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Emily Staples

St. Catherine University, emily.t.staples@gmail.com

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The Effectiveness of Animal-Assisted Interventions in
Reducing Student Anxiety in School Settings

by

Emily Staples, B.S.

MSW Clinical Research Paper

Presented to the Faculty of the

School of Social Work

St. Catherine University and University of St. Thomas

St. Paul, Minnesota

In partial fulfillment of the Requirements for the Degree of
Master of Social Work

Committee Members

Sarah Ferguson, Ph.D., MSW, MA, LISW (Chair)

Mary Tinucci, MSW, LICSW

Jim Durand, School Social Worker, BSW, LSW, MA

The Clinical Research Project is a graduation requirement for MSW students at St. Catherine University/ University of St. Thomas School of Social Work in St. Paul, Minnesota and is conducted within a nine-month time frame to demonstrate facility with basic social research methods. Students must individually conceptualize a research problem, formulate a research design that is approved by a research committee and the University Institutional Review Board, implement the project, and publicly present the findings of the study. This project is neither a Master's thesis nor a dissertation.

Abstract

Anxiety has a detrimental effect on child development in numerous capacities including academics, peer relationships, and long-term effects if left untreated (Nail et al., 2015; Siegel, LaGreca & Harrison, 2009; Van Ameringen, Mancini & Farvolden, 2001). The use of animal-assisted interventions (AAIs) has been widely reported to have beneficial impacts on human anxiety levels (Bert et al., 2016). The purpose of this systematic review was to understand how the presence of a therapy dog reduces levels of anxiety, and to discuss how the findings can be interpreted and applied for children and adolescents in a school setting. Fifteen peer-reviewed scholarly journal articles met inclusion criteria and were examined. Emerging themes were categorized in terms of the psychological, physiological and psychiatric effects of animal-assisted interventions. The findings of this systematic review give supporting evidence to the positive benefits of using animal-assisted interventions in the school setting for children and adolescents.

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The increasing popularity of Animal-Assisted Interventions (AAIs) has provided a collection of predominantly anecdotal testimonies highlighting the benefits and positive results experienced by clients. AAIs include any therapy, learning, or training intervention in which an animal is involved. “The modalities that use animals as tools for improving physical, mental and social functions, and educational and welfare aspects of humans are called animal-assisted interventions (AAI)” (Kamioka et al., 2014, p. 372). Due to their excellent training capacities, therapists most frequently choose to partner with dogs for animal-assisted interventions (Bert et al., 2016).

For AAIs to become more widely accepted and utilized, more research must be performed to provide evidence for the legitimacy of AAIs. The lack of existing research surrounding this topic is problematic for social workers who wish to incorporate AAIs into their practice. Decision-makers tend to think in terms of liability and risk, such as allergies to the therapy animal or potential injuries such as bites. Therefore, evidence must be available to help them embrace this practice tool and to give consideration to the benefits and not only the risks. The purpose of this systematic review was to understand how the presence of a therapy dog reduces levels of anxiety, and to discuss how the findings can be interpreted and applied for children and adolescents in a school setting.

Literature Review

A review of the literature on the topic of anxiety reveals it to be the most common psychiatric disorder in children and adolescents. Anxiety has a detrimental effect on child development in numerous capacities including academics, peer relationships, and long-term effects if left untreated (Nail et al., 2015; Siegel, La Greca & Harrison, 2009; Van Ameringen, Mancini & Farvolden, 2001). Most children who receive treatment for anxiety recover from their symptoms and maintain results for years after the completion of treatment (Schoenfield & Mather, 2009). Recently, the use of animal-assisted interventions in various therapeutic settings has gained popularity for its unique ability to help reduce client anxiety (Bert et al., 2016). The American Academy of Pediatrics (2011) found that “70-80% of schoolchildren who need mental health services receive that care in the school setting” (p. e1359). The purpose of this systematic review was to understand how the presence of a therapy dog reduces levels of human anxiety and to discuss how the findings can be interpreted and applied in a school setting. The following literature review will address anxiety in children and adolescents, the detrimental effects it has on various aspects of their lives, and the growing use of Animal-Assisted Interventions as a treatment approach for anxiety.

Anxiety

Anxiety defined. As defined by the American Psychiatric Association (APA) (2013) anxiety disorders are those with “shared features of excessive fear and anxiety and related behavioral disturbances” (p. 189). At a basic level, anxiety is the brain’s response to danger, a response that is not necessarily pathological. As Beesdo, Knappe & Pine (2009) explain, “pathological anxiety at any age can be characterized by persisting or extensive degrees of anxiety and avoidance associated with subjective distress or impairment” (p. 2). Classifications

of anxiety disorders in the DSM-V include Separation Anxiety Disorder, Selective Mutism, Specific Phobia, Social Anxiety Disorder, Panic Disorder, Agoraphobia, Generalized Anxiety Disorder, Substance/Medication-Induced Anxiety Disorder, and Anxiety Disorder Due to Another Medical Condition (APA, 2013). Diagnostic criteria for many of the anxiety disorders include the presence of persistent and excessive symptoms more days than not for at least a six-month period (APA, 2013). The symptoms cause distress and impairment in areas of functioning such as social, school, or work (APA, 2013). Among the different anxiety disorders, many of the common clinical symptoms appear in adults and children alike. However, the thresholds used for diagnosing children may be lowered (in duration or number of symptoms) to facilitate early detection and intervention (Beesdo et al., 2009).

Prevalence and age of onset. Anxiety disorders are among the most common psychiatric disorders in children and adolescents, with prevalence rates ranging from 15-20% (Costello, Egger & Angold, 2005; Beesdo et al., 2009). Existing literature and research focus primarily on anxiety beginning in school-aged children and adolescents. Infants and toddlers commonly experience phases of non-pathological fear or anxiety during what Costello et al. refer to as normative phases of development (2005).

Beesdo et al. (2009) explain, “Findings suggest that the age of onset of the first or any anxiety disorder is clearly in childhood.” (p. 4). However, more precise estimates for the age of onset for specific anxiety disorders have proven difficult to determine. This difficulty is due, in part, to the high level of comorbidity among the specific anxiety disorders and other psychological disorders. “Anxiety disorders in children and adolescents rarely occur in isolation,” state Rapee, Schniering & Hudson (2009), who estimate that “40%-60% of anxious children meet criteria for more than one anxiety disorder” (p. 313).

Demographics. Existing research findings suggest numerous risk factors for anxiety disorders. The most prominent risk factor is sex, with females accounting for twice the rate of anxiety disorders as for males (Beesdo et al., 2009; Tramonte & Willms, 2010). Additional risk factors include lower socioeconomic status, lower levels of education, and having a parent with an anxiety disorder (Beesdo et al., 2009). Researchers Tramonte and Willms (2010) studied the prevalence of anxiety among students of various skill levels. They concluded that students with high skill levels and low levels of challenge in school were less likely to experience anxiety, whereas students with low skill levels and higher level challenges were the most at risk for experiencing anxiety (Tramonte & Willms, 2010). Research and data of risk factors relating to race and ethnicity are lacking. Studies have failed to identify the family size, degree of urbanization, parents' marital status, or education level as risk factors for anxiety in children and adolescents (Beesdo et al., 2009; Rapee et al., 2009).

Problem

The impact of anxiety on learning and academic achievement. Anxiety in children and adolescents is responsible for numerous obstacles to learning. Excessive anxiety, as assessed diagnostically or symptomatically, has been demonstrated to correlate with decreased academic motivation, lower grades and poor academic achievement (Elmelid et al., 2015; Nail et al., 2015). Based on data from the 2003 US National Survey of Children's Health, children and adolescents with "chronic emotional, behavioral and developmental problems that persisted for at least a year missed more than ten days per year at school, three times that of their peers without these problems" (Tramonte & Willms, 2010, p. s19).

While examining the level of impairment that anxiety has on academic performance, Nail et al. (2015) draw attention to what they refer to as a bidirectional conceptualization in which

excessive anxiety negatively impacts academic performance, while at the same time, poor academic performance contributes to greater levels of anxiety. Therefore, the levels of anxiety and poor academic performance have a reciprocal effect upon one another.

In a study examining academic deficits of clinically anxious youth, impaired concentration was the most frequently reported academic difficulty (Nail et al., 2015). This outcome raises the question about whether the increasing rates of ADHD diagnoses could be more accurately attributed to the anxiety-related difficulty with concentration (Nail et al., 2015). Nearly half of the clinically anxious students studied by Nail et al. (2015) were impaired on at least four of the seven academic aspects (completing assignments, concentrating on work, doing homework, getting good grades, giving oral reports, taking tests/exams, and writing in class). Two additional reasons commonly cited for poor attendance and lack of enjoyment in school were fear of speaking in front of the class and feeling nervous at school (Van Ameringen et al., 2001).

Peer relationships. Peer relationships begin to shift into a primary source of support and companionship during early adolescence. Individuals with anxiety are prone to numerous difficulties with social adjustments and forming friendships (Erath, Flanagan, Bierman & Tu, 2010). Peer interactions may cause distress among socially anxious youth who often have “concerns about negative peer evaluations, hypervigilance for signs of social disapproval, and concurrent physiological arousal” (Erath et al., 2010, p.22). Therefore, socially anxious youth are more likely to have impaired peer relationships and fewer opportunities to develop and enhance social skills during this critical developmental period. Since initial friendships in childhood are thought to “provide a framework for developing intimacy in more mature peer relationships, including romantic relationships,” an impaired social skill set could result in poor

quality and functioning of future close friendships as well as romantic relationships (Hebert, Fales, Nangle, Papadakis & Grover, 2013, p. 1709).

Furthermore, socially anxious youth are subjected to the bidirectional relationship between symptoms of social anxiety and problematic peer relations (Siegel et al., 2009). “Specifically, social anxiety may result from problematic peer relations (such as aversive or exclusionary experiences with peers); in turn, feelings of social anxiety may inhibit positive social interactions and reduce social opportunities, further contributing to problems in interpersonal relations. Subsequent problems in peer relations may further exacerbate feelings of anxiety” (Siegel et al., 2009, p. 1097). In other words, symptoms of social anxiety contribute to poorer social interactions with peers and vice versa.

Long-term impacts of anxiety. While most anxiety disorders have an onset in childhood or adolescence, they have the potential for harmful long-term effects extending into adulthood if left untreated. A delay or lack of treatment can lead to academic challenges resulting in low attendance and graduation rates. The effect of academic challenges in childhood or adolescence can negatively impact the occupational or higher education goals for a person with anxiety. Individuals who have not graduated high school experience lower employment rates and income levels, which impact individuals as well as society (Elmelid et al., 2015). Early identification and treatment of anxiety in childhood and adolescence “may help ensure that as many youth as possible have the opportunity to enjoy school, complete high school, college and/or university, and become full participants and contributors to society” (Van Ameringen et al., 2001, p. 569).

Solution

Overview of animal-assisted interventions. Animal-assisted interventions (AAIs) include any therapy, learning, or training intervention in which an animal is involved. “The

modalities that use animals as tools for improving physical, mental and social functions, and educational and welfare aspects of humans are called animal-assisted interventions (AAI)” (Kamioka et al., 2014, p. 372). The use of AAIs has been widely reported to have beneficial impacts on human anxiety levels (Bert et al., 2016). For this review, the term AAI is used to encompass all types of animal-related interventions mentioned in the literature, including animal-assisted therapy, learning, and training.

AAIs involve a human handler and trained animal working in partnership with clients on goal-oriented tasks. Due to their excellent training capacities, therapists choose to partner with dogs most frequently for animal-assisted interventions (Bert et al., 2016). However, other species such as cats, horses, and birds are also beneficial and often assist in animal interventions (Bert et al., 2016).

Prevalence and practice: Animal-assisted interventions. The companionship and bond between humans and animals have been well-documented for centuries. Only recently have researchers begun to speculate and examine the nature of the positive impact that people experience through their relationship with animals (Risley-Curtiss, 2013). Due to the broad range of AAI methods and implementations, estimates of the rates of use are difficult to capture (Bert et al., 2016).

Growing popularity of animal-assisted interventions. The use of AAIs has been steadily gaining popularity in recent years as a treatment intervention. Tedeschi, Fitchett & Molidor (2005) attribute this increase in popularity to the “reliable beneficial effect that animals have on human health, well-being, and motivation, which can be demonstrated across age, race, gender, sexual orientation, socioeconomic status, and life condition” (p. 61). Indeed, AAIs have been shown to help facilitate therapeutic relationships between clients and therapists, assist in

health and healing, and to promote skill development (Evans & Gray, 2012; Risley-Curtiss et al. 2013). The approach is incredibly versatile and adaptable to various situations. AAIs are used in a variety of settings including schools, hospitals and nursing homes (Bert et al. 2016). The pathologies of the clients who stand to benefit from AAIs include anything from mental illness, health conditions, cognitive impairments and more (Bert et al. 2016). AAIs are appropriate for all age levels from pediatric to elderly (Bert et al. 2016).

Conclusion

The use of AAIs in the social work field is widely believed to have positive impacts on the therapeutic relationship, assist with health and healing, and promote client skill development. AAIs have the potential to become an extremely effective and beneficial treatment approach for children and adolescents experiencing anxiety. While a substantial amount of literature with anecdotal testimonies regarding the benefits of AAIs exists, more research is warranted to substantiate the effectiveness and prove the legitimacy for the inclusion of animals in a therapeutic setting. The purpose of this systematic review was to understand how the presence of a therapy dog reduces levels of anxiety, and to discuss how the findings can be interpreted and applied for children and adolescents in a school setting.

Methods

Research Design

The purpose of this systematic review was to understand how the presence of a therapy dog reduces levels of anxiety, and to discuss how the findings can be interpreted and applied for children and adolescents in a school setting.

A systematic review was conducted to synthesize existing literature relating to the impact of a dog's presence on levels of anxiety in humans. The findings of this review helped shape a discussion of how animal-assisted interventions can be used in school settings to help reduce anxiety levels of children and adolescents.

A systematic review is conducted by gathering and synthesizing the results of existing literature and research studies on an understudied question to gain understanding and clarity. The process uses a pre-planned, clearly defined strategy to locate and evaluate the relevant research. The project plan includes clear inclusion and exclusion criteria, documentation of included articles, and strategies to explore and synthesize findings.

Data Collection

Inclusion criteria. Empirical, peer-reviewed studies outlining the effectiveness of canine AAI in reducing levels of anxiety were included in the systematic review. I started by looking at quantitative, quasi-experimental studies. Anything of higher rigor was also accepted. No limitations were placed on the age of participants, setting of AAIs, sample size or geographical location of the studies. Studies from other countries were included if the research article was written or translated into English. Research on participants diagnosed with anxiety disorders, as well as undiagnosed participants experiencing symptoms associated with diagnostic criteria as outlined by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) was included. I

reviewed articles published in the year 2000 or after to focus on recent research. Articles that failed to meet the previously discussed criteria were not included in the systematic review.

Search strategy. Resources used for this systematic review were peer-reviewed journal articles located by various electronic databases including PubMed, Health Source, Academic Search Premier, SocINDEX, Social Work Abstracts, DSM-5, PSYC Info, and Psychiatry Online. The search strategy included the keywords *animal-assisted therapy, animal-assisted interventions, canine therapy, dog, youth, adolescents, school, anxiety, and stress*. These keywords were searched individually, and in combinations within article titles, abstracts, and key words indices. Once I located an article, I reviewed the abstract to determine the relevance of the article. After reading the abstract, I determined whether or not the article would be included in the initial screening. I then screened the remaining articles to determine whether they met the criteria to be included in the systematic review. I aimed to collect thirty to forty articles during for the first round of screening with the goal of having at least ten to twenty articles meeting criteria for inclusion. Thorough documentation was maintained on a spreadsheet tracking the number of articles screened, as well as reasons for inclusion or exclusion in the review.

Data Analysis

After the final round of screening, a data abstraction was applied. Articles that met the criteria of the systematic review were read thoroughly and examined for specific details. All articles were documented on a spreadsheet with the following criteria:

- Article Name
- Date Published
- Authors
- Research Question

- Research Design
- Measurements/ Instruments
- Sample
- Results/ Findings
- Discussion
- Limitations

Strengths and Limitations

Strengths of this systematic review include its ability to add to the social work field of knowledge about effective client interventions. The social work field will also benefit from the summarizing of existing literature on this topic into a condensed review.

Limitations of this systematic review include the limited amount of research available focusing specifically on AAIs for children and adolescents. Research of minor children is more difficult to conduct compared to research on adults because there are additional guidelines and obstacles, such as requiring parent permission. Therefore, I was required to examine a broader age range and then considered how the outcomes of the adult studies may be similar or different for children and adolescents. I also looked primarily at qualitative quasi-experimental studies due to the limited availability of true experimental design studies.

Findings

The purpose of this systematic review was to understand how the presence of a therapy dog reduces levels of anxiety, and to discuss how the findings can be interpreted and applied for children and adolescents in a school setting. The amount of research regarding effects of AAIs on minor children is limited, due to the additional guidelines and obstacles involved with studying minors. Therefore, I examined a broader age range and then considered how the outcomes of the adult studies may be influential for children and adolescents. Throughout the various settings and populations studied, three general themes emerged in the findings. The findings are categorized in terms of the psychological, physiological and psychiatric effects of AAIs.

Introduction

Of the 23 articles that passed the initial screening, fifteen met the criteria for inclusion in the final systematic review. Eight articles were excluded from this review for failing to meet the proper criteria. Five of the excluded articles were not quantitative studies. Two articles discussed the effects of family pets rather than therapy dogs. One study evaluated the combined effect of multi-species animal interventions. The remaining fifteen articles provided an understanding of how the presence of therapy dogs in AAIs reduces anxiety in people. The findings of this review will help shape a discussion of how AAIs can be used in school settings to help reduce anxiety levels of children and adolescents.

Psychological Effects

The psychological findings of this research relate to the ways a therapy dog interaction impacts human cognition and behavior, including mindfulness, fear, and trauma-related symptoms.

Mindfulness. Mindfulness practices are commonly used as a strategy to decrease psychological distress. Mindfulness-based activities such as yoga and meditation have recently been introduced in school settings to help students gain focus and reduce distractions and anxiety. Mindfulness is defined as “awareness of one’s present internal and external experiences with acceptance and kindness” and is the foundation of the Mindfulness-Based Stress Reduction (MBSR) therapy intervention (Henry & Crowley, 2015, p. 386). Henry and Crowley (2015) sought to examine whether the addition of animal-assisted therapy (AAT) to an existing MBSR group would impact the expected psychological and physiological effects of participation. In a randomized controlled trial, 21 public university students who were experiencing at least mild psychological distress, were assigned to either an MBSR or MBSR+AAT group. The researchers hypothesized that the addition of a therapy dog would complement the MBSR intervention by providing a focus for attention and “enabling the understanding and main aspects of mindfulness” (Henry & Crowley, 2015, p. 385). However, the study found that the addition of AAT did not significantly help or hinder the desired treatment outcomes. Participants of both groups (MBSR and MBSR+AAT) described an equivalent decrease in anxiety after practicing mindfulness. A significant finding of this research, however, was that AAT was attributed to greater “client satisfaction, perception of therapist efficacy, recommendation of the intervention, and future participation in similar interventions” (Henry & Crowley, 2015, p. 397).

Fear. Fear of public speaking is one of the most universally experienced fears. Students often experience that fear, since public speaking is a common requirement in school curriculum. The research indicates that the presence of a therapy dog can reduce the fear and anxiety involved with public speaking. Researchers Buttelman and Rompke (2014) examined this fear in their study investigating the anxiety-reducing abilities of different animal and plant interventions.

In a study involving 71 undergraduate students, researchers assigned students to one of three experimental groups (dog, fish, plant) or to the control group. Participants were then told that they would be given five minutes to prepare for a public presentation on a topic unfamiliar to them, and were presented with either a dog, fish, plant, or left alone (control group). Results of the study showed that all participants in the experimental groups experienced reduced levels of anxiety, compared to no reduction in the control group. While there was no significant difference in the level of anxiety reduction between experimental groups, researchers discovered that one measure revealed differences between the dog group and other experimental groups. The dog group had the greatest percentage of participants with post-intervention anxiety levels that went even below the induced anxiety levels (Buttelman & Rompke, 2014, p. 274). Furthermore, this finding correlated with the greater amount of laughter observed in the dog group interventions, which was not observed with any amount of difference between the fish, plant and control groups. Buttelman and Rompke (2014) call for further research to determine how the characteristics of various species affect the interaction quality to induce laughter and long-term anxiety reduction.

Further research on the topic of fear was performed by Tsai, Friedmann, and Thomas (2010), who examined the impact of AAT on medical fear in hospitalized children. In this comparison study, hospitalized children aged seven through seventeen with acute or chronic conditions were assigned to one of two groups. The experimental group received two AAT visits from a therapy dog and handler on two consecutive days for roughly ten minutes. The comparison group had visits of the same length and time frames, but their visitor was a person with whom they assembled a puzzle. Results indicated that older children had lower levels of medical fear after both types of visits, and lower anxiety after the AAT visit. This study

demonstrates that AAT is more effective than a visit by a person, and lends support to the benefits of AAT for child and adolescent populations (Tsai et al., 2010, p. 256).

The studies conducted by Buttelmann and Rompke (2014) and Tsai et al. (2010) conclude that AAT has positive and long-lasting impacts on anxiety levels.

Trauma-related symptoms. Whether in the form of individual or group therapy, research indicates, “70-80% of schoolchildren who need mental health services receive that care in the school setting” (The American Academy of Pediatrics, 2011, p. e1359).

The effectiveness of AAT in group treatment for child survivors of child sexual abuse was evaluated in research conducted by Dietz, Davis, and Pennings (2012). A sample of 153 children, ages seven through seventeen, were assigned to one of three types of twelve-week therapy groups. Group One involved standard therapy protocol. Group Two added the presence of a therapy dog and handler to the waiting room lobby for 30 minutes before, and the first 10-15 minutes of the group therapy session. Group Three included a therapy dog and also incorporated stories about the therapy dog written by the clinical director from the dog’s perspective. Results of the pre-test and post-test surveys indicated that Groups Two and Three showed significant decrease in trauma symptoms including anxiety, depression, anger, PTSD, dissociation and sexual concerns (Dietz et al., 2012, p. 678). Furthermore, Group Three showed consistently decreased trauma symptoms as compared to Group Two. Dietz et al. speculate that the dog’s stories had a therapeutic effect because children with a history of sexual abuse often have difficulty verbalizing what happened. Therefore, the introduction of the dog’s story allowed for a transition into sharing their story (2012, p. 679). The study clearly demonstrates positive impacts of AAT in child sexual assault therapy groups.

Physiological Effects

The physiological findings of this research relate to the ways a therapy dog interaction impacts the physical body, including pain, blood pressure, heart rate, and hormones. These types of physiological indicators of stress and anxiety may negatively impact attendance rates and school achievement.

Pain. Three studies investigated the effects of AAT on pain levels of hospitalized patients. In a study of 40 hospitalized children ages eight through eighteen, researchers evaluated the effect of a ten-minute animal-assisted intervention as compared to a control group intervention of a visiting volunteer and puzzle task (Barker et al., 2015, p. 105). Results of this study failed to identify significant differences in reported pain levels between the two groups.

To examine the effect of AAT on pain levels of adults in various hospital inpatient units, Phung et al. (2017) surveyed participants before and after a brief visit from a therapy dog and handler. The data showed statistically significant reduction of pain levels after AAT. Furthermore, 94% of the patients who were surveyed post-intervention agreed that AAT would be helpful to them (Phung et al., 2017, p. 65).

In a study of the effects of animal-assisted activity (AAA) on adult inpatient mental health patients, pain was measured before and after a one-hour intervention. Patients elected to join either the AAA group with a dog or a stress-management group without an animal present. Although Nepps, Stewart, and Bruckno (2014) found significant decreases in the reported levels of pain for the AAA group, the results were comparable to the reported decreases of pain in the stress-management group. Therefore, Nepps et al. (2014) concluded that AAA could improve pain at a comparable level to a more traditional stress-management program (p. 214).

Cardiovascular. Additionally, when Nepps et al. examined the blood pressures of participants in the aforementioned study, no changes were observed in either group (2014, p. 213). Researchers did, however, observe a reduced pulse rate that was comparable for both groups (Nepps et al., 2014, p. 213).

Researchers Tsai et al. (2010) and Cole, Gawlinski, Steers and Kotlerman (2007) observed similar cardiovascular effects in their studies on hospitalized patients. Tsai et al. (2010) observed cardiovascular benefits for participants in the aforementioned study on hospitalized children. The observed decrease in blood pressure continued after the AAT visit was over, suggesting that the “effect of the AAT visit lasted beyond the time of the intervention itself” (Tsai et al., 2010, p. 255).

Cole et al. (2007) sought to determine whether a twelve-minute hospital visit with a therapy dog improved certain physiological indicators of stress and anxiety. Patients in the study included hospitalized adult patients with a diagnosis of advanced heart failure. Participants were randomly assigned to one of three groups, including a visit from a therapy dog and handler, a visit from a person, or a control group receiving usual care (Cole et al., 2007, p. 575). Results indicated that participants in the AAT group had clinically significant improvements in their cardiopulmonary pressures, an effect which was not observed in either of the other two groups (Cole et al., 2007, p. 575).

Hormones. Similarly, the participants receiving AAT in the Cole et al. study also experienced decreased neurohormones, as compared to the control and volunteer-only group. The effects of these decreased levels of epinephrine and norepinephrine were significant because of their direct harmful effects on cells, heart function, and mortality (Cole et al., 2007, p. 575).

Cortisol is a hormone that rises in response to stress or fear. Two different studies by Nepps et al. (2014) and Lass-Hennemenn, Peyk, Streb, Holz and Michael (2014) evaluated the effect of AAT on cortisol levels. Despite significant prior research observing decreased cortisol levels in AAT interventions, neither study revealed the hypothesized decrease in cortisol levels (Lass-Hennemann et al., 2014, p. 5; Nepps et al., 2014, p. 214). Lass-Hennemann et al. (2014) call for future research about the effect of the participant having physical contact with the dog, which was not a required condition of their study. Nepps et al. (2014) speculate that the interventions in their study were too brief to allow for any cortisol level changes to be observed.

Psychiatric Effects

The psychiatric findings of this research relate to the ways a therapeutic interaction between a client and therapy dog impacts anxiety, dementia, and mood.

Anxiety. Anxiety in children and adolescents is responsible for numerous obstacles to learning. Excessive anxiety is associated with decreased academic motivation, lower grades and poor academic achievement (Elmelid et al., 2015; Nail et al., 2015). Three separate studies evaluating the impact of animal-assisted interactions in university or college settings found that the presence of a therapy dog significantly decreased students' self-reported anxiety levels (Crossman, Kazdin & Knudson, 2015; Lass-Hennemann et al., 2014; Stewart, Dispenza, Parker, Chang & Cunnien, 2014). Conversely, animal-assisted interactions failed to correspond with a significant reduction of anxiety levels in elderly residents of a long-term nursing facility (LeRoux & Kemp, 2008).

Hospitalized children who received AAT reported post-intervention anxiety levels that were not significantly different from the comparative interventions (Barker, Knisely, Schubert, Green & Ameringer, 2015; Tsai et al., 2010). However, in three separate studies regarding the

impact of AAT on hospitalized adults, statistically significant decreases in anxiety levels were observed, as compared to the alternate interventions or control groups (Cole et al., 2007; Nepps et al., 2014; Phung et al., 2017).

Dementia. The categorization of dementia as either physiological or psychiatric is complicated due to its organic, physical etiology, which often results in psychiatric diagnosis related to the decline from a previous level of performance in domains such as executive function and social cognition (APA, 2013, p. 602). Although the issue of dementia does not directly relate to school aged children, the results of this study lend further validity to the universally positive effects of AAT on anxiety levels. Researchers Mossello et al. (2011) sought to explore how AAT impacts various symptoms, including anxiety levels, in elderly patients with dementia and Alzheimer's. They concluded that participation in AAT with a therapy dog resulted in decreased anxiety when compared to the control group (Mossello et al., 2011, p. 899).

Mood. Similarly, Mossello et al. (2011) discovered an increase in positive emotions and a decrease in sadness for the elderly participants with dementia. A noteworthy aspect of this finding is that "the effect of the intervention on the emotional status persists through the day, beyond the limited time of the activity" (Mossello et al., 2011, p. 903).

Interaction with a therapy dog increased positive mood and decreased negative mood for university students in a study by Crossman et al. (2015, p. 649). Likewise, Stewart et al. (2014), who studied the impact of AAT on college students, observed a significant decrease in students' emotional states of loneliness (e.g. alienation, feeling empty, having negative self-perceptions). Such findings can be directly applied to school settings for children and adolescents, where emotional states and mood have a strong effect on one's ability to focus and learn.

Significant, positive differences in mood were observed after AAT for adults in both inpatient hospital settings and long-term care facilities (Lutwack-Bloom, Wijewickrama & Smith, 2005; Phung et al. 2017). In a study by Johnson, Meadows, Haubner and Sevedge (2008), patients with cancer who received therapy dog visits over a four-week period reported no significant change in mood but did view their health as improved. Interestingly, the numeric data of this study did not support the positive participant feedback about the dog visits. The researchers speculate this inconsistency may be due to a small sample size (Johnson et al., 2008, p. 230).

Discussion

Psychological Implications

The following section will discuss the psychological implications of AAT for both students and practitioners. The psychological implications relate to the ways a therapy dog interaction impacts human cognition and behavior, including mindfulness, fear, and trauma-related symptoms.

Implications for Students. The data show that AAT is an effective strategy for increasing mindfulness, reducing fear, and treating trauma-related symptoms in children and adolescents. Children who have difficulty expressing their emotions and discussing fear and anxiety may overcome these insecurities when exposed to the unconditional acceptance provided by a therapy dog (Dietz et al. 2012). Indeed, Lass-Hennemenn et al. (2014) note that individuals who have been traumatized, often resulting in a feeling of detachment from other people, may find it easier to establish relationships with animals than with other people (p. 6). Early intervention and effective treatment can reduce the long-term consequences of traumatic experiences (Dietz et al., 2012).

Implications for Practice. Dietz et al. (2012) recommend incorporating AAT into a variety of treatment modalities, such as cognitive-behavioral therapy, trauma-focused therapy, or play therapy for children who have experienced trauma (p.679). Furthermore, they note the convenient fact that AAT programs often operate on a volunteer basis and provide free services, which are covered by their own liability insurances (Dietz et al., 2012, p. 679). Therapists who choose to partner with their own therapy dog are typically responsible for obtaining their own insurance. These details are noteworthy for clinicians who wish to incorporate AAT in a school setting to share with their administration.

While studying the psychological effects of adding AAT to a modified Mindfulness-Based Stress Reduction (MBSR) Program, Henry and Crowley (2015) did not find the addition of AAT to significantly enhance or hinder the treatment outcomes. However, we do need to pay attention to their results that reflected increased client satisfaction, “particularly perception of therapist efficacy, recommendation of the intervention, and future participation in similar interventions,” all of which are important to the therapeutic relationship (Henry & Crowley, 2015, p. 397). Henry and Crowley (2015), along with numerous other researchers, noted the potential for the therapy dog to act as an icebreaker and topic of discussion to facilitate rapport between the client and therapist. These findings illustrate important strategies for improving relationships between clinicians and students.

Physiological Implications

The following section will discuss the physiological implications of AAT for both students and practitioners. The physiological implications relate to the ways a therapy dog interaction impacts the physical body, including pain, blood pressure, heart rate, and hormones. These types of physiological indicators of stress and anxiety may negatively impact attendance rates and school achievement.

Implications for Students. The physiologically calming presence of a therapy dog and its impact on physiological symptoms of anxiety may be contributing factors to the reduction of self-reported anxiety symptoms in the study by Stewart et al. (2014, p. 340). Barker et al. (2015) found that “children are as emotionally close to their pet dog as they are to their closest family member” (p. 109). This observation calls for further research into the attachment between children and dogs, and whether the positive qualities of the pet relationship also exist between

children and therapy dogs. We can speculate that children who experience such a high level of emotional attachment to their family pet would also benefit from interactions with a therapy dog.

Implications for Practice. School social workers may find AAT to be an efficient and effective intervention for students experiencing physiological symptoms of stress and anxiety. In fact, in two ten-minute visits, Tsai et al. (2010) demonstrated AAT to be “more effective than a visit by a person at alleviating some signs of physiological stress in inpatient pediatric settings” (p. 256). Additionally, the physiological effect of reduced blood pressure lasted beyond the time of the intervention itself, suggesting a prolonged benefit to the use of AAT (Tsai et al., 2010, p. 255). The research suggests that school social workers can utilize AAT for brief, occasional, and successful anxiety reducing interventions.

A significant aspect of the impact of AAT on physiological symptoms involves the amount of physical contact between the person and dog. Research shows “the stress-reducing effects of dogs are stronger when actual tactile contact (stroking of the animal) is established” (Lass-Hennemann et al., 2014, pg. 5). School social workers should, therefore, be intentional about the interactions between students and therapy dogs to encourage and facilitate physical contact.

Psychiatric Implications

The following section will discuss the psychiatric implications of AAT for both students and practitioners. The psychiatric implications of this research relate to the ways a therapeutic interaction between a client and therapy dog impacts anxiety and mood.

Implications for Students. AAT’s effectiveness in decreasing anxiety may be attributed to the social support provided by the dog and the way it helps to buffer one’s reactivity to uncertain outcomes and mental stressors (Cole et al., 2007, p. 579). Although research by Le

Roux and Kemp (2008) did not find a significant difference between quantitative anxiety scores in AAA and control groups, participants did share positive verbal feedback, which nevertheless is valuable information to consider. Mossello et al. (2011) also discovered a noteworthy effect in their study of the effects of AAA on emotional status. They observed that the participants' increased positive emotions and reduced levels of sadness persisted throughout the day, beyond the length of the intervention itself (Mossello et al., 2011, p. 903). This is valuable information for a school-based clinician to consider, since students may experience a positive impact not only during the brief interaction with the social worker and therapy dog but potentially for an entire school day.

Implications for Practice. The findings of Crossman et al. (2015) have significant implications for school-based clinicians to consider. They found that a single, brief (7-10 minutes) interaction with a therapy dog in a high-traffic setting (library) was enough to reduce anxiety and negative affect, and increase positive affect (Crossman et al., 2015, p. 656). Compared to traditional therapy methods, AAT can offer similar benefits in shorter, fewer visits, and in various settings as opposed to counseling centers (Crossman et al., 2015, p. 656). AAT is in no way a replacement for psychotherapy, but it does warrant strong consideration by school administrators and clinicians for its supplemental strengths to existing approaches.

Additional cost-effective aspects of AAT include the ability to deliver services in a group format, and “the amount of time needed to produce a durable effect” (Nepps et al., 2014, p. 214). Nepps et al. (2014) also noted numerous examples when the AAT session acted as a “clinical bridge, with patients revealing significant issues or, in one case, speaking for the first time in days, while interacting with the dog and her owners” (p. 214). This increased potential for

gaining therapeutic rapport with students is one of the most compelling arguments for the inclusion of AAT in schools.

Conclusion.

The findings of this systematic review give supporting evidence to the positive benefits of using AAT in the school setting for children and adolescents. The interventions are time-effective, cost-effective and have great potential to reduce many psychological, physiological and psychiatric symptoms of stress and anxiety.

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