
Hyperactivity	9	12.52	4.54	
				-.978
Hyperactivity X[a]	9	13.55	5.61	

[a] Refers to TRF posttest scores after intervention
*p< .05

Table 4

Results from Disciplinary Referrals t-Test

	N	Mean	SD	*T*
Excused Absences	9	4.00	3.67	
				.15
Excused Absences X[a]	9	3.85	2.10	
Unexcused Absences	9	.38	.48	
				-1.31
Unexcused Absences X[a]	9	.75	1.10	
Disciplinary Referrals	9	11.38	9.00	
				2.00*
Disciplinary Referrals X[a]	9	6.13	3.55	

[a] Refers to posttest scores after HABIC intervention

*p< .05

Figure 1

Changes in EA Scores during HABIC Intervention

Note: Session times are in 4-week increments
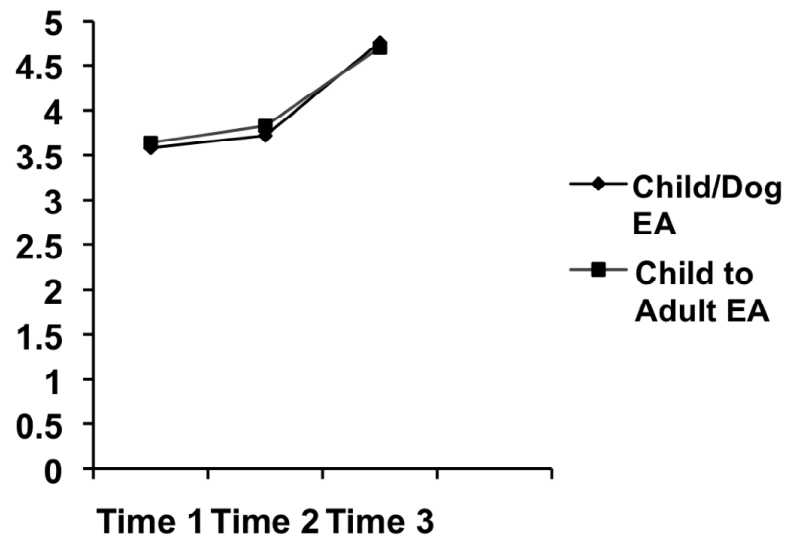
APPENDIX I: LITERATURE REVIEW

Historical Beginnings of Animals in Therapy

For centuries, dogs have been called "a man's best friend." Undoubtedly, this phrase formed as humans began to realize their emotional connection to their animals, which they had originally bred to perform functional tasks, such as hunting, transportation, or provide protection (Beck, 2000). The inevitable attachment between animals and humans has been the focus of many writings and has lead to an increase in dogs being used as companion animals or as an adjunct to traditional psychotherapy (Beck & Madresh, 2008; Levinson, 1970; Walsh, 2009a).

Starting as early as 1742 in York, England, dogs were used to increase the self-control of clinically ill individuals. William Tuke thought having patients care for farm animals would help individuals feel needed, leading to better behavioral regulation (Dashnas-Stiles, 2001; Mallon, 1992). Sigmund Freud was the first documented professional to use an animal in family therapy, with a father and his son learning to handle the dog in the session. Freud hypothesized that being in charge of the dog during the session was associated with the child's increasing positive interactions within the father-child relationship (Walsh, 2009b). Although therapists (such as Freud) were using animals to increase the amount of change clients were experiencing, the topic was rarely explicitly discussed in the field (Hines, 2003).

In the 1960's, Boris Levinson, a child psychologist often referred to as " The Father of Animal-Assisted Therapy", began to publicize the success he had witnessed with incorporating animals into therapy with children (Walsh, 2009b). Levinson promoted the idea that using animals was especially useful for children with physical disabilities or psychological challenges, such as anxiety, obsessive-compulsive, or externalizing behaviors

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(Mallon, 1992). Although Levinson's work was predominantly anecdotal and based on case studies, he provided some of the first documentation of positive therapeutic outcomes. He strongly believed that more research needed to be done to strengthen empirical support for having animals as co-therapists, simultaneously making it a more socially acceptable practice (Levinson, 1970). His timeless ideas are still the underlying basis for many research studies done in the field of AAT that aim to pinpoint the most valuable aspects of the human-animal relationship (Granger & Kogan, 2006; Walsh, 2009b).

In a recent meta-analysis, Nimer and Lundahl (2007) found that studies using AAT consistently showed moderately high effect sizes especially with dogs, ultimately recommending dogs might be the best choice of animal for AAT. Of the 250 studies reviewed, 49 met the inclusion criteria, the highest effects sizes were recorded when treatment was in the individual format, that is, the provision of one-on-one interaction with the dog. Moderate effect sizes were most commonly associated with autism-spectrum symptoms, medical challenges, behavioral problems and emotional well-being. Young children consistently evidenced the most beneficial outcomes from AAT; the authors proposed that children are most accepting of the animal's influence. Nimer and Lundahl (2007) stress the need for more theoretical exploration of the specific mechanisms that contribute to the empirically validated success of AAT.

Humans' Attachment with Animals

Levinson (1970) believed that children found it easier to connect with animals because they could receive necessary physical touch without the use of language or fear of emotional entanglement that human relationships can entail. He found this to be especially true if the child had anxious tendencies or a history of problematic relationships with

humans. He hypothesized that animals are less threatening to engage with, satisfy basics needs of trust and loyalty, allow for a quicker therapeutic process, and provide more opportunities to incorporate play (Mallon, 1992). Levinson stated that children often feel lonely and removed from the adult world and their families. Children experiencing problems socializing with peers or adults have been reported to feel like they are no longer alone while interacting with an animal (Levinson, 1970).

In many ways Levinson's rationales for incorporating animals were based in attachment theory. The dog is theorized to be a transitional 'object' or attachment figure, which helps a child create a more positive outlook of forming relationships with others (Triebenbacher, 1998). When a child is allowed ample opportunities to form a strong emotional connection with a dog, the child is hypothesized to transfer these positive perceptions and show a desire to create stronger relationships with other children or teachers.

Similar to Levinson's perceptions, Sable (1995) addresses the importance of humans' attachment with pets across the life cycle to promote valuable social policies, interventions, and research. At each stage in childhood, the attachment needs and developmental tasks of a child grow and change. Although the role of a significant attachment figure may vary as people develop, a secure emotional bond with an animal is known to promote well-being and higher levels of functioning across the lifespan (Sable, 1995; Melson, 2003; Nimer & Lundahl, 2007; Walsh, 2009a)

Adult owners of companion animals reported the most important reasons for having their animal was the feeling of security they provided (Endenburg, 1995). In a recent study of college aged pet-owners, Beck and Madresh (2008) found that attachments with pets were consistently rated as more secure than human relationships. Given these results, the authors

suggested animals could serve as a potential buffer against other life stressors. This notion coincides with beliefs that during a time of transition or experience of stress at home or school, a canine attachment figure can serve as a protective factor for children (Levinson, 1970; Walsh, 2009a).

Trienbenbacher (1998) found that 98% of children alluded to loving their pets "very much" and the undeniable connection between touch and expression of love for most children. Interviews exploring how children communicated with their pets showed that touch, as in hugging, kissing, or petting, were the primary ways to express love. Although professionals who work with children in schools, therapy, or in any context want children to know they are loved and appreciated, physical touch that is expected and socially acceptable with a dog, will usually not be within the realm of appropriate therapeutic practices.

Melson (2003) presents empirical support for the idea that animals can be seen as humans in their ability perform tasks related to "higher" cognitive functioning. Animals have been known to learn ways to communicate with language and express emotions such as empathy and altruism. Exemplifying commonalities of humans and animals is one way to conceptualize why the human-animal interaction and bond may be a stress reducing experience (Friedmann, Katcher, Thomas, Lynch, & Messent, 1983) and facilitate social interaction with humans (Melson, 2003).

Commonly used measures. Viewing the animal as human provides support for the applicability of using relational measures originally created for humans with a dog. Kurdek (2008) attempted to study the application of Ainsworth's four-feature model of human attachment tendencies in dogs, more specifically, whether a dog could be seen using a human as secure base or safe haven, displaying such behaviors as proximity maintenance and

separation distress. In agreement with Melson's assumptions and Ainsworth's model, the authors stated dogs did in fact display attachment behaviors (Kurdek, 2008). Given the notion that both children and dogs display secure relationship tendencies, literature points to an identifiable attachment between humans and animals.

Internal Working Model. To further understand the benefits of a human-animal attachment, researchers have attempted to delineate signs of transferable human-animal internal working models. Beck and Madresh (2008) found attachment ratings were significantly correlated or carried over from humans to animals when the individuals reported anxious or avoidant attachment styles, suggestive of the presence of an internal working model transferable from animal to human, and vice versa.

Kurdek (2008) aimed to test the transferability concept by recording if lower self-reports of human attachments are associated with lower attachments with a dog. They found little evidence supporting this notion--results supported human- or animal-specific working models. Overall, researchers have proposed the idea of multiple internal working models and recommend further research in this area (Beck & Madresh, 2008; Endenburg, 1995; Kurdek, 2008).

The collection of findings above suggests inconsistent support for the transferability concept, but a weakness of the above approaches was the use of self-reports. The inclusion of observational measures may be useful. For example, scoring the child's EA with the dog and using other reliable measures to assess their relationships with teachers, peers, and parents may provide valuable and novel insights for the notions of transference versus multiple internal working models within a child.

Emotional and Behavior Disorders

Children and adolescents with symptoms of emotional or behavioral disorders (EBD) represent close to nine percent of all students who receive special education services (Jenson, 2005). EBDs are identified when a child displays challenging behaviors that appear to be persistent, more extreme than typical developmental behaviors, and not aligned with cultural and socially accepted values. Behaviors could be in the form of externalizing (aggression, hostility, or hyperactivity) or internalizing (anxiety, depression/suicidal acts, or helplessness) problems. Socially these children are often isolated or excluded from peer interactions, which is the largest predictor of problems adjusting to adulthood (Jenson, 2005). In parent and child self-reports, children with EBD's as compared to children with no established disabilities, report significantly lower scores on quality of life measures, more specifically their quality of relationships with family and friends (Sacks & Kern, 2008).