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# Conceptual Framework for Animal Assisted Therapy

Tracy S. Geist

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**Abstract** Animal-assisted Therapy (A-AT) is becoming a popular therapeutic treatment for both children and adults. The author has used A-AT in a school setting with students with emotional disturbances. A review of the literature regarding A-AT reveals a lack of a unified theoretical framework. This paper proposes a conceptual framework that incorporates a physiological, psychological, and cognitive model to depict the functional deficits that challenge students with emotional disturbances. Attachment Theory is then used to describe why A-AT may be effective in improving the socio-emotional and behavioral functioning of students with emotional disturbances.

**Keywords** Animal assisted therapy · Attachment theory · Cognitive theory · Students with emotional disturbances

## Introduction

Working with children and adolescents who have emotional disturbances can be a challenge. Educating them can be even tougher. These students are often viewed as being too disruptive to the general population in their public schools. Some of these students have a mental health diagnosis; others have horrible home situations, and many have both. In a school environment, they usually perform better in smaller size classrooms that incorporate therapeutic interventions into the educational program.

In Pennsylvania, the Capital Area Intermediate Unit (CAIU) operates an emotional support program at Hill Top Academy. This program provides educational services for students from kindergarten to twelfth grade. Like many

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emotional support programs, classes are designed to be small in size. In addition to the teacher in each classroom, there are educational aids, social workers, speech therapists, and occupational therapists available to assist each student's individualized educational need. All students have an Individualized Education Plan (IEP) that has academic and behavioral goals. All members of the student's education team work on stabilizing the student through progress on IEP goals. When students are able to make sufficient progress on their behavioral and academic goals, they are often transitioned back to their home districts. What makes the program at Hill Top Academy unique is the use of five, full-time therapy dogs that assist the school staff as co-teachers and co-therapists throughout the school day.

It is often the case that students who have been stabilized for a few months can de-stabilize over night as a result of emotional trauma. For example, one student, who had been stabilized for 5 months, became unstable when his parents were arrested for felony charges. Another student, who was progressing smoothly, lost much of his progress when a friend committed suicide. At times like these, their IEP goals become unrealistic and a crisis intervention response is needed. One particularly effective approach to the crisis intervention has been the use of therapy dogs.

The CAIU has always been open to new interventions to help the students and supported the utilization of therapy dogs in the emotional support program approximately 7 years ago. Currently, the program has five, full-time therapy dogs with over 20 trained staff as dog handlers. When each of the young men in the above mentioned examples came to school following the events described, they trashed their classrooms before being ushered to a social worker's office containing a therapy dog. There they collapsed on beanbag chairs. Both were greeted by a therapy dog, which slowly emerged from its place of rest. Slowly, the dog approached the students and lay against them. Within half an hour, both boys were expressing their emotions while petting the dog. Within an hour, both boys had managed a smile as the result of something silly the dog did. Within 2 hours both boys were back in their classrooms feeling ready to try some work. Before the integration of therapy dogs into the program, situations like this typically would have required the student to be in the social worker's office for an entire day, if not several. Therapy dogs do not "fix" the students, but they help them find temporary healing by helping them de-escalate and refocus enough to get through the day.

Delta Society is a nationally known organization that certifies therapy dogs. They define animal-assisted therapy (A-AT) as:

Animal-assisted therapy utilizes the human/animal bond in goal-directed interventions as an integral part of the treatment process. Working animals and their handlers must be screened, trained and meet specific criteria. A credentialed therapist working within the scope of practice of his/her profession, sets therapeutic goals, guides the interaction between patient and animal, measures progress toward meeting therapy goals, and evaluates the process (1997, p. 1).

A review of the literature reveals a lack of a unified theoretical framework. This creates a problem for professionals who realize the importance of A-AT for

therapeutic purposes but need a scientific evaluation of its effectiveness for legitimizing and funding a program. This paper proposes a conceptual framework which incorporates a physiological, psychological, and cognitive model to depict the functional deficits that challenge students with emotional disturbances and applies Attachment Theory to describe why A-AT may be effective in improving the socio-emotional and behavioral functioning of students with emotional disturbances.

## Literature Review

### Attachment Theory: Neuro-physiological Features

Allan Schore (2001a, b, 2003, 2005, 2009) has conducted research regarding the effects of attachment on right brain development, affect regulation, and infant mental health. Schore focuses on right brain development since it is the right hemisphere that gives us the sense of being connected to one another. The right hemisphere also deeply connects into the limbic system which is the center for processing emotion.

According to Schore (2001a), the human brain has a critical growth spurt that begins in the third trimester and continues to about 18–24 months of age. Schore states that this is considered a critical period because this time frame:

prescribes that specific critical conditions or stimuli are necessary for development and can influence development only during that period. But it also suggests that during critical periods brain growth is exquisitely susceptible to adverse environmental factors such as nutritional deficits and dysregulating interpersonal affective experiences, both of which negatively impact infant mental health (p. 3).

If the right hemisphere of the brain fails to mature because of a lack of experience, the child will become vulnerable to losing structural components of the right hemisphere necessary for affect attunement and connection with others (Siegel 1999). Insecure attachment therefore triggers chaotic alteration in the limbic system which processes emotion. This creates an unorganized state of mind. Siegel (1999) defines the mind as the “flow of energy and information within the brain and between brains” (p. 2). A person’s state of mind (organized or unorganized) is consequently contingent on attachment interactions with others.

An unorganized state of mind deeply impacts a child’s affect regulation. According to John Bowlby (1969), an infant’s capacity to cope with stress is correlated to certain maternal interactions. A child with an insecure attachment and an unorganized state of mind is unable to regulate arousal states he or she experiences (Schore 2001a). Arousal states are caused by both familiar experiences as well as novel experiences. Stress theory asserts that a person will have a “fight or flight” response when experiencing stress. The first stage of the fight or flight response is the activation of the sympathetic nervous system. This causes a system-wide response. Adrenaline and noradrenalin are released leading to increased

alertness. Blood is diverted from the internal organs and the skin to skeletal muscles. The heart rate, force of heart contractions, and respiratory rate are increased. All of these changes allow the body to exert a large amount of energy over a short period of time so that the individual may either fight or run away effectively (Spierer et al. 2009). Without the ability to regulate emotion, the child can be in a fight or flight mode the majority of his or her day, causing socio-emotional and behavioral distress.

Different attachment patterns activate unique groups of neurons. These neuron groupings create our representation or our experience of reality. Siegel (1999) states:

The emotionally distant connection of avoidantly attached children with their dismissing parents can be understood as involving primarily the linear, logical, linguistically based mode of communication of the left hemisphere. Persons in whom the left-brain mode of processing predominates have been shown to be markedly deficient in the ability to read others' nonverbal communications and to sense the emotional expressions of others or of the self (p. 161).

This connects with Schore's earlier statement about the right hemisphere of the brain being relational and experience dependent. Since the brain is dynamic, new forms of interpersonal relationship experiences may evoke new representational processes. Therapists such as Dr. Rise VanFleet (2008) state that therapy dogs can help facilitate healthy attachment experiences through the human-animal bond and therefore help change representational processes.

### Attachment Theory: Psychological Features

Bowlby (1969) defines attachment as "an inborn system in the brain that evolves in ways that influence and organize motivational, emotional, and memory processes with respect to significant care giving figures." At the level of the mind, Siegel (1999) states "attachment establishes an interpersonal relationship that helps the immature brain use the mature functions of the parent's brain to organize its own processes" (p. 67). In this way, if a caregiver is attuned to their infant, the child will have a secure attachment and develop a healthy concept of self. However, if there is a disruption in the attunement of that attachment process, an avoidant, ambivalent, or disorganized attachment style can develop (Wallin 2007). An avoidant attachment style is usually developed with a caregiver who is dismissive of the infant's emotional needs. Ambivalent attachment style occurs when a caregiver fluctuates from dismissive to overly intense involvement while pushing his or her emotional state of mind onto the infant. A disorganized attachment style develops when the caregiver, typically reacting to her/his own troubled emotional state, is frightening to the child. For the purposes of this paper, these three attachment styles will be grouped as "insecure" attachment. This is done to help describe the use of A-AT with children who may come from any of these three styles of attachment.

In these attachment transactions, the brain/mind of the caregiver is influencing the brain/mind of the child in the form of co-regulation. According to Schore (2001a), Schore and Schore (2008), attachment theory is in essence a regulatory

theory. A secure mother is, at a non-conscious level, continually regulating her infant's emotional arousal. This dyadic regulation of emotion influences the development and expansion of the infant's regulatory system which appraises and copes with stress (Schore 2001a, 2009).

An abusive or weakly attached caregiver is inaccessible and reacts to the infant's expressions of emotions and stress inappropriately and/or rejectingly, and shows minimal or unpredictable participation in the various types of arousal regulating processes. Instead of modulating, she induces extreme levels of stimulation and arousal, either too high in abuse or too low in neglect. Because she provides no interactive repair, the infant's intense negative emotional states last for long periods of time. Such states are accompanied by severe alterations in the biochemistry of the immature brain, especially in areas associated with the development of the child's coping capabilities (Schore 2001b, 2009). Early dysregulating experiences lead to more than an insecure attachment; they trigger a chaotic alteration of the emotion processing limbic system that is in a critical period of growth in infancy. The limbic system has been suggested to be the site of developmental changes associated with the rise of attachment behaviors. It is also thought to be centrally involved in the capacity to adapt to a rapidly changing environment and in the organization of new learning, both critical for school-aged children.

This echoes Winnicott's concept of the holding environment, described as a place where the mother organizes perceptions of the infant while bringing the environment to the child (Greenberg and Mitchell 1983). According to Winnicott, without this holding environment, the infant is unable to self-integrate. The mother functions as a mirror, precisely reflecting to the infant their own experience. Winnicott described this experience as "When I look I am seen, so I exist" (as cited in Greenberg and Mitchell 1983). "Imperfections in the reflected rendition mar and inhibit the child's capacity for self-experience and integration and interfere with the process of 'personalization' " (Greenberg and Mitchell 1983, pp. 192–193). To further expand on the concept of the holding environment, Schore (2001a) views attachment as synchrony and stress as asynchrony. If synchrony follows stress and the infant recovers from the asynchrony, resilience is developed. In this way, a child will develop a "true self" through the maturation of the experience dependent right brain. If the attachment is insecure and asynchrony is never resolved, a child is vulnerable to developing a chaotic sense of self.

## Cognitive Theory

Cognitive theory is based on the belief that there is a continuous reciprocal relationship among a person's cognitions, behavior, and environment. For an individual with an insecure attachment style, perceptions of the world can be marked by shame or rejection. Strong negative emotions are linked to memories of rejection and therefore the individual develops a model of itself as unlovable and of others as unavailable, which can then be acted out behaviorally (Siegel 1999). For instance if a person feels they are "bad", they will behave "bad", and society will treat them as a "bad" person. Psychological disorders result from discordance between the internal cognitive system of processing and interpreting external stimuli

related to these unhealthy representations ([Patterson 1986](#)). According to Aaron Beck ([1976](#)), the founding father of cognitive therapy, psychological problems:

may result from commonplace processes such as faulty learning, making incorrect inferences on the basis of inadequate or incorrect information, and not distinguishing adequately between imagination and reality. Moreover, thinking can be unrealistic because it is derived from erroneous premises; behavior can be self-defeating because it is based on unreasonable attitudes (pp. 19–20).

To have a healthy sense of self, the autobiographical memory requires autoeosis, or self knowing. Autoeosis appears to be dependent on critical development of frontal cortical regions of the brain which are influenced by interactions with others ([Siegel 1999](#)). In this way, cognitive theory is harmonious with attachment theory.

According to cognitive theory, people react to events in terms of the meaning they attribute to the events. According to [Patterson \(1986\)](#), “the nature of a person’s emotional response—or emotional disturbance—depends on whether he perceives events as adding to, subtracting from, endangering, or impinging upon his domain” (p. 35). A person’s distorted thoughts have the characteristics of automatic thoughts. These thoughts arise reflexively and seem plausible to the individual but not to others. Because these thoughts are automatic, they are resistant to change.

From experience, many of the students enrolled in the emotional support program display insecure attachment, are unable to regulate their emotions, and view themselves as “bad”. Many of the students either become self-destructive as a result of self-hate or adopt a “bad” persona that is tough, uncaring, and celebrated by them. The physiological, psychological, and cognitive features are therefore linked together since developments in one area affect the other two. It is my contention that intervening in a student’s emotional state with animal-assisted therapy will break the sequence of negative automatic thoughts and help the student develop a healthier attachment and self-concept.

### Empirical Studies Using Animals in Therapy

Animals can reduce the physiological reaction to stress. [Allen et al. \(1991\)](#) attempted to gather physiological proof that companion dogs could affect levels of stress reported by their owners. They conducted an experimental study involving women who reported high levels of stress in their jobs. All jobs were within the “helping” profession (i.e. nursing, teaching, medicine, etc.). The women were asked to perform a difficult mental arithmetic task in one of three conditions. The subjects were either alone with the experimenter, with their best friend, or with their dog. Measures were taken of diastolic and systolic blood pressure, skin conductance response, and heart rate. Women responded as “challenged” when their dogs were present and “threatened” when their best friends were present. Also, the women with their dogs performed the difficult arithmetic task considerably better than those with only their best friend or the experimenter present. As a part of the study, the researchers interviewed this “dog” group. The women predominately responded

that with their dog, there were no fears of being judged. The women said the dogs provided all the desirable qualities of a best friend (listening, empathetic, physical comfort) without any of the undesirable evaluative traits (Allen et al. 1991). Friedman et al. (2000) concluded the same outcome in a similar study with children. “The presence of a calm, attentive dog apparently moderates the stress responses more than the presence of an adult and even more than the presence of a supportive friend when children were reading aloud or having a routine medical exam” (Friedman et al. 2000).

Kogan et al. (1999) conducted two case studies on the use of A-AT with children with emotional disorders. Two boys, ages 12 and 11, were chosen for the study. Both boys were placed in an emotional support classroom with weekly individual and group counseling, as well as an Individualized Education Plan (IEP) and were not showing improvement with this added support. The students had individual sessions with an A-AT therapist. These sessions were videotaped. Goals on which the A-AT therapist could focus were developed by the IEP team. This treatment lasted for fourteen sessions, culminating in a presentation to the students’ class of the commands they had learned with the dog.

Treatment sessions were 45–60 min in length. The first 20 min were used to talk with the students and build rapport while grooming the dog. Topics were sometimes introduced by the therapist that related to recent issues in the classroom but the child was never forced to discuss any of these topics. The second half of the session was spent working with the dog and utilizing a variety of commands and training techniques. As sessions progressed, multi-step commands that required patience and perseverance were introduced. To measure progress, teachers completed an ADD-H Comprehensive Teacher Rating Scale both pre- and post-treatment. Each goal was operationally defined and observations were noted by educational professionals. The videotapes were coded from the first, midpoint, and final sessions. They were coded for eye contact and appropriate tone of voice. Progress towards goals on the IEP was monitored. Finally both parents and child completed a survey discussing their experience. All data sources reported growth in use of positive comments, a decrease in distractibility, an increase in eye contact with people, improved appropriateness of voice tone with people, and increase in sense of control over self and environment. All data sources with the exception of the teacher rating form showed improved peer relations and a decrease in tantrums.

Katcher and Wilkins (1994) designed an experimental study at Devereux assessing the use of animals with residents diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) and Conduct Disorder (CD). Fifty children were randomly assigned to one of two voluntary experiences. The control group was assigned to an Outward Bound (OB) course where they learned how to rock climb, kayak, hike, as well as learning water safety and wilderness safety skills. The treatment group was assigned to the Companion Zoo (CZ) program. In this program they received 5 h of nature education during the school week. After 6 months the OB group went through the CZ course and the original CZ group transitioned back to a regular school program but were allowed visits to their animals during free time.



The Zoo contained gerbils, hamsters, mice, chinchillas, iguanas, fish, turtles, doves, chicks, goats, a Vietnamese pig and the facilitator's pet dog. In the CZ program there were two general rules. The participants had to be gentle with the animals and each other which included speaking softly while in the zoo, and they had to respect the animals and each other which included avoiding speech that would be de-valuing. Participants had to learn how to care for and hold the animals before they were allowed to adopt them. After adoption there were several other skill areas the students could master including how to weigh and measure their pet, chart growth, and compute feeding requirements. Katcher and Wilkens (1994) point out "the educational and learning tasks of the CZ program are comparable in scope to the very school tasks which these students experience with antipathy, avoidance, and repeated failure" (p. 2).

Attendance at the CZ program was always better than attendance at the OB program. For the summer term, average attendance at the CZ program was 93% compared to 71% for OB. In the fall term, attendance at the CZ program was 89% compared to 64% for OB. When the OB group switched to the CZ program their attendance increased from 67 to 87%. Education also progressed rapidly in the CZ group. "Some students who had made no progress in the regular school program for as long as 4 years rapidly accomplished learning tasks in the Zoo" (Katcher and Wilkins 1994, p. 3). It is also important to note that no child was ever restrained in the Zoo. In fact, teachers and staff started to use trips to the Zoo as a therapeutic intervention to calm children who would have otherwise needed to be restrained or medicated.

The Achenbach Child Behavior Checklist (Achenbach and Edelbrock 1986) was completed at four intervals by the teachers in the students' regular education program. These measures revealed a significant reduction in total behavioral pathology in the Zoo group as compared to the control group. The effects noted were a decrease in agitated and aggressive behavior, improved cooperation with instructors, enthusiastic engagement with learning, and improved behavioral control in the regular education classes. These changes were immediate within the Zoo environment and generalized into the regular school setting within 6 months. However these behaviors did not generalize into the less structured settings such as their resident life. When the children left the Zoo program, their behaviors deteriorated. Katcher and Wilkins (1994) concluded that "animal assisted therapy and education has a large, persistent, and broadly distributed therapeutic effect on highly aggressive, emotionally disturbed children and adolescents with severe learning difficulties" (p. 3).

Ainsworth (1991) described attachment figures as having four features: proximity maintenance (physical nearness and accessibility are enjoyable), separation distress (they are missed when they are absent), secure base (dependable source of comfort), and safe haven (they are sought to alleviate stress). Previous research has indicated dog companionship can provide proximity maintenance (Bonas et al. 2000), separation distress (Stallones 1994), and a secure base (Bonas et al. 2000). In 2009, Kurdek completed the research on whether dogs can serve as attachment figures by studying whether owners turn to their dogs to alleviate stress (safe haven). Participants were 975 adults who responded to an e-mail survey that was advertised

in newspapers and local news shows in Ohio and Canada. Most participants were Caucasian and were considered middle class. Ages ranged from 19 to 82 with 47.95 being the average. Kurdek selected five moderator variables of gender, marital status, involvement in pet care, self-disclosure, and fulfillment of relatedness needs. Kurdek (2009) found that “on average, participants were more likely to turn to their pet dogs when they experienced emotional distress than they were to turn to mothers, fathers, brothers, sisters, best friends, and children” (p. 444). Participants were less likely to turn to their dogs than to their romantic partners.

Hanselman (2001) measured coping skill interventions with adolescents in an anger management group with therapy dogs. As previously outlined in the description of the conceptual framework for A-AT, cognitive behavioral therapy and attachment theory were the foundational epistemological approaches for the study. The subjects for the study were seven adolescents who were either court-referred or self-referred to an anger management group. All participants had been subject to some form of parent brutality whether verbal, physical, or emotional. All had also abused animals in some form in their past. The group lasted for 12 weeks including one “Scared Straight” outing at the local county jail. Two trained therapy dogs that had been abused and rescued were intermittently brought to the sessions to compare the differences with other sessions when they were not present. The dogs were available for petting as well as props for discussion. Their abuse stories were told to the group, and a video on animal abuse and the link to human violence was viewed. The stories and video were used for discussion on how one can manage to still love and be caring after trauma as shown by the animals. The *Companion Animal Bonding Scale* (CABS) mean scores showed a significant increase in animal bonding. In addition, the presence of the dogs increased feelings of happiness, security, and self-worth, and reduced feelings of loneliness, isolation, and stress. With the premise that animal abuse in childhood is linked to human violence as an adult, Hanselman was hopeful that her outcome measures suggested a hopeful future of less abusive anger from the teen. In a similar study done by Lange et al. (2006/2007) adolescents involved in an anger management group using A-AT reported that the dogs had a calming effect, provided humor and an emotional break, provided increased safety, and provided motivation to attend group. The adolescents stated they felt they were more empathetic.

## Applications

Boris Levinson is considered the founding father in the field of A-AT as it relates to psychotherapy. His work stated that the therapeutic effect animals had with humans was through their use to us as a transitional object. Levinson was a child psychologist who based his practice out of his home where his dog, Jingles, would often be present in his office during sessions. He noticed an almost immediate benefit having Jingles as a “co-therapist”, especially among the mute and detached children with whom he worked. He wrote extensively about his observations in *Pet-Oriented Child Psychotherapy*. Levinson theorized that animals could act as a

transitional object between us and our alienation with nature. Levinson (1969) states:

By destroying nature, man alienates himself from his inner being and in a sense commits suicide. Throughout the ages, nature and particularly its animals have assumed for mankind the role of “transitional objects” which mediate between the known terrors of outer reality and the unknown realities of the inner world. Unlike the animal, man can adapt himself to all kinds of nonhuman environments. This is at once his virtue and undoing. By removing himself from nature by being independent of nature, man also loses part of his psychological (and physical) strength. Despite man’s ever-increasing power over the forces of nature, despite the immeasurable increase in our comfort and wealth for the past 50 years, our feelings of security have not grown commensurably. Paradoxically, the reverse seems to be true. With the increase of man’s knowledge and power, there has strangely been a corresponding increase in tensions, fears, anxieties, and lack of ease (p. 22).

Since Levinson, other researchers have also explored the effects of the human-animal bond. In an article written for the Delta Society on stress management and the human-animal bond, Stuart-Russell (1997) shared the same view as Levinson. He states:

From conception, areas of growth and development are organized around stress. In infancy the period of separation-individuation is stress laden. Its resolution leads to the development of resources to be kept in the ready for future stress needs. During this stage a child’s attachment to an animal can serve as a transitional object that makes stress manageable. The relationship will reduce high stress levels that can induce unproductive patterns of regression to an earlier developmental stage. It can mediate oppositional stressors that are acting in unison to paralyze developmental movement (p. 1).

With the physiological reduction in stress a companion dog can provide, along with the ability for it to become a transition object, the dog can become a type of “holding environment”, allowing the individual to integrate themselves with the environment. During times of stress, a therapy dog can help provide synchrony and therefore self-awareness.

An important aspect to secure attachment is the amount of attunement between the individual and their attachment figure. Due to the nonverbal nature of dogs, attunement with a dog can have a crucial impact. According to Siegel (1999):

Attuned communication involves the resonance of energy and information. For the nonverbal infant, this intimate, collaborative communication is without words. This need for nonverbal attunement persists throughout life. Within adult relationships of all sorts, words can come to dominate the form of information being shared, and this can lead to a different form of representational resonance. Such a verbal exchange may feel quite empty if it is devoid of the more primary aspects of each person’s internal states (p. 71).

In this way, a dog can be the source of nonverbal attunement to a student who has not experienced that state of mind. All of the therapy dogs at Hill Top Academy have been trained to maintain eye contact and to gently rest their heads on the laps of their “masters”. Some of the students in the school become completely nonverbal when stressed. During these times of escalated stress, our voices seem to heighten their stress. At these times, the therapist guides the student into the office where there is usually a therapy dog present. The student will usually slump into a beanbag chair where the therapy dog will visit them. The dogs lay their heads on the student’s laps and look up into their faces. The dogs adjust their ears and tails to magically fit the mood of the student. At times they will even produce a slight cry or sigh. The therapist does not talk, but sits there and observes. The students will make eye contact with the dogs and pet them in silence. It is amazing to watch their bodies relax from their stressed states. Many of the students have written in their creative writing exercises about how the dogs seem to understand how they are feeling through their non-verbal communication.

There are students at Hill Top Academy with very disorganized and disoriented states of mind. They can often escalate into crisis where they need to be restrained for abusive behavior towards themselves or others. The restraint solidifies their conception of themselves as being “bad”. The restraint with the human contact almost escalates the student to the point of no return. When a therapy dog is strategically introduced during these times, the child often de-escalates quickly. They respond to the dog’s signs of stress and unhappiness when seeing the child in a crisis, in this way reflecting back to the child appropriate empathy and reflection of the environment. The child feels safe with the dog since the dog has never been unresponsive or frightening in the school setting. The dogs are all highly trained to be gentle and attuned to their “master”. In this environment, the therapy dog is used as a tool for processing the crisis with the child. This assists in promoting synchrony after the stress and leads to the development of greater self-awareness and resilience.

[Nelson \(2008\)](#) describes laughter as an attachment behavior. Laughter is a “right-brain-to-right brain” behavior that can promote strong social bonding between parent and child. Laughter can encourage the caregiver to prolonged, positively arousing, social interaction. According to [Schore \(2003\)](#), positive affect in a mother’s face triggers high levels of opiates in the child’s developing brain. These endorphins biochemically link social interactions and attachment as positive qualities that are desirable. The simple act of a dog bringing a squeaky toy to a child in distress and attempting to force it into the hand (or sometimes for more comic effect, the mouth) of the distressed student often prompts a smile and often a giggle from the student. This interaction motivates the dog to continue their attempts at play which is usually accompanied by more humorous interactions, which usually stimulates more laughter. In this way the interaction mimics the right-brain-to-right-brain interaction that promotes social bonding and attachment. It is this author’s experience that this attachment behavior to the dog can then be transferred to the social worker who has been observing this interaction in silence.

The therapy dogs at Hill Top Academy also serve as implements for expressive therapy. As mentioned earlier, along with attachment disorders many of the students

at Hill Top Academy have also suffered traumatic events. Traumatic memories are stored in the right hemisphere of the brain, making verbal expression of these memories difficult (Klorer 2008). In a study of patients suffering post-traumatic stress disorder (PTSD), PET scans showed that when presented with accounts of the traumatic event, the language area of the left hemisphere of the brain turned off while there was heightened activity in the right hemisphere of the brain (right amygdala, areas of temporal and frontal cortex, and right visual cortex). This suggests a neurobiological explanation for the difficulty patients with PTSD have in verbally relating their traumatic memories although the memories themselves trigger a physical feeling of re-experiencing the trauma (Rauch et al. 1996). Since these experiences are stored in a part of the brain that is non-verbal, it makes sense to use non-verbal therapeutic treatments. The use of therapy dogs can be the non-verbal, therapeutic modality. As the students interact with the dogs, the dogs are looking in the students eyes while either mirroring their behavior to match the students (playful, subdued, etc.) or stimulate the student into a more playful interaction. The students get a sense of attunement from this interaction and therefore a sense of attachment. They then can use this relationship as a safe way to play out their desires to dominate, love, or master others. In the safety of the therapeutic environment, they can begin to experience a healthier expression of attachment from the therapy dog and ultimately the social worker.

## Conclusion

Many professionals feel A-AT is not given respect as an effective therapeutic intervention. Boris Levinson was aware that his work and observations would be received with skepticism by his colleagues. Foreseeing their doubts, he states “Do professionals consider this subject too humdrum, too lowbrow or ‘unscientific’ to warrant serious consideration and investigation?” (Levinson 1969, p. 35). As an attempt to quiet his skeptics, Levinson (1969) states:

Since the problem of mental disorders in children is so vast, any plausible measure that promotes diminution deserves investigation and testing. Even with the enormous escalation of scientific research, little is known concerning what brings about improvement. Some authorities in the field question whether therapy of any kind is effective. Furthermore, the current methods of treatment, assuming their effectiveness, are very lengthy and costly, therefore, there is a need to develop new ways of cutting down on cost and length of success treatment (p. 27).

Many professionals in the field of A-AT believe that animal-assisted therapy could be an answer to these concerns. However, due to the lack of a unified theoretical foundation, the profession continues to struggle to be seen as legitimate. The conceptual framework presented in this paper addresses many of the issues surrounding A-AT. Further research needs to be conducted in each domain as it relates specifically to A-AT to determine the validity of the framework.

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