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Effect of Animal-Assisted Intervention on Graduate Students' Perceptions of Well-being: Insights from Occupational Therapy

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The Effect of Animal-Assisted Intervention on Graduate Students' Perceptions
of Well-being: Insights from Occupational Therapy

by

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ii

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Certification

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Abstract

Problem Statement: There is a growing concern regarding college student well-being that requires a need for implementation of cost-effective interventions addressing the increasing number of students experiencing negative mental health symptoms. Studies from medical and educational settings suggested positive mental health benefits from animal assisted intervention (AAI). Researchers studying college students exposed to animals during periods of high academic stress demonstrated successful reductions in stress and anxiety; however, researchers have not examined a specific area of dosage, including the influence of recurring AAI (more than one session) in the graduate student population. Furthermore, researchers have failed to include each element of dosage in their studies. **Purpose:** This study investigated the effects of AAI on well-being, including QOL, stress, anxiety, occupational performance, and adjustment with graduate college students. **Methodology:** A quantitative, experimental, within and between subjects, pre-post randomized control trial was implemented. **Procedures:** Recruitment included 104 participants. Participants in the experimental group engaged in a recurring weekly 35-minute AAI intervention for six weeks. Participants in the control were told they are on a waitlist and were given the opportunity to engage in the intervention following posttest data collection. **Data Analyses:** A one-way ANCOVA analyzed between subjects data and paired t-tests analyzed within subjects data. Graduate college students experienced a statistically significant effect in three areas of well-being, including increased QOL, decreased stress and anxiety. Students did not experience significant effects in the areas of occupational performance and adjustment to the graduate student role.

Keywords: Animal assisted intervention (AAI), canine assisted intervention (CAI), graduate students, mental health, well-being, stress

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Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Health care providers, educators, and animal handlers have used many approaches in a variety of contexts to alleviate detrimental mental health symptoms and associated characteristics for a variety of individuals and clients (Binfet & Passmore, 2016; Binfet & Stuik, 2018; Jalongo, Astorino, & Bomboy, 2004; Kamioka et al., 2014). Historically, therapy dog programming was used exclusively for the sick and elderly in psychiatric units and skilled nursing facilities (Binfet, Passmore, Cebry, Struik, & McKay, 2018; Ernst, 2014). Contemporarily, Binfet et al. (2018) noted that therapy dogs have been introduced into an array of stressful environments, such as funeral homes, courtrooms, and airports, to help alleviate an individual's stress and to provide support. One environment facing increasing stress and mental health concerns at alarming rates is that of college campuses (American College Health Association [ACHA], 2017). A specific approach, which has been shown to be effective in providing health benefits within many populations and settings, including students on college campuses, is the opportunity for students to participate in therapy dog programming. Therapy dog programming on college campuses, involving the interaction of individuals with dogs resulting in therapeutic benefits, continues to grow in popularity worldwide; however, the most significant interest is seen in the United States (US; Adamle, Riley, & Carlson, 2009; Barker, Barker, McCain, & Schubert, 2016; Binfet, 2017; Binfet & Passmore, 2016; Crossman & Kazdin, 2015; Daltry & Mehr, 2015; Delgado, Toukonen, & Wheeler, 2018; Grajfoner, Harte, Potter, & McGuigan, 2017; Hall, 2018; Muckle & Lasikiewicz, 2017). The accepted term encompassing all therapy dog programming is animal assisted intervention (AAI; Animal Assisted Intervention International, 2018). A subcategory of AAI is animal assisted activity (AAA), which is a term used for casual interaction between therapy dogs and individuals intended to result in a benefit for the individual and describes the

type of intervention that is implemented in this dissertation study (Animal Assisted Intervention International, 2018; see Figure 1).

Evidence-based interventions must have theoretical underpinnings. Kellert (1997) supported the application of the biophilia hypothesis, which emphasizes humans' natural affiliation and attachment to living things. A person's natural tendency towards connecting with living things provides the framework for an interaction with a companion animal, a term often used in animal-based theories to denote an animal used for company, amusement, or psychological support, to produce pleasant experiences for the individual, especially in stressful contexts (see Figure 1). The introduction of therapy dogs into varying environments continues to yield positive results (Binfet, 2017); however, AAI research lacks information regarding the most effective "dosage," which includes "the duration of each session + the number of sessions + the ratio of handler/animal/client" (Binfet et al., 2018, p. 3). The ratio conveys the number of handlers, animals, and clients during an AAI session. Information regarding all aspects of dosage is imperative to include in studies to allow researchers to understand the intervention fully as well as to alter dosage to determine the best outcomes on mental health. Researchers have recommended varying aspects of dosage, including the number and frequency of sessions (Barker et al., 2016; Binfet, 2017; Binfet & Passmore, 2016). It is also important for researchers to describe the nature of the sessions ensuring welfare of both the participants and the animals. Furthermore, research in the college setting has focused largely on undergraduate students engaging in AAI for a single session during exam periods. The investigator hypothesizes that recurring therapy dog visits, dosage, including more than one session, may decrease mental health symptoms, such as stress and anxiety perception, thus increasing graduate student well-being. Research in this dissertation will add valuable information to occupational therapy (OT)

and AAI literature through studying the effects of recurring AAA, a subcategory of AAI, on

graduate college students' well-being, including quality of life (QOL), stress, anxiety,

occupational performance, and adjustment to the graduate college student
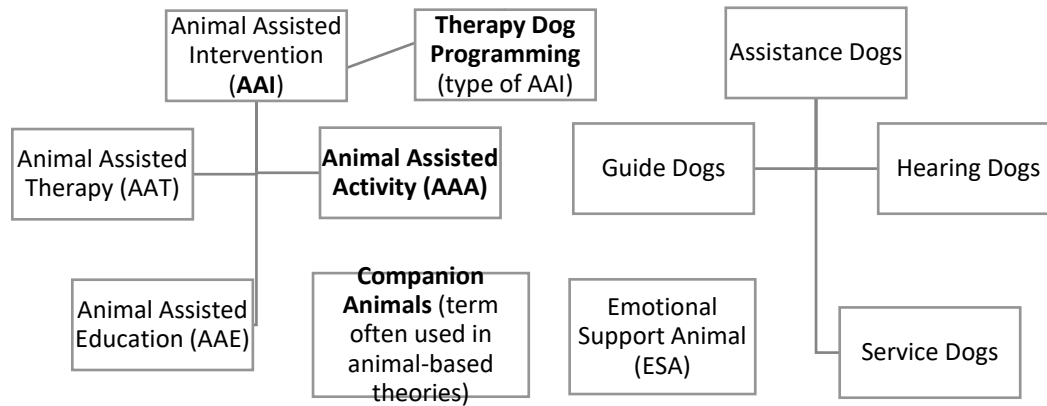
Figure 1
Animal Terminology Hierarchy

Background to the Problem

College educators and higher education personnel are facing a national mental health

concern on college campuses. Xiao et al. (2017) noted the dangers of increasing mental health

concerns on college campuses across the United States, using data presented by the Center for

Collegiate Mental Health. The concept of stress in college students has been studied since the

inception of higher learning; however, the sources of stress have evolved over time (Brougham,

Zail, Mendoza, & Miller 2009; Chiazzu, Brevard, Thurn, Decembrele, & Lord, 2008;

Hysenbegasi, Hass, & Rowland, 2005; Kraft, 2011; Ratanasiripong, Sverdunk, Hayashono, &

Prince, 2010; Reetz, Bershad, LeViness, & Whitlock, 2017). Historically, student stressors

included poor sleeping and eating habits, new responsibilities, increased workload, multitasking

demands, financial difficulties, and social challenges (Fogle & Pettijohn, 2013). Many of these

historical stressors still remain in effect for current college students. New stressors for students

include the overwhelming stimuli of technology; less individualized support from student services; and new financial stressors, such as student debt and employment concerns (Brown, 2018; Fogle & Pettijohn, 2013; Piercell & Keim, 2007). The additional stressors have dramatically increased the demand for counseling services, making it difficult to provide individualized student support (Kitzrow, 2003). The fact that 75% of lifetime mental health disorders surface by age 25 shows the need to provide interventions that combat mental health challenges during the college years (Brown, 2018; Kessler, 2007). Brown (2018) and Kessler (2007) utilized information from the World Health Organization (WHO) counseling centers across the United Kingdom (UK) and US to publish research on added stressors and decreased availability of individualized mental health support among college students, demonstrating a need for further intervention. Increasingly, innovative and effective strategies are needed to address the mental health challenges in this population in order to improve overall well-being, including QOL, stress and anxiety perception, and occupational performance.

Current college populations are comprised of an increasing number of individuals diagnosed with mental health conditions for which they have difficulty obtaining sufficient treatment (Kitzrow, 2003; Reetz et al., 2017). The Association for University and College Counseling Center Directors (AUCCCD, 2017) surveyed over six million college students and 621 counseling center directors at 529 colleges across the United States. According to the AUCCCD (2017), 57% of the counseling center director respondents saw an increase in mental health concerns among students over previous year, 24% reported no change in incidence, and only 0.8% reported a decrease in mental health concerns. The ACHA (2015) stated that 40% of college students perceived more than an average amount of stress within the previous year, and nearly one in six college students (15.8%) had been diagnosed with or treated for anxiety.

Although not formally diagnosed with a mental health condition, 80% of college students in the

US have felt overwhelmed by the responsibilities they had in the previous year (National

Alliance on Mental Illness [NAMI], 2016). The aforementioned statistics show the need to

implement methods to alleviate mental health concerns among the college population, which

may improve well-being, including QOL, stress and anxiety perception, occupational

performance, and adjustment to graduate student role. Studies have shown college students

experiencing mental health challenges have a lower QOL or well-being compared to students

without mental health challenges (Keyes, Shmotkin, & Ryff, 2002; Ridner, Newton, Staten,

Crawford, & Hall, 2016). Furthermore, Baker and Siryk (1984a, 1984b, 1989) argued that

adjusting to the college student role involves having the drive to meet educational standards and

having satisfaction with the academic context. Reducing negative mental health symptoms may

allow the student to become more motivated to meet educational standards and to increase their

satisfaction with the academic context. Therefore, introducing recurring AAA has the potential

to decrease negative mental health symptoms, including stress and anxiety perception (Barler et

al., 2012; Besser & Zigler-Hill, 2014; Binfet et al., 2018), which may in return increase QOL,

occupational performance, and the ability to adjust to the graduate student role. However,

research has been limited in studying the relationships between AAI and its effects on well-

being, specifically in the areas of QOL and occupational performance. Currently, only one study

has linked AAI directly to occupational performance in the undergraduate student population;

however, the investigator hypothesizes that recurring AAA has the potential to increase well-

being, including QOL and occupational performance.

The presence of animals is one approach that has been used to alleviate symptoms of

psychological distress (Bardill & Hutchinson, 1997; Briggs, 1996; Draper, Gerber, & Layng,

1990; Fick, 1993). Researchers have demonstrated success in reducing psychological distress

and anxiety in the college student population when introducing animals during predictable high-

stress times (Barker et al., 2016; Crossman, Kazdin, & Knudson, 2015; Crump & Derting, 2015;

Dell et al., 2015; Grajfoner et al., 2017; Jarolmen & Patel, 2018; Misra & McKean, 2000;

Trammell, 2017; Ward-Griffin, Klaiber, Collins, Coren, & Chen, 2018). Emotional support

animal (ESA) eligibility requires physician documentation of a *Diagnostic and Statistical*

Manual (DSM) diagnosis and related justification of the beneficial effect of the animal's

presence (Kruger & Serpell, 2006). An increasing number of students have submitted requests to

have ESAs stay with them in their dormitory to help them manage with symptoms associated

with diagnosable concerns, such as anxiety, depression, and post-traumatic stress (Adams,

Sharkin, & Bottinelli, 2017). Many students do not qualify to have their own ESA on campus,

and offering AAI via the use of registered therapy dogs would ensure a safe means of providing

the general student population an opportunity to have access to the potential mental health

benefits of interacting with an animal.

Statement of the Problem

The specific problem identified by the investigator is a growing concern regarding

college student well-being, including graduate students, who requires a need for the

implementation of supplementary cost-effective interventions addressing the increasing number

of students experiencing negative mental health symptoms. Although this problem is widespread

and cannot be solved by a single intervention, studies within medical and educational settings

may be suggesting positive mental health benefits associated with AAI (Brelsford, Meints, Gee,

& Pfeffer, 2017; Kamioka, 2014). Researchers studying college students exposed to animals

during periods of high academic stress demonstrated successful psychological stress reduction

(Adamle et al., 2009; Bilinsky, 2011; Jalongo & McDevitt, 2015; Lannon & Harrison, 2015; Von Bergen, 2015); however, very few researchers have exclusively examined the influence of exposure to animals in the graduate student population or during regular academic periods in which external stressors may be present. The majority of researchers conducting studies examining the mental health benefits of college students' exposure to therapy dogs have focused on the exposure occurring during a single visit and in the undergraduate student population (Binfet et al., 2018), leaving AAI within the graduate student population largely understudied. To date, AAI randomized control trials (RCTs), incorporating all elements of dosage, including "the duration of each session + the number of sessions + the ratio of handler/animal/client" (Binfet et al., 2018, p. 3), are limited to one study. Studies reviewing one and two elements of dosage are reviewed in the literature review. Additionally, a lack of research analyzing the effect of recurring AAI and dosage including more than one session on the college student population exists. Therefore, an expansion of the evidence is needed to investigate the effects of recurring AAI, specifically AAA in this dissertation study; on mental health characteristics, including stress and anxiety perception; and how AAA will ultimately influence QOL, occupational performance, and adjustment to graduate student role.

Relevance

The results of the dissertation study may appeal to a variety of audiences, including occupational therapy practitioners, higher education personnel, students, and individuals working or volunteering in the area of AAI. Knowledge gained from the dissertation study may expand the literature available to occupational therapists by providing evidence about how engagement in AAA may affect individuals' occupational performance and QOL through the reduction of stress and anxiety, specifically for the graduate student population. Stressors among college

students include exams, financial responsibilities, coursework, the atmosphere created by faculty,

fear of failing, and a lack of healthy coping skills to deal with heightened academic

responsibilities (Binfet, 2017; Hamaideh, 2011). Therefore, personnel in student services may

use results from this dissertation study for guidance in designing therapy dog programming,

utilizing AAA to alleviate stress and anxiety as well as to increase QOL, occupational

performance, and adjustment to graduate student role. Many rehabilitation hospitals offering

exposure to therapy dogs reported positive outcomes, such as increased client QOL and

engagement in occupations (Nimer & Lundahl, 2007; Velde, Cipriani, & Fisher, 2005; Wood,

Fields, Rose, & McLure, 2017). More specifically, findings from this line of inquiry could

provide evidence needed for institutions of higher education to add therapy dogs to their roster of

employees. The results of this dissertation study have potential to benefit individuals in the AAI

community by increasing the understanding of the effect of AAI administered on a recurring

basis (several sessions) and on a new population: graduate college students.

Theory

Constructs within theory explain how aspects of behavior are organized and help a person

to make predictions about behavior (Miller & Schwartz, 2004). Theory is used to make

connections between actual experiences and observed events (Miller & Swartz, 2004). Theorists

in general claimed, "[t]he major constructional components of a theory are *concepts,* which are

ideally well defined, and *principles,* or postulates, which explain how the concepts are related to

one another" (Miller & Swartz, 2004, p. 2). Researchers can use concepts and principles to assist

in justifying interventions involved in research and practice as well as to predict the future

(Miller & Schwartz, 2004). Additionally, theory can be used to describe, explain, and predict

behavior and relationships between people, objects, and the environment (Miller & Schwartz, 2004).

Theoretical frameworks that support the examination of the impact of animal-student relationships on occupational performance and well-being, including stress, anxiety, and QOL in graduate college students, are present in the biophilia hypothesis and the person-environment-occupation (PEO) model. Constructs within the biophilia hypothesis explain the importance of the relationship between humans and nature, including animals (Kellert & Wilson, 1993). Theoretical constructs within the PEO model explore personal and environmental factors influencing an individual's performance in occupation (Law et al., 1996).

The Biophilia Hypothesis

The term biophilia is derived from the Greek words *bios,* meaning life and *philia* meaning affiliation (Antonioli, 2005). Psychologist Erich Fromm first used the term in 1973 to explain "the need for cultivating the capacity for love as a basis for mental health and emotional well-being" (Kellert, 1997, p. 2). Kellert (1997) demonstrated that Fromm's view is one among many views that highlighted the "emotional and intellectual expressions of this tendency" to connect with all living things (p. 2). In 1984, Edward Wilson developed the concept of biophilia when he proposed humans have a natural based connection with nature and life (Kellert & Wilson, 1993). In *The Biophilia Hypothesis,* Kellert and Wilson (1993) stated, "[t]he biophilia hypothesis proclaims a human dependence on nature that extends far beyond the simple issues of material and physical sustenance to encompass as well the human craving for aesthetic, intellectual, cognitive, and even spiritual meaning and satisfaction" (p. 20). Humans connect with living things on an emotional level, and the biophilia hypothesis demonstrates how well-being is reliant on relationships with the natural environment, including both the flora and fauna.

The biophilia hypothesis may be suggesting that humans have deeply grounded affiliations with all living things, including animals (Kellert, 1997; Kellert & Wilson, 1993). Researchers compared aesthetic studies that examined individuals' environmental preferences and demonstrated that individuals prefer to be in a context with natural elements as compared with one without (Kellert & Wilson, 1993). Behavioral changes in the human mind and body can result from aesthetic responses to nature (Kellert, 1997; Kellert & Wilson, 1993). Kellert (1997) noted "[t]he companionship of other creatures and even landscapes offer an invaluable source of friendship, relationship, and means for expressing and sometimes receiving affection" (pp. 110-111). Additionally, Fine (2006) studied the theoretical constructs supporting the bond or friendship created between humans and animals. The companionship of an animal is popular in modern culture as evidenced by pet ownership increasing radically despite the responsibilities involved with owning an animal, such as walking, feeding, and caring for the animal (Kellert, 1997). Socially, the human animal bond fills the need for relationships and affection (Burls & Caan, 2005; Chandler, 2005; Corson, 1978; Fine, 2006; Kellert, 1997; Levinson, 1969; Maller, Townsend, Brown, & Leger, 2002). Kellert (1997) discussed the four adaptive benefits an individual can gain from having a bond with nature: emotional sustenance and security, sociability and affiliation, self-esteem and self-respect, and physical healing and mental restoration.

Emotional sustenance and security. Kellert (1997) maintained that "[s]tudies offer evidence to support the role of companion animals and more generally, nature in encouraging our emotional development and sense of security" (p. 109). In fact, a person's self-confidence and ability to handle stressful events are closely related to a sense of belonging (Serpell, 1996). A person experiencing seclusion and loneliness for a length of time has the potential to result in

mental and physical deterioration (Mushtaq, Shoib, Shah, & Mushtaq, 2014). Animal companionship contributes to emotional sustenance through the ability to give and receive affection and form close bonds with people (Kellert, 1997; Fine, 2006). Research may be suggesting that animals can compensate for human relationships as well as expand upon and complement them (Crossman & Kazdin, 2015; Fine, 2006; Kellert, 1997; Levinson, 1969). A person can feel less lonely by spending time with companion animals, which provide an unconditional support system for an individual that is not geographically close to his or her friends and family (Binfet, 2017; Kellert, 1997). Unique features that animals contribute to the human animal bond include being nonjudgmental, providing complete devotion, reliability, assurance, and a feeling of being wanted (Kellert, 1997). Animals can fulfill a sense of place and permanence within a person's life that adds a layer of security, especially when confronting death or disease of a family member or friend (Kellert, 1997). Often, college students feel homesickness, isolation, and loneliness when transitioning into a college student role in a new environment and therapy dog programing or AAI on college campuses has the potential to add an extra layer of security for the college student (Binfet, 2017; Binfet & Passmore, 2016).

Sociability and affiliation. Kellert (1997) claimed "[t]he extraordinary success of human species has occurred despite our relative lack of speed, strength, stamina, stealth, or other physical attributes possessed by many other creatures" (p. 111). The human species' achievements in meeting basic physiological and safety needs are in part due to social bonding and affiliation (Kellert, 1997). Humans have developed advanced social capabilities, which primarily stem from relationships with friends and family; however, relationships involving the care of animals and nature are another significant way to express and receive both affection and intimacy (Kellert, 1997). The bond between human and nature promotes connectedness in

relationships and provides a sense of "stewardship" (Kellert, 1997, p. 112). The ability to form close connections with nature is cultivated by the human traits of "sociability, cooperation, and affiliation" (Kellert, 1997, p. 112). These connections are particularly important for living beings that may be "young, vulnerable, or isolated," which may be exacerbated when students move away from their support systems to attend college (Kellert, 1997, p. 112).

Self-esteem and self-respect. The practice of caring for animals has the opportunity for humans to feel valued and unique, thereby contributing to self-esteem and self-respect (Kellert, 1997). Chandler (2005) and Fine (2006) explained that relationships with animals can increase an individual's perception of confidence and capabilities. AAI was developed to encourage self-esteem and self-respect for individuals with mental health challenges and to enable them to relate to others, creating a sense of happiness and self-worth (Draper et al., 1990; Serpell, 1996).

Physical healing and mental restoration. According to Kellert (1997), a person's physical fitness and mental restoration have benefited from a person spending time in nature and with living things. Throughout history, humans have described a restorative and revitalizing impact when spending time in and around nature and living things (Kellert, 1997; Kellert & Wilson, 1993). Additionally, several researchers have shown the therapeutic value and restorative effects of animals on individuals with such conditions as anxiety, stress, attention disorders, medical trauma, and violence (Bardill & Hutchinson, 1997; Briggs, 1996; Draper et al., 1990; Fick, 1993). Researchers have reported that college student populations experience high levels of anxiety, stress, and attention disorders; furthermore, they often are geographically relocating away from their support systems, including friends and family (ACHA, 2015; Binfet, 2017; NAMI, 2016). Companion animal is a broad term often used in animal-based theories to denote an animal used for company; therefore, all animals used in AAI and AAI are companion

animals; however, not all companion animals are registered with programs participating in AAI and AAI (see Figure 1).

The biophilia hypothesis summary. The biophilia hypothesis has the historical foundational information regarding the deep-rooted connections between humans and living things (Kellert & Wilson, 1993). As society has evolved, an influx of built materials and technology have been infused into most environments that individuals interact in, including the college environment (Kellert, 1997). Introducing the option to interact with a living being, such as a therapy dog, can have a sense of security, increase confidence and mental health, and offer the opportunity to connect with a relatable being. Although there is a vast amount of literature describing the positive feelings and emotion experienced by individuals when immersed in nature and with living animals, the implementation of rigorous research designs with supported evidence are still needed to substantiate these claims. More specifically, the descriptive details of such interactions are missing in many studies. Researchers are encouraged to include all elements of dosage, including the duration of each session, the number of sessions, and the ratio of handler/animal/client as well as the details regarding the nature and activities involved in each session, including animal welfare (Binfet et al., 2018). The specific aims of this investigator is to seek to fill these gaps in particular by analyzing AAA programming in a population largely understudied, graduate students. This aim will be discussed further in Chapter 2, a Review of the Literature.

Person-Environment-Occupation

In 1996, Mary Law and colleagues developed the person-environment-occupation (PEO) model, which has foundational roots derived from the environmental press theory and Csikszentmihalyi's concept of flow (Law et al., 1996). The environmental press theory is used

for all populations in which competence may be compromised and defines the environment as "stressors or resources influencing competence" (Law et al., 1996, p. 12). An assumption that supports this definition includes the notion that "environmental press consists of forces in the environment that evoke a response and as personal competence decreases, vulnerability by environment[al] influences increase" (Law et al., 1996, p. 12). Csikszentmihalyi (2004) has a concept of flow that refers to finding the perfect fit between challenge level and skill level in an activity that is meaningful to a person and yields increased performance. The importance of environmental influence and concept of flow are brought together as Law et al. (1996) explains:

> The model assumes that its three major components (person, environment, occupation) interact continually across time and space in ways that increase or diminish their congruence. The closer their overlap or fit, the more harmoniously they are assumed to be interacting. The outcome of greater compatibility is therefore represented as more optimal occupational performance. (p. 17)

Person. Law et al. (1996) defined the person as a "unique being" involved in "simultaneous dynamic roles" that fluctuate across time (p. 15). The person is "holistic" and has skills obtained from "life experiences" and genetics to assist in occupational performance (Law et al., 1996, p. 16). The person in this dissertation study (i.e., graduate college students) is continuing to fulfill previous roles as well as balancing the new role as a graduate college student. This new role includes an additional set of responsibilities and expectations, including more autonomy in daily routine and finances. This transition naturally encompasses a new set of opportunities and stressors involved with the adjustment of assuming the graduate college student role. The investigator used the Student Adaptation to College Questionnaire (SACQ) to

measure the student's ability to adjust to the graduate student role academically, socially, and from a personal-emotional perspective (Baker & Siryk, 1989).

Environment. The environment is described generally, giving "equal importance to the cultural, socio-economic, institutional, physical, and social considerations of the environment. Additionally, the model considers each of these domains from the unique perspective of the person, household, neighbourhood, or community" (Law et al., 1996, p. 16). An individual transitioning to a graduate or professional program experiences changes in each of the environmental domains. Students are adjusting to a change in culture set forth by the institution they attend. The financial investment in education may influence students' perception of their present or future social economic status. The physical environment has also changed for college students. Additionally, new social demands are placed on the college student. The student will be required to interact with new peers, staff, and faculty. Finally, new stressors, including technological stimuli, limited availability of individualized support from student services, and new financial concerns, including student debt and employment concerns, can affect the student's mental health (Brown, 2018; Fogle & Pettijohn, 2013; Piercell & Keim, 2007). The investigator will use the SACQ to explore the graduate student's adjustment and attachment to the college context.

Occupation. The PEO model includes definitions of activity, task, and occupation. Mary Law et al. (1996) stated:

> The model proposes that the concepts of activity, task and occupation are nested within each other. . . . Activity is considered to be the basic unit of a task. . . . Task is defined as a set of purposeful activities in which a person engages. . . . Occupation is defined as

groups of self-directed, functional tasks and activities in which a person engages over the

lifespan. (p. 16)

American Occupational Therapy Association (AOTA, 2014) reports, "Occupations can contribute

to a well-balanced and fully functional lifestyle or to a lifestyle that is out of balance and

characterized by occupational dysfunction" (p. S6). Occupational balance has a major impact on

stress and mental health (Yu, Manku, & Backman, 2018). As a student transitions into the role of a

graduate college student, often a new level of independence is required not only in the education

domain but throughout the domains of activities of daily living (ADLs), instrumental activities of

daily living (IADLs), social participation, leisure, and rest and sleep, which may make it difficult

for the student to find balance between each occupational domain (Ross, Niebling, & Heckert,

1999).

Occupational performance. Law et al. (1996) defined occupational performance as

"the outcome of the transaction of the person, environment, and occupation and is defined as the

dynamic experience of the person engaged in purposeful activities and tasks within an

environment" (p.16). The fit between the person (graduate college student), environment

(college campus), and occupations (education) across time and space will be examined to

understand compatibility or occupational performance (Law et al., 1996). The investigator will

utilize the Canadian Occupational Performance Measure (COPM) to investigate the graduate

student's self-perception of occupational performance, specifically education, over time (Law et

al., 1990).

Research Questions

The aim of this dissertation study is to answer the following questions:

1. Are there significant differences on graduate students' QOL for students who participate in a recurring weekly 35-minute AAA session for 6 weeks compared with a control?

1a. Is there a significant difference in graduate students' perceptions of stress between those who participated in AAA compared with a control?

1b. Is there a significant difference in graduate students' perception of stress before and after engaging in an AAA intervention session within the experimental group?

1c. Is there a significant difference in graduate students' perception of anxiety between those who participated in AAA compared with a control?

2. Does a recurring weekly 35-minute AAA session for 6 weeks affect occupational performance, specifically education, of the graduate college student population compared with a control?

2a. Is there a difference in the ability to adapt to the college graduate student role between graduate college students that participate in a recurring weekly 35-minute AAA session compared with a control?

Hypotheses

The investigator hypothesizes that participation in AAA will positively affect college graduate students in the categories of QOL, including decreased stress and anxiety perception. In addition, the investigator hypothesizes that the participants in the experimental group will report a higher degree of improvement in occupational performance, specifically education, and adjustment to the graduate student role.

Definitions of Terms

1. Well-being. Conceptually, well-being is defined "as a state of well-being in which every individual realizes his or her potential, can cope with normal stresses of life, can work productively and fruitfully, and can contribute to his or her communities" (WHO, 2014, para. 1). Operationally, well-being is defined as positive changes in the dependent variables including, QOL, stress and anxiety perception, occupational performance, and adjustment to graduate student role.

2. Human animal bond. Conceptually, the human animal bond is defined as "a mutually beneficial and dynamic relationship between people and animals influenced by behaviors essential to the health and well-being of both" (American Veterinary Medical Association [AVMA], 2018a, para. 1). This dynamic relationship includes "emotional, psychological, and physical interactions of people, animals, and the environment" (AVMA, 2018a, para. 1). Operationally, the human animal bond will refer to the relationship established between the college student and the therapy dog.

3. Companion animal. A companion animal is a term often used in animal-based theories to denote an animal without specialized training used for company, amusement, or psychological support (AVMA, 2018b).

4. Therapy dog. A dog that has been trained for AAI and can be included in AAA, animal assisted therapy, and/or animal assisted education (AAE) programs (Animal Assisted Intervention International, 2018).

5. AAI. Animal assisted intervention "encompasses various procedures that are goal-directed and target the specific developmental, therapeutic, emotional, and behavioral [aspects] of individual or groups of people involved in working with trained animals.

It [AAI] is conducted by an animal-handler team, by meeting the standards of a
competent organization" (Animal Assisted Intervention International, 2018, p. 1).

6. AAA. Animal assisted activity is explained by Animal Assisted Intervention
International (2018) as "most often conducted on a volunteer basis by people and
animals (usually dogs), which have received at least introductory training and
preparation for visitation in social institutions for motivational, educational and/or
recreational reasons" (p. 1). Operationally, AAA will encompass the aforementioned
explanation and refer to the time spent between the participants and the therapy dogs.

7. QOL. Quality of life is defined as "an individual's perception of his or her position in
life in the context of the culture and value systems in which s/he lives and in relation
to his or her goals, expectations, standards, and concerns," which will be measured by
the World Health Organization Quality of Life Brief (WHOQOL-BREF; Skevington,
Lofty, & O'Connell, 2004, p. 299).

8. Stress. Operationally, in this dissertation study, perceived stress is measured by the
Perceived Stress Scale (PSS), which is "a measure of the degree to which a situation
in the participant's life is appraised as stressful" (Cohen, Kamarck, & Mermelstein,
1983, p. 385).

9. Anxiety. Anxiety is defined as feeling nervous, anxious, frightened, worried, on edge,
or panicked and is measured by the PROMIS Emotional-Distress-Anxiety-short form
(American Psychological Association [APA], 2013, p. 2).

10. Occupational performance. In occupational therapy, Law et al. (1996) defines
occupational performance as "the outcome of the transaction of the person,
environment, and occupation and is defined as the dynamic experience of the person

engaged in purposeful activities and tasks within an environment" (p. 16).
Operationally, in this dissertation study, occupational performance will be measured
using the COPM (Law et al., 1991). The investigator will identify potential
occupational problems within the productivity domain, specifically education. The
participants will rate their performance and satisfaction before and after the AAA
intervention.

11. Graduate student role. AOTA (2014) defined roles as "sets of behaviors expected by
    society and shaped by culture and context that may be further conceptualized and
    defined by the client" (p. S27). Operationally, in this dissertation study, graduate
    student role will be measured using the SACQ (Baker & Siryk, 1999). The tool
    measures the following domains: the student's academic adjustment, social
    adjustment, personal-emotional adjustment, and attachment to context.

12. Dosage. In general, dosage is defined by size, frequency, and number ("Dose," n.d.).
    Operationally, dosage is the "duration of each session + the number of sessions + the
    ratio of handler/animal/client" (Binfet et al., 2018, p. 3)

13. Animal welfare. Animal welfare is defined by Animal Assisted Intervention
    International (2017) as

    the animal having access to the five freedoms while working, including (1)
    freedom from thirst, hunger, and malnutrition by ready access to fresh water and a
    diet to maintain full health and vigor (2) freedom from discomfort by providing a
    suitable environment, including shelter and a comfortable resting area (3) freedom
    from pain, injury, and disease by prevention and/or rapid diagnosis and treatment
    (4) freedom from fear and distress by ensuring conditions that avoid mental

suffering, and (5) freedom to express most normal behavior by providing

sufficient space, proper facilities, and company of the dog's own kind. (p. 2)

Animal welfare is pivotal to include because the well-being of the animal ensures the

client's safety and is directly related to dosage in considering the ratio of handler/animal/client.

Description of Variables

Independent Variable

The independent variable in the dissertation study is AAA. Researchers in the AAI field

have specified the need to identify the dose of intervention in their studies, referring to "the

duration of each session + the number of sessions + the ratio of the handler/animal/client,"

(Binfet et al., 2018, p. 3). In this dissertation study, the experimental group will experience a

dosage of a 35-minute session + once a week for 6 weeks + with a ratio of one handler/one

therapy dog/three to five clients. The preferred average time of college student exposure to AAA

to be about 35 minutes and is supported by the literature (Binfet et al., 2018). Binfet et al. (2018)

were the first researchers to investigate dosage and conducted a study in which 1,960 students

(26% of the undergraduate student population) chose to participate in this study and the average

preferred time students spent with the therapy dogs was 35 minutes. The specific dosage was

determined after interviewing an expert in therapy dog programming for college students,

Jonathon Binfet recommended a 35-minute duration once a week for 6 weeks for this dissertation

study (J. Binfet, personal communication, July 6, 2018). All participants were in a group with a

ratio of one handler/one therapy dog/three to five participants. Additionally, participants were

required to read and sign adherence to animal welfare standards during the informed consent

process.

Dependent Variables

The primary dependent variables are QOL and occupational performance. QOL will be assessed as defined by the WHOQOL-BREF (WHO, 1994). This measure is a standardized assessment that measures quality of life within the context of an individual's culture, value systems, personal goals, standards, and concerns covering four domains, including physical health, psychological well-being, social relationships, and environment in which satisfaction is a key thread throughout each domain (Appendix A; Skevington et al., 2004). Occupational performance will be measured by using an adapted version of the COPM, which is a clinical outcome measure using a 1 to 10 rating scale, designed to "detect the change seen in the client['s occupational performance] over time (Appendix D; Law et al., 1990, p. 85). While the typical use of the COPM is utilized as a semi-structured interview, the tool has been used to measure satisfaction and performance of pre-determined occupations, specifically caregiving skills (DiZazzo-Miller, 2015). The investigator has identified the performance area of productivity, specifically education, and graduate students will rate performance and satisfaction of activities in this area.

The secondary dependent variables are perceived stress, perceived anxiety, and adjustment to the graduate student role. Stress and anxiety are measured through psychological and physiological means and are the most cited variables within the AAI literature (Barker, Knisely, & McCain, 2010; Barker et al., 2016; Binfet & Passmore, 2016; Binfet, 2017; Crossman et al., 2015; Grajfoner et al., 2017; Vagnoli et al., 2015). Perceived stress will be measured using the (see Appendix B) and a stress visual analog scale (SVAS; see Appendix F; Binfet, 2017). The PSS is the most widely used psychological instrument for measuring the perception of stress and the degree to which situations in one's life are considered stressful (Cohen, 1994). The

SVAS will be used as an entry and exit assessment at each AAA session to capture the

participant's self-ratings of the construct. This scale has been used to measure stress before and

after AAA in the college student population in previous studies (Barker et al., 2010, 2012, 2016;

Binfet, 2017). Additionally, students will identify the level of engagement in AAA, which will

be measured using a perception scale indicating low, moderate, or high engagement (see

Appendix G). Anxiety will be measured utilizing the Health Measures PROMIS emotional

distress anxiety short form (see Appendix C). The tool utilizes a seven-item questionnaire with a

1 to 5 rating scale of never through always (Cella, 2010). Adjustment to the graduate student

role will be measured using the SACQ (see Appendix D; Baker & Siryk, 1989), which examines

academic adjustment, social adjustment, personal-emotional adjustment, and attachment to the

institution (context).

Rationale

Practitioners within the field of occupational therapy focus on enhancing individuals'

health and well-being through the use of occupation. Engagement in occupation promotes

health, well-being, and quality of life by facilitating "productive and powerful engagement in

occupation that is meaningful to the client's own life" (Pizzi & Richards, 2017, p. 1). The

college population has been identified as at risk for experiencing mental health challenges (Furr,

Wetefeld, McConnell, & Jenkins, 2001; Reetz et al., 2017; Scoptelliti & Tiberio, 2010; Terry,

Leary, & Mehta, 2012; Ward & Styles, 2005) through recent literature, which has provided

evidence of the reasons for heightened levels of psychological distress (ACHA, 2015; Bitsika,

Sharpley, & Rubenstein, 2010; Besser & Zeigler-Hill, 2014; Brundtland, 2001; Durand-Bush,

McNeill, Harding, & Dobransky, 2015; Heck et al., 2014; Reetz et al., 2017). The increasing

number of college students experiencing mental health symptoms has created a significant

demand on mental health providers in higher education, thereby creating a need for effective

interventions aimed at reducing negative mental health symptoms that are cost effective,

available, and attractive to the diverse student body of colleges and universities (Barker et al.,

2016; Binfet, 2017; Lockhard, Hayes, McAleavey, & Locke, 2012; Mowbray et al., 2006). A

service that is available to the majority of college students is one-on-one counseling; however, it

is becoming increasingly expensive to provide one-on-one counseling to the number of students

that need it. Additionally, one-on-one counseling is not always attractive to students, particularly

students in health professions because of the associated stigma (Gaddis, Ramirez, & Hernandez,

2018).

Utilizing therapy dogs through AAI as a means to support college students' mental and

emotional well-being is growing in popularity (Binfet, 2017; Binfet & Passmore, 2016; Binfet et

al., 2018; Binfet & Stuik, 2018). In fact, several researchers found exposure to therapy dogs

through AAA improved college student well-being by decreasing stress (Barker et al., 2016;

Crump & Derting, 2015; Dell et al., 2015), anxiety (Grajfoner et al., 2017; Stewart, Dispenza,

Parker, Chang, & Cunnien, 2014), loneliness (Binfet et al., 2018; Binfet & Passmore, 2016;

Stewart et al., 2014) homesickness (Binfet & Passmore, 2016), and depression (Folse, 1994).

Improvements in the aforementioned areas support the hypothesis that engagement in AAA can

reduce stress and anxiety, thus improving QOL, occupational performance, and adjustment to the

graduate student role.

While the literature in AAI continues to grow, researchers consistently recommend

including objective and rigorous assessment measurements and dosage of exposure to therapy

dogs (Adams et al., 2017; Binfet, 2017; Binfet & Passmore, 2016; Barker et al., 2016). The

number of RCTs within AAI research is increasing, including eight RCTs that included AAI

programming in the college student population. However, only one study has included AAI programming for more than one session (Binfet & Passmore, 2016). Additionally, many researchers have concentrated on AAI programing during midterm or final examination periods, recommending researchers investigate the impact of AAI programming outside of these time periods (Grajfoner et al., 2017). Most notably, the majority of AAI programming to date has concentrated on the undergraduate student population as evidenced by zero AAI RCTs being completed in the graduate college student population. Given the risks inherent among the graduate college student population, including increased stress, anxiety, loneliness, homesickness, and depression, examining the engagement in AAA could significantly affect graduate students' health and well-being (Coleman & Iso-Ahola, 1993; Misra & McKean, 2000), resulting in increased occupational performance and the ability to adapt to the graduate college student role.

In this dissertation study, the investigator aims to expand upon previous studies by examining a largely understudied population, graduate students, and examine more than one session, engagement in recurring AAA. The investigator hypothesized graduate student engagement in recurring AAA will increase their well-being, including increased QOL, occupational performance, adjustment to graduate student role, and decreased stress and anxiety. The investigator in this dissertation study used psychometrically robust instruments to study engagement in recurring AAA over the course of 6 weeks. The results of this dissertation study may enhance the animal-assisted intervention community by expanding upon the understanding of the effects of therapy dogs and augment programming and the delivery of services. These results may also contribute to the field of occupational therapy by providing evidence of recurring AAA to determine its effect on well-being, including decreasing stress and anxiety, and

increasing QOL, occupational performance, and adjustment to graduate student role of an understudied population with identified mental health concerns, graduate college students.

Assumptions

All research studies include certain assumptions. Fundamental assumptions of quantitative research include the investigator using objectivity in specifying research goals, reviewing the literature, and formulating hypotheses. These assumptions are stated as follows:

1. The tools selected to measure the problem are valid and reliable.

2. The investigator utilizes training to perform an objective analysis of data and invited scrutiny throughout the process (Portney & Watkins, 2009).

3. The introduction of a therapy dog will yield an effect on the college student population.

4. Although this area is only one geographical location and not able to be generalized, the large Midwest University in this dissertation study presents with a diverse student body, both academically and culturally, thus an assumption can be made that the college students at the University reflect the makeup of college students across the country.

5. Therapy dogs will be trained and registered through competent organizations and, therefore, perform as expected and with appropriate temperament in response to commands.

6. Therapy dogs will be treated by participants according to animal welfare standards.

7. AAA has resulted in a significant change in stress (Barker et al., 2016; Bessler & Zigler-Hill, 2014; Binfet et al., 2018; Crossman & Kazdin, 2015), self-esteem (Bessler & Zigler-Hill, 2014; Bilinsky, 2011), and well-being (Binfet, 2017), thus an

assumption can be made AAA programming has the potential to create change in an individual's mental health.

Summary

The literature and statistics surrounding mental health characteristics, more specifically stress and anxiety, within the college student population includes the need to develop programming that will optimize students' occupational performance within the graduate college student population. The introduction of AAA has had a positive impact on individuals within a variety of settings, such as rehabilitation, community, and educational settings, including higher education (Kamioka et al., 2014; Binfet & Passmore, 2016). Theoretical frameworks, including the biophilia hypothesis (Kellert & Wilson, 1993) and PEO model (Law et al., 1991), present the foundational support for this dissertation study to occur. Constructs within the biophilia hypothesis have support for the innate draw of human interactions between the therapy dog and college student (Kellert, 1997). Additionally, constructs within the PEO model have support for exploring personal and environmental factors that affect the college student's occupational performance, such as interaction in AAA (Law et al., 1996). Although research has shown a positive influence of AAI in various populations, the effect of AAI in the graduate student population is not known. Therefore, the investigator in this dissertation seeks to investigate the effect of AAI on the graduate college student population, including participants engaging in six AAA (subcategory of AAI) sessions over 6 weeks throughout an academic semester compared with a control. The results from this dissertation study will be used to provide valuable information in understanding the effect of engagement in recurring AAA on graduate student well-being, including QOL, stress, anxiety, occupational performance, and adjustment to graduate student role.

Chapter 2: Review of the Literature

A historical overview of the independent variable, AAI, is reviewed. Additionally, the settings in which the AAI are most prevalent are reviewed. Animal assisted intervention as well as its subcategories are defined. Additional animal terminology regarding assistance dogs is presented to ensure the reader understands the difference between AAI/therapy dog programming and assistance dog work, which includes dogs providing a specific service to the handler. Lastly, a review of the research regarding AAI's effect on college students' well-being, including graduate students, is provided. Well-being in this dissertation study includes QOL, perception of stress and anxiety, engagement in occupational performance, and adjustment to the role of being a graduate college student.

Important aspects of the population are discussed, including the evolution of mental health needs and services provided to college students, which is necessary to understand the scope and frame of this dissertation. The need to expand student health services to include mental health followed the expansion of student enrollment and increases in the number of colleges and universities (Kraft, 2011). As organizations evolved to address college mental health, they refined needs assessment methods in order to develop solutions (Kraft, 2011). As mental health needs increased, professional organizations expanded, refining methods for collecting information from colleges and universities in order to determine how these needs should be addressed (Mowbray et al., 2006). Colleges today continue to experience an increased demand to address the mental health needs of their student populations and are in need of effective, low cost mental health programming (Mowbray et al., 2006), such as AAI. The increased demand of mental health services results in increased cost for the college due to one-on-one counseling being the primary method of treatment. The use of AAI programming

primarily includes volunteer services by therapy dogs and handlers, thus AAI on college campuses is one possible low-cost solution in working towards battling the current growing concerns regarding college student well-being.

Animals have been used for health benefits in a variety of different settings beginning with psychiatric hospitals (Connor & Miller, 2000; Kamioka, 2014). AAI expanded to a variety of settings, including hospitals and rehabilitation units, and became very popular in older adult settings, including skilled nursing facilities and assisted-living centers (Nimer & Lundahl, 2007). AAI has also been incorporated into a variety of educational settings across the continuum, including preschool, improving reading skills, student behaviors, social interactions, and physiological benefits (Kotrschal & Ortbauer, 2003; le Roux, Swartz, & Swart, 2014), through higher education settings, reducing stress and anxiety (Barker et al., 2016; Binfet, 2017; Blender & Ryan, 2009; Jalongo & McDevitt, 2015; Stewart et al., 2014; Ward et al., 2017; Wood, Ohlsen, Thompson, Hulin, & Knowles, 2018), increasing well-being (Crump & Derting, 2015; Grajfoner et al., 2017; Lannon, Harrison, & Tremmel, 2017; 2015; Reynolds & Rabschutz, 2011; Ward et al., 2018), and changing the perception of students' environment (Binfet, 2017; Binfet & Passmore, 2016; Jalongo & McDevitt, 2015).

Relevant Concepts

Historical Overview of AAI

It is vital to have knowledge about the evolution of the independent variable, AAI, in order to understand how AAI has evolved over time. Although there has been a recent surge in interest in studying the effect of animals on different populations, the bond between animals and humans dates back to prehistoric times as evidenced by cave drawings (Connor & Miller, 2000; Johnson, 2014, 2018a, 2018b). Evidence of the link between animals and humans can be found

in historical reports, dating as early as the 13th century that document the existence of animals living inside the home as pets (Connor & Miller, 2000; Johnson, 2014, 2018a, 2018b). This practice was initially more popular among the upper class; however, it continued to gain popularity among all socioeconomic levels as time passed (Connor & Miller, 2000).

Animals in medicine. Animals have been reported as being used for therapeutic value within medical settings as early as 1792 (Connor & Miller, 2000; Johnson, 2014, 2018a, 2018b). Animals were introduced to work with patients in psychiatric settings because of the belief that patients benefited from "proximity, observation, touching, and tending of animals" (Connor & Miller, 2000, p. 21). The term animal assisted therapy was introduced in 1969, following the use of animals to facilitate sounds in nonverbal patients (Draper et al., 1990). Beginning in 1985, animals were used in occupational therapy to improve physical and cognitive function in patients (Connor & Miller, 2000; Johnson, 2014, 2018a, 2018b).

In the ensuing years, AAI gained popularity, and evolving researchers discovered that animals can help individuals to reduce stress, recover more quickly after medical traumas (Briggs, 1996; Johnson, 2014, 2018a, 2018b), stabilize vital signs, and to reduce violence and suicide rates in prison settings (Nimer & Lundahl, 2007). Improved well-being in individuals was rationale for the increased use of animals in a variety of disciplines and settings. The expansion of disciplines using animals in practice necessitated the need to define and categorize the type of animal intervention into more specific groups (Johnson, 2014, 2018a, 2018b).

AAI defined. Animal Assisted Intervention International (2018) reports their organization, "is a non-profit association and coalition of practitioners, individuals or organizations that have a strong foundation of positive interactions with people and animals, at all stages in the Animal Assisted Intervention International continuum, [including] training,

handling, treating, and educating" (para. 1). Although animal assisted therapy (AAT) had been a term previously established in 1969, Animal Assisted Intervention International introduced the umbrella term AAI to encompass animal assisted therapy, animal assisted education, and animal assisted activities (Animal Assisted, Intervention International 2018; Johnson, 2014, 2018a, 2018b).

Animal assisted intervention. Animal assisted therapy and animal assisted education are both terms used to describe the use of animals within interventions geared towards assisting a client in reaching a formal individualized client goal (Animal Assisted Intervention International, 2018; Johnson, 2014, 2018a, 2018b).

Animal assisted therapy. The goals of AAT are to promote improvements in physical, social, and/or cognitive functioning of the client (Animal Assisted Intervention International, 2018; Johnson, 2014, 2018a, 2018b). An example of AAT addressing a physical health goal, such as improving mobility and endurance, would include implementing a walking program with an animal. Participation in a walking program would be an example of a physical goal (Johnson, 2014, 2018a, 2018b). A social goal could include participation in socialization groups to discuss the animals involved in an AAT intervention with other members of the community. Additionally, a cognitive goal could address improvement in memory skills by participation in a meaningful game in which one is asked to recall specific characteristics of the animal (Johnson, 2014, 2018a, 2018b).

Animal assisted education. AAE is also directed towards a client meeting a formal goal; however, the treatment is delivered by a professional in an educational setting, and the goal is to improve the client's cognitive status (Animal Assisted Intervention International, 2018; Johnson,

2014, 2018a, 2018b). An example of an intervention in this domain would include a child reading to an animal to improve speech, comfortability, reading speed, and comprehension.

Animal assisted activities. Animal Assisted Intervention International (2018) defines animal assisted activity as the following:

> most often conducted on a volunteer basis by people and animals (usually dogs), which
> have received at least introductory training and preparation for visitation in social
> institutions for motivational, educational, and recreational reasons . . . AAA refers to an
> organization that participates in activities in which a specially trained dog handler and
> dog is an integral part of the activity, providing opportunities that are recreational and
> leisure-based. (p. 1)

AAA often includes animal handler teams providing services to larger groups of people, such as providing regular visiting therapy animal visits within a hospital. Another example includes therapy dogs that provide comfort after a tragedy, such as in Connecticut following the Sandy Hook Elementary shooting tragedy. Following the catastrophic shooting in Newtown, Connecticut, many therapy dog handler teams responded by visiting various schools and attending events to bring some stress relief to the children and families (V. Neumann, personal communication, September, 15, 2013).

Animal-related terminology. Although the focus of this project is about AAI, an understanding of assistance dogs is necessary to comprehend the differences between therapy animal work and assistance dog work. Assistance dogs provide a specific service to their handlers and significantly enhance their QOL through providing the ability to be more (Assistance Dogs International [ADI], 2018). The three types of assistance dogs include guide dogs, hearing dogs, and service dogs (ADI, 2018). A notable difference between a therapy dogs

and assistance dogs is that a therapy dog has both a handler and client, whereas an assistance dog has a client that is the handler. Guide dogs assist people who are blind and visually impaired by navigating the environment while avoiding any barriers while being mobile (ADI, 2018). Additional benefits of owning a guide dog have been reported to be increased opportunities within work, leisure, and social environments (Reightler, 2018). Hearing dogs provide assistance to individuals who are deaf and hard of hearing by signaling the handler to variety of household sounds through making physical contact and leading the handler to the sound (ADI, 2018). Service dogs include dogs that assist people with disabilities other than vision or hearing (ADI, 2018). They can be trained to work with people who experience a variety of challenges related to mobility, mental illness, and medical concerns, such as low blood sugar or seizures (ADI, 2018). Service dogs can be trained to perform skills, such as retrieving objects out of reach, opening and closing doors, turning light switches off and on, barking to indicate help, and providing deep pressure for calming (ADI, 2018).

Historical Overview of College Student Mental Health

It is necessary to have knowledge regarding the evolution of college student mental health in order to understand the problem identified by the investigator, a growing concern regarding college student well-being related to the levels of stress and anxiety ultimately affecting QOL, occupational performance, and adjustment to graduate student role. Student health services were developed as early as 1861; however, it was not until 50 years later that the first student mental health service was initiated in 1910 (Kraft, 2011; Mowbray et al., 2006). The numbers of mental health professionals increased dramatically throughout the 20th century under the Mental Hygiene Movement (Kraft, 2011). It was under this movement that the occupational therapy profession was born. From 1910 to 1920, college administrators added

psychiatrists as a staff position to promote retention of students with emotional and personality issues (Kraft, 2011).

Expansion of mental health services. The first American Student Health Association, later becoming ACHA, advocated for the importance of addressing the mental health needs of students (Kraft, 2011). In the early 19th century, health professions, involved with treating clients with mental health disorders, continued to expand to include occupations, such as counseling, occupational therapy, and social work (National Association of Social Work, 2019). This expansion would allow for innovative and creative treatment ideas. Counseling, occupational therapy, and social work professionals would later include AAI as a possible addition to complement treatment options.

Historical funding challenges. From early to mid-20th century, mental health funding became a significant concern on college campuses as the number of students increased as well as the services they required. The topic of mental health was addressed in the first national conference on college health in 1931 (Kraft, 2011). After World War II, in 1944, the GI Bill provided funding for educational expenses, which increased enrollment at colleges and universities (Kraft, 2011). In 1954, only 8% of colleges and universities were using psychiatrists, and 74% were providing mental health services without psychiatric consults (Kraft, 2011). Furthermore, Kraft (2011, p. 479) stated, "[the] enrollment of students [increased from] 3.6 million students in 1960 to 18.2 million in 2008 (a 405% increase)." In the 1960s, as baby boomers reached college age, mental health services expanded and were much more established within colleges (Kraft, 2011). During this time, funding for mental health services was derived from general university revenues. However, as enrollment and associated mental health needs

continued to increase, funding shifted to colleges charging separate health fees for student health services to support prepaid routine services, including mental health care (Kraft, 2011).

Presently, a significant concern among colleges is examining ways to reduce the financial costs associated with the treatment of mental health, which can be reduced by the inclusion of informal health services that do not require a fee (Brindis & Reyes, 1997; Kraft, 2011). An example of an informal health service that does not require fees is the addition of AAI to supplement traditional treatment options. Therapy dog programming implementing AAA is run primarily on a volunteer basis (AOTA, 2018; Pet Partners, 2015).

Mental health assessment and research expansion. After funding increased, colleges began to evaluate and compare their services to increase mental health literature. In the 1970s, "the mental health section of the ACHA [developed and] initiated the Mental Health Annual Program Survey," (Kraft, 2011, p. 479) later becoming the National College Health Assessment (NCHA), which is a survey that assists institutions to collect and compare data regarding students' health habits, behaviors, and perceptions (ACHA, 2018; Kraft, 2011). Concurrently, the *Diagnostic and Statistical Manual of Psychiatric Disorders, Edition III (DSM-III)* was developed and published, which provided specific diagnostic criteria (American Psychiatric Association, 2019). Kraft (2011) explained that "this resulted in a set of diagnostic categories even more applicable to students than previous versions, such as the addition of different types of adjustment disorders, eating disorders, and learning problems" (p. 479). Higher education personnel and health care professionals continue to implement new and creative treatment options, such as AAI, to compliment traditional mental health services.

During the same time frame, researchers were discussing mental health, including publishing in the *Journal of American College Health (JACH)* and increasing the number of

publications addressing student mental health content (Kraft, 2011). Published diagnostic

criteria and an increase in publications of mental health disorders created additional interest in

the topic leading to the mental health concerns we are currently experiencing. The evolution of

mental health services has insight into understanding the mental health challenges higher

education personnel are currently battling, which is the problem identified in this dissertation

study.

   College student mental health today. A summary of college student mental over the

past 5 years is presented to give context to the population studied, including instances of stress

and anxiety as well as to highlight the problem identified in this dissertation. College campuses

are facing increases in mental health concerns and decreases in overall well-being at an alarming

rate (ACHA, 2017; Martin, Mockry, Puliatte, Simard, & Squires, 2018; NAMI, 2014). The

World Health Organization (2014) defines mental health "as a state of well-being in which every

individual realizes his or her potential, can cope with normal stresses of life, can work

productively and fruitfully, and can contribute to his or her communities" (para. 1). This

definition reinforces importance of understanding how every college student is affected by and

manages his or her mental health. Although signs of mental health disorders may occur prior to

college entry, challenges associated with the transition from high school to college and from

undergraduate to graduate school may affect the mental health of college students (Martin et al.,

2018). College enrollment has increased by 5.2 million in the past 20 years and continues to

grow (Martin et al., 2018), thus indicating a continued need for the provision of effective and

affordable mental health services for the college population (Mowbray et al., 2006). One

example of an affordable service that can complement traditional services is AAA, typically

conducted on a volunteer basis.

Researchers theorized that college students experience mental health and well-being challenges due to the demands of adjusting to a new community (Levens, Elrahal, & Sagui, 2016; Martin et al., 2018). Moreover, changes in environment may result in increased levels of stress and negative consequences, which impacts students' "retention, persistence, and academic successes as well as those around them" (Martin et al., 2018, p.7). The introduction of AAI into the campus environment may be an option to reduce stress, thus help the student adjust to his or her new environment. According to the results of ACHA's National College Health Assessment II (NCHA; 2016), "17% of student respondents report[ed] having been treated by a professional for anxiety, 13.9% for depression, and 8.4% for panic disorders" (p. 15). Furthermore, the students more frequently identified stress and anxiety as barriers to academic success. Additionally, the ACHA's NCHA (2016) depicted a high frequency of mental health concerns:

36.7% felt so depressed it was difficult to function; 58.4% felt overwhelming anxiety; 9.8% seriously considered suicide; 6.7% intentionally injured themselves; 39.6% felt overwhelming anger; 65% felt very sad; 49.8% felt things were hopeless; [an alarming] 85.1% felt overwhelmed by all they had to do; 81.7% felt exhausted (but not from physical activity); and 59.3% felt very lonely at [some] time within the previous year. (p. 13-14)

The ACHA's assessment contrasts the small number of students seeking services to the larger number of students who identify as experiencing negative mental health symptoms (2016), which demonstrates a need for informal programming, such as AAA.

Many factors should be considered when promoting positive mental health within the college student population. A particularly noteworthy finding in the ACHA 2012 survey indicated "when individuals regularly engage in physical and social activities, the individual

live[s] a healthier lifestyle and experience[s] improved mental health and well-being" (Martin et al., 2018, p. 9). Introducing an AAA program can provide students an opportunity to engage with others as a social activity as well as to increase physical activity through walking and interacting with the therapy dog. Another significant predictor of positive mental health and well-being of college students is the role of the student's family. The family provides emotional support, which results in developing useful coping skills (Levens, Elrahal, & Sagui, 2016; Martin et al., 2018). The majority of pet owners (63.2%) consider their pets to be family members (AVMA, 2018), and the human-animal bond can have a significant impact on well-being, including eliminating the worry of being judged when seeking comfort in an animal (Fine, 2015). The power of the human-animal bond coupled with individuals considering pets to be family members may be suggesting students may consider therapy dogs to be family members and, therefore, the therapy dog would provide a significant emotional support.

Student services. Mental health services on college campuses tend to take a proactive approach, including counseling sessions, consultations with higher education personnel, and information regarding campus safety (Martin et al., 2018; Prince, 2015). A proactive approach is supporting the rationale that additional services beyond counseling services can influence student mental health (Binfet & Passmore 2018; Martin et al., 2018). Researchers suggested faculty should share the responsibility of student mental health with student services as well as focus on programming within the campus community in order to be most effective (Bishop, 2010; Martin et al., 2018).

Disclosure. One barrier that students with mental health challenges face is they cannot receive services without disclosing their disorder, which many students fear due to the perceived stigma adverse mental health can carry, thereby limiting access and affecting overall

psychological well-being (Martin et al., 2018; NAMI, 2012). Researchers described college students feeling comfortable when seeking help informally with 78% of students with adverse mental health having sought support from nonprofessionals, such as family members (52%) and friends (67%; Eisenberg, Hunt, Speer, & Zivin, 2009; Martin et al., 2018). Providing an informal service, such as AAA, would be giving students an opportunity to engage in a service that does not require disclosure but can still affect overall well-being and QOL.

<div align="center">**Relevant Contexts**</div>

There are various contexts in which AAI takes place. Most common contexts include the medical arena, specifically with the older adult population. The next most frequent area studied is in educational settings, which range from preschool through college settings. While undergraduate college student research with AAI focuses on variables, such as quality of life, stress, anxiety and adjustment, graduate students, AAI is largely understudied with only two studies including graduate students and only one study focusing on only graduate students.

AAI in Medical Settings

Medical settings are of the most prevalent setting in which AAI has been researched. Animals have been reported to have a significant role in well-being within medical settings (Nimer & Lundahl, 2007; Uglow, 2019). Merely owning a pet has been an indicator that patients recovering from illness while in the hospital will improve at a faster rate (Friedmann & Thomas, 1995; Johnson, 2014). Friedmann and Thomas (1995) demonstrated improved cardiovascular health and pet ownership to be a significant predictor in patients' health one year post-myocardial infarction (Johnson, 2014). Additional researchers have suggested AAI resulted in patients experiencing positive health outcomes in the categories of cognitive disorders, psychiatric disorders (Stefanini, Martino, Allori, Galeotti, & Tani, 2015; Stefanini, Martino, Bacci, & Tani,

2016), stress, mood, pain (Harper et al., 2015), and physiological factors (Nagengast, Baun, Megel, & Leibowitz, 1997) in medical settings (Lundqvist, Carlsson, Sjodahl, Theodorsson, & Levin, 2017; Uglow, 2019).

Researchers report AAI utilized with clients diagnosed with cognitive disorders demonstrated a significant decrease in depression and an increase in QOL (Bernstein, Friedmann, & Malaspina, 2015; Travers et al., 2013; Lutwack-Bloom, Wijewickrama, & Smith, 2005). An additional study of AAI with clients with cognitive disorders showed significant slowing in declines of functional status, which is related to occupational performance, and development of cognitive impairment (Bono et al., 2015). Stefanini et al. (2015, 2016) conducted research in psychiatric settings that showed individuals receiving conventional treatment with AAI compared with receiving conventional treatment alone demonstrated improvements in global competence and psychological functioning and a reduction in emotional and behavioral symptom. Furthermore, Stefanini et al. (2015, 2016) noted individuals with schizophrenia and/or ADHD experienced a decrease in symptoms.

Researchers have examined the psychological and physiological effects of the use of AAI in medical settings during such procedures as physical examination, venipuncture, radiation oncology, and cardiovascular health (Nagengast et al., 1997; Hansen, Messinger, & Baun, 1999). In these studies, both psychological and physiological results were captured. Psychological results included lower stress levels (Nagengast et al., 1997; Hansen et al., 1999). Physiological results include decreased arterial and systolic blood pressure, heart rate, and serum cortisol, which indicates stress levels (Havener et al., 2001; Krause-Parello & Kolassa, 2016; Nagengast et al., 1997; Vagnoli et al., 2015). Additionally, Uglow (2019) stated patients reported therapy dogs in the hospital during procedures reduced anxiety. Lastly, researchers examined the

influence of AAI on pain management and determined pain was significantly reduced in both inpatient and outpatient settings (Bice & Wyatt, 2017; Brown & Agnello, 2013; Harper et al., 2015; Marcus et al., 2012).

Older adults. Nursing home environments and other long-term care facilities (LTCF) are among the most common settings where AAI takes place (Johnson, 2014, 2018a, 2018b; Velde et al., 2005; Zissleman, Royner, Shmuely, & Ferrie, 1996). Additionally, Zissleman et al. (1996) found that AAI helped patients diagnosed with mental illnesses to experience decreased irritable behaviors. Researchers reported positive results involving AAI with patients with Alzheimer's disease, living in a LTCF, resulted in a decreased need for nutritional supplements (Edwards & Beck, 2002; Johnson, 2014, 2018a, 2018b; Menna et al., 2016).

Loneliness and socialization. Researchers support the use of AAI to reduce loneliness and improve socialization, and thus overall QOL. Banks and Banks (2002) noted reductions in loneliness for clients in the most extreme category of loneliness exposed to AAI. Furthermore, they explained when the residents interacted with the therapy dog, the residents demonstrated a spontaneous increase in socialization. Calvert (1989) also examined loneliness in LTCF and found that residents who had greater levels of interaction with animals experienced less loneliness. Similarly, nursing home residents who experienced the introduction of a resident dog in their facility demonstrated increased social interactions (Gammonley & Yates, 1991; Johnson, 2014, 2018a, 2018b; Winkler, Farnie, Gericevich, & Long, 1989). Additional studies about the effects of introducing a dog within nursing home settings showed improved socialization and increased verbalizations among residents (Fick, 1993; McQuillen, 1985; Roenke & Mulligan, 1998).

AAI in Educational Settings

The use of animals in educational settings has increased significantly in recent years (Binfet, 2017; Jenkins, Laux, Ritchie, & Tucker-Gail, 2014; Johnson, 2014, 2018a, 2018b; Mendonca, Yhost, Santalucia, & Ideishi, 2017; Kumasaka, Fujisawa, & Masu, 2017; O'Haire, McKenzie, McCune, & Slaughter, 2014; Zents, Fisk, & Lauback, 2017), resulting in challenges in reporting data. A variety of psychological, social, and physiological health benefits have been achieved by introducing animals into educational settings (Binfet; 2017; Brelsford et al., 2017). However, clinicians and researchers interested in this field face a tremendous challenge due to the lack of consistency in the terminology, which makes generalizations about studies difficult. Although many researchers reported investigating AAT, the activities taking place would be more aligned with AAA as defined by Animal Assisted Intervention International. It is important for researchers to understand and use correct terminology as well as the use of a sound methodology, including reporting of dosage and the nature of the sessions, including animal welfare standards.

Preschool and elementary school. Research of AAI programs within preschool and elementary schools has included pediatric populations with mental, cognitive, physical, and developmental disabilities (Bell, 2013; Bilinsky, 2011; Blender & Ryan, 2009; Esteves & Stokes, 2008; Fung, Chunn, Leung, & Ming, 2014; Geist, 2013; Heimlich, 2001). Researchers examining the influence of an animal's presence in the classroom showed improved occupational performance of reading skills, student behaviors, and social interactions as well as physiological benefits (Kotrschal & Ortbauer, 2003; le Roux et al., 2014).

Kotrschal and Ortbauer (2003) reported an increase in student attention and socialization with the presence of a dog in the classroom compared to the control group without a dog present.

In two studies, researchers using a randomized clinical trial (RCT) design evaluated the effects of having an animal present for students having difficulty with reading (Gee et al., 2009; le Roux et al., 2014). Overall, children reading to a dog demonstrated significant improvement in reading rate, accuracy, and comprehension (le Roux et al., 2014). Le Roux et al. (2014) compared groups of students reading to a live animal, stuffed animal, and no animal. Only students from the live dog group showed improvements in reading comprehension (le Roux et al., 2014). Researchers concluded that students likely performed better as a result of the dogs reducing stress, which can cause decreases in blood pressure and cortisol levels, thereby increasing relaxation (le Roux et al., 2014). Furthermore, the researchers hypothesized students were encouraged to read and make mistakes because of the nonjudgmental nature of dogs, reducing overall fear, anxiety, and stress in comparison to reading to adults who correct the students' mistakes (le Roux et al., 2014).

Children diagnosed with autism (ASD) is one of the most researched populations in terms of the effects of AAI (Nimer & Lundahl, 2007). Fung et al. (2014) analyzed social interactions with children diagnosed with ASD. The intervention involved children in small groups interacting with either the dog (treatment group) or stuffed dog (control group) for 20-minute sessions. Children in the live dog group demonstrated a more playful mood and were happier overall (Fung et al., 2014), demonstrating an increase in occupational performance of play. The researchers concluded that although dogs are nonverbal in communication, they are intentional in behavior, thereby allowing children with ASD to comprehend them more easily (Fung et al., 2014). Fung et al. (2014) also found that children with ASD demonstrated significantly more verbal and social behaviors after AAI intervention.

Friesen (2010) showed that animals may offer physiological, emotional, social, and physical support for children. Researchers determined that AAI helps children with a variety of diagnoses to improve their interactions with others, which leads to increases in their academic performance and QOL (Anderson & Olson, 2006; Friesen, 2010; Gee et al., 2009).

Middle school and high school. A variety of qualitative and quantitative research studies have been conducted within this age group, including people age 11 to 18. Student populations have included children with developmental disabilities, social-emotional diagnoses, as well as populations with no diagnoses (Friesen, 2010; Kogan, Granger, Fitchett, Helmer, & Young, 1999; Geist, 2013). Common findings maybe suggesting positive correlations between social, emotional, and physical benefits when engaging in AAI. In a review of the literature, Friesen (2010) compiled a list of possible positive benefits of AAI, including significantly lowered verbal, emotional, and behavioral distress in adolescents with severe emotional disorders when faced with a challenging activity. Friesen proposed that AAI contributed to emotional stability for children and provided positive attitudes towards the school and suggested that the presence of animals provided a source of companionship, allowing animals to help children with emotional disorders feel positive about their experiences (Friesen, 2010). It can be argued emotional stability is similar to quality of life and stress and anxiety in adults (graduate students). In addition to positive student attitudes, Friesen noted increased participation in social interaction in special needs classrooms and reported that the animal's presence in the classroom facilitated adolescents to be more attentive, responsive, and cooperative with teachers (Friesen, 2010). Additional researchers found positive effects on behavior and increased socialization when having an animal in the classroom (Esteves & Stokes, 2008; O'Haire, McKenzie, Mcune, & Slaughter, 2014). Sams, Fortney, and Willenbring (2006) conducted a study involving

adolescents receiving standard occupational therapy with a focus on facilitating sensory integration, language use, sensory skills, and motor skills. Their results showed adolescents receiving occupational therapy and AAI demonstrated significant increases in using language during social interactions with peers in contrast to the control group receiving standard occupational therapy alone (Sams et al., 2006).

In another study, Kogan et al. (1999) analyzed the effects of AAI on the progression of therapeutic goals for students diagnosed with emotional disorders. Participants displayed decreased distractibility and learned helplessness and improved social relationships with peers, voice expression, and tone (Kogan et al., 1999). Participants also reported a greater sense of control over their environment and activities (Kogan et al., 1999), which can be related to the potential to increase adjustment to graduate student role in new college campus environment. In a qualitative study, Geist (2013) analyzed dogs providing emotional support for adolescents in partial hospitalization classrooms. Four themes emerged: qualities attributed to the dog, affective responses the therapy dog evoked in students, the student relationship with the therapy dog, and improvement in student adjustment attributed to the influence of dog interaction (Geist, 2013). Each of these themes could be studied individually to understand AAI benefits in this population further and could yield similar results in increased student adjustment in the graduate college student population.

Martin and Farnum (2002) used quantitative measurements to evaluate the interactions and influences of animals on adolescents with pervasive developmental disorders (PDD). The study involved intensive therapy with a therapy dog and showed adolescents demonstrated elevated mood and energy when interacting with an animal (Martin & Farnum, 2002). Additional researchers, utilizing a quantitative quasi-experimental design, have analyzed the

effect of animals on youth prone to violence (Hinshaw & Anderson, 1996; Wicker, 2005). In this study, researchers explained students were given the opportunity to train dogs, thereby creating a rapport with the animal and learning responsibility. Results showed statistical significance in decreased violent tendencies and increased commitment in caring for the animal (Wicker, 2005). Bilinsky (2011) noted positive effects of AAI on self-esteem and empathy in at-risk adolescents.

College. Researchers have demonstrated great interest in studying the impact of AAI among college students in the recent years (Barker et al., 2016; Binfet & Passmore, 2016; Binfet et al., 2018; Crossman et al., 2015; Crump & Derting, 2015; Daltry & Mehr, 2015; Delgado et al., 2018; Grajfoner et al., 2017; Hall, 2018; Haggerty & Mueller, 2017; Jarolmen & Patel, 2018; McDonald, McDonald, & Roberts, 2017; Muckle & Lasikiewicz, 2017; Norton, Funaro, & Rojiani, 2018; Trammell, 2017; Ward, Collins, Corens, Chen, Klaiber, & Owens, 2018; Wood et al., 2018). The college-aged population can be operationally defined as individuals attending college who are 18 years of age or older. The aim of this section is to review AAI in the college student environment and to identify existing gaps in the literature regarding content and research design. The literature will be organized by dependent variables, including QOL, stress, anxiety, adjustment to graduate student role, and occupational performance.

QOL. Three AAI studies have been conducted on college student populations to measure QOL or an element closely related to QOL. Grajfoner et al. (2017) conducted an exploratory study to investigate the effect of AAI on college student mood and well-being, which are closely related to QOL. The researchers randomly assigned 123 participants to one of three groups, including the experimental group where participants interacted with both a handler and the therapy dog, control group one where participants interacted with the therapy dog only, or

experimental group two where the participants interacted with the handler only. All the sessions were 20 minutes in length. Although the researchers mention six participants were assigned to a therapy dog at a time, the experimental condition is described to have had 45 participants freely interacting with six to seven therapy dogs in a room. The results showed a one-time 20-minute session improved student well-being in both conditions in which a dog was present. Furthermore, interacting with the dog alone was most beneficial to mood (Grajfoner et al., 2017). Ward-Griffin et al. (2018) implemented a study with two components, including a pretest/posttest within-subjects design and an experimental design with a delayed-treatment control group during midterm exam week. The researchers' results showed statistical significance in increasing happiness and energy levels. Furthermore, participants in the experimental group experienced improvements in negative affect and perceived social support.

Binfet and Passmore (2016) were the first researchers to conduct a RCT in which college student participants engaged in more than one AAI intervention session. Participants in the experimental group were put into groups of three to four students and had weekly 45-minute sessions for 8 weeks. Participants in the control group were told they were on a waitlist and given the option to engage in the intervention after posttest data was collected. The sessions were 45 minutes in length and allowed for assigned small group interaction between the participants and therapy dog/handler teams in the first 30 minutes and unstructured interaction between participants and any of the therapy/dog handler teams in the last 15 minutes (Binfet & Passmore, 2016). The participants in the experimental group experienced feeling less homesick and increased satisfaction to life compared with the participants on the waitlist control who reported feeling more homesick and no changes in satisfaction with life.

Stress. Twelve AAI studies have been conducted to measure stress on college student populations. Blender and Ryan (2009) conducted a study on college student stress in which participants were required to "fill out self-report questionnaires about their experience . . . with the therapy dog and their own pet, and personality traits" (p. iii). Physiological stress measurements of heart rate and blood pressure were taken, and the participants experienced decreases in blood pressure in the presence of the therapy dog compared to the absence. Researchers reported that although heartrate was lower when the dog was present, it was not a statistically significant change (Blender & Ryan, 2009). Jalongo and McDevitt (2015) noted positive outcomes of incorporating therapy dogs in an academic library during a final examination period. The implementation of a therapy dog program helped reduce students' perception of stress levels. It is also important to note the researchers mentioned dosage, describing over 200 students interacting with eight therapy dogs during a 90-minute event; however, it is unclear how many students were interacting with each therapy dog simultaneously.

Bell (2013) discussed therapy dog programming occurring in a Toronto University library for 90 minutes, 2 days a week, for 3 weeks, which developed due to the high stress levels experienced among students. Although a specific stress instrument was not implemented, Bell (2013) explained that 417 students and faculty attended a therapy dog programming/AAI event with 77 students filling out responses. The responses indicated that 82% rated the event as excellent, and 100% indicated interest in attending a similar event in the future. Lannon and Harrison (2015) conducted a study in which 94.7% of the undergraduate students reported stress levels decreasing after interacting with a therapy dog.

Many researchers have measured stress before or after AAA around examination periods. Reynolds and Rabschutz (2011) reported decreased stress levels in students participating in AAA

during a final examination period in the undergraduate library at the University of Connecticut. Additionally, Barker et al. (2016) utilized a RCT with a cross-over design to assess stress levels in students just prior to final exams. Although the students' status was not explicitly stated, undergraduate status can be assumed due to the mean ages of students being 18.92 and 19.10 in each group. The researchers collected data utilizing stress scales, including PSS, SVAS, and saliva for 57 students. Although the physiological indicator of saliva did not detect statistically significant changes, significant differences in PSS and SVAS scores were discovered between the experimental and control conditions using large effect sizes. Barker and colleagues (2016) did not find significant differences in SVAS scores for control group participants. It is also significant to note, regardless of the condition order, SVAS scores were lower after the intervention was implemented (Barker et al., 2016). Similar results were noted in female freshman college students, including decreased stress and increased arousal, indicated on the PSS-14 and Stress-Arousal Checklist (SACL), respectively, but no significant results in physiological measures of blood pressure and salivary cortisol were indicated (Crump & Derting, 2015). Pendry and Vandagriff (2019) conducted a RCT measuring undergraduate students' cortisol levels. Students were assigned to one of four 10 minute-conditions, including hands-on condition (petting cats and dogs), observation (watching others pet animals), slideshow (viewing images of animals) or waitlist. Researchers found the students in the hands-on condition had lower posttest cortisol compared to the slideshow, waitlist, and observation conditions. Wood et al. (2018) measured stress levels and blood pressure of 131 students utilizing a drop in event during an exam period, allowing students to interact with guide dogs (a type of assistance dog) in training, found statistical significance in stress, measured by systolic and diastolic blood pressure using a small effect size. Trammell (2017) aimed to investigate stress and memory retrieval

during the college student exam period. The researcher found consistent results of reduced stress after interacting with a therapy dog, but no significance in memory retrieval in the undergraduate participants.

Ward-Griffin et al. (2018) measured stress perception and found statistically significant findings in reduction in perceived stress. Binfet (2017) conducted a RCT aimed to examine the how effective a single dose, or one session, of animal assisted intervention was on students' perception of stress and homesickness. Results showed significant decrease in stress and homesickness; however, researchers also noted the results did not last over time, such as 2 weeks later (Binfet, 2017). Delgado et al. (2018) conducted a study with undergraduate nursing majors to analyze the impact of AAI on perceived and physiological stress. Forty-eight students engaged in AAA, 15 minutes of interaction with a therapy dog, during finals week and completed PSS as well as vital signs and salivary cortisol were collected. Data results showed paired t tests demonstrating statistically significant results in perceived and physiological stress measurements except for diastolic blood pressure (Delgado et al., 2018).

Anxiety. There have been seven AAI studies conducted in the college student population that measured anxiety. In addition to well-being and mood, Grajfoner et al. (2017) also measured anxiety in college students using the State-Trait Anxiety Inventory (STAI). The results showed a one-time 20-minute session improved anxiety in both conditions in which the dog was present (Grajfoner et al., 2017). Blender and Ryan (2009) studied personality variables, such as anxiety, agreeableness, and extraversion interacted with the presence of the dog and outcome variables. Additional benefits the participants experienced in the presence of the dog were increased engagement, motivation, and socialization (Blender & Ryan, 2009). The effects were significant for participants having the highest levels of anxiety or neuroticism and the

lowest levels of extraversion or agreeableness (Blender & Ryan, 2009). Wood et al. (2018) showed that students demonstrated a decrease in anxiety as measured by STAI using large effect sizes.

Jarolmen and Patel (2018) analyzed the effect of AAI on the college student population during an examination period by testing blood pressure; however, they connected blood pressure to anxiety instead of stress. Researchers collected data from 86 students, including 75 students in the experimental group and 11 in the control group. Physiological measures of blood pressure were taken, which demonstrated statistical significance (Jarolmen & Patel, 2018). The researchers took blood pressure immediately before and after a 15-minute interaction with the therapy dog, and inclusion criteria had a requirement for students to have an exam the day of the interaction. Interestingly, some participants had their exam before the interaction while other students had their exam after the interaction. No statistical significance was found in the smaller control group of 11 students, which involved students to sit quietly for a 15-minute interval between blood pressure readings (Jarolmen & Patel, 2018). Stewart et al. (2014) conducted an exploratory pilot program study to gain understanding of AAI delivered in a group setting among undergraduate college students with mental health challenges. The researchers specifically focused on analyzing AAA/AAT within groups of students who report having symptoms of anxiety and loneliness.

Stewart et al. (2014) hypothesized students would feel less anxious and lonely after participating in a group counseling session with the inclusion of AAA/AAT. Stewart et al. reported the intervention would be considered AAA because of the spontaneous meet and greet style of participants with therapy dogs but also included essential aspects of AAT due to the client having specific goals related to reduction of anxiety and loneliness. The intervention

involved the researcher bringing her therapy dog to a residence hall for a two-hour block twice a month during one semester in which students were allowed to drop-in and spend time with the dog. After engaging in the intervention, the results showed an increase in student well-being, including a decrease in anxiety and loneliness scores (Stewart et al., 2014). Additionally, Stewart et al. (2014) mentioned dogs spent a range of 5 minutes to 2 hours with therapy dog, but in respect to dosage, it is unclear how many students were present at any given time and if students returned for subsequent sessions throughout the semester.

Hall (2018) also studied anxiety in undergraduate students. Participants included 77 students enrolled in an associate degree nursing program. Hall's study was interesting in that Hall described the interaction between the students and the therapy dogs stating, "Participants in the treatment group had the opportunity to pet and/or play fetch with a registered therapy dog throughout the rest of the semester. There was not a defined or required therapy dog activity," (Hall, 2018, p. 204). Additionally, students had more than one opportunity to interact with therapy dogs, and Hall stated the therapy dog was on campus 2 days a week from 8:00 a.m. to 3:00 p.m. The researchers did not include information regarding the number of students interacting with the therapy dog during a given time or the number of sessions each student engaged with the therapy dog; however, results showed a significant change in both the treatment group and the control group and no significant difference in depression (Hall, 2018). There is support in the literature for the need to implement additional studies when there is more than one occurrence of AAI with a comparison control group in order to understand the effect of recurring AAI on the college student population.

Occupational performance. The specific variable of occupational performance has not been studied in the college student population, which is an identified gap in the literature.

However, Pendry, Kuzara, and Gee (2019) conducted a mixed method study, utilizing an evidence-based academic stress management program with the incorporation of different levels of human animal interaction. The students engaged in human-animal intervention (HAI) while also engaging in the program outcomes. Students also perceived the program to be useful and recommended it to others (Pendry et al., 2019). The investigator hypothesizes a reduction in stress and anxiety and an increase in QOL and adjustment to graduate student role are in line with a possible increase in satisfaction and performance of the occupation of education.

     Adjustment to graduate student role. There have been three AAI studies conducted in the college student population that measures aspects related to adjusting to the college graduate student role. In addition to stress perception, Jalongo and McDevitt showed how interaction with therapy dogs also improved how the students' perceived the library environment and the library staff (Jalongo & McDevitt, 2015). Moreover, AAI was shown to assist in building a sense of community (Jalongo & McDevitt, 2015). Similarly, Binfet and Passmore (2016) measured satisfaction with life and homesickness, an additional benefit experienced by participants in the experimental group who were feeling more connected to their academic environment. In a RCT Binfet (2017) examined AAI's effect on student's perception of stress, and homesickness, and also reported students experienced a significant increase in affinity to campus compared with controls.

     Graduate students. The majority of the AAI research conducted in the college setting has been with undergraduate students or does not specify the status of undergraduate versus graduate; however, there have been three studies that explicitly presented the incorporation of graduate students in the population being studied. Bell (2013) found 15 of the 77 respondents who elected to participate in the AAI session were graduate students, and the remaining 52

students were undergraduate students. Additionally, Wood et al. (2018) stated that 10 of 131 students in the study reported to be postgraduate students and 121 reported to be undergraduate students. Crossman et al. (2015) were the only other researchers to specifically study a graduate-level program medical residents. The study included 67 medical residents and measured anxiety, mood, and attitude. Participants were randomly assigned to a treatment, control, or waitlist. The participants in the treatment condition had a 7-minute to 10-minute unstructured canine interaction, whereas the participants in the control condition viewed images of the same canine in the treatment condition. Finally, individuals one the waitlist received no intervention or visual stimulation. The results demonstrated a statistically significant change in anxiety and affect for participants in the treatment condition compared with participants in both control conditions.

Research implications. There have been a variety of gaps and areas of further investigation that are needed to be reported by researchers in the field of AAI, specifically within college settings. Lannon and Harrison (2015) identified gaps in study designs and suggested to examine AAI programming outside of midterms and finals in order to understand the impact of recurring AAA programming for other stressors students are experiencing that create stress and anxiety, ultimately affecting QOL and occupational performance, with the aim of the dissertation to address these gaps. In addition, the study design includes careful attention to describing all elements of dosage as research to date as lacked consistency in the reporting of each element of dosage of AAI including, "the duration of each session + the number of sessions + the ratio of handler/animal/client" (Binfet et al., 2018, p. 3). Binfet et al. (2018) were the first researchers who analyzed dosage, and he found that when giving students the opportunities to utilize AAA at their free will, the preference was for the college student to spend approximately 35 minutes with the therapy dog. Moreover, Ward-Griffin et al. (2018) commented on the need to include and

study specific aspects of activities occurring during the AAI intervention. Ward-Griffin et al. (2018) specifically commented on the amount of time students were in a session and determined the need of the ideal ratio of students to therapy dog.

Bell (2013) reported a need for researchers to concentrate on specific disciplines and programs to better understand if AAI is most effective within specific populations, giving support to study graduate students as a specific population. Furthermore, researchers identified a need to study AAI over multiple sessions (Crump & Derting, 2017; Grajfoner et al., 2017). Grajfoner (2017) stated, "researchers need to move beyond examining 'temporary relief' provided by a one-off . . . in their design," (p. 7). Furthermore, Haggerty and Mueller (2017) conducted a study that addressed the prevalence of AAI programming on college campuses as it has become increasingly popular over the past decade. Researchers reported 45% of the schools surveyed have implemented AAI programming on the campus, and 50% of the programming occurred during examination periods (Haggerty & Mueller, 2017). Researchers also reported some therapy dogs did not have liability insurance and/or were not registered with a national/local organization (Haggerty & Meuller, 2017), which demonstrates a lack of knowledge by higher educational personnel regarding the specifics involved with therapy programming or AAI.

Researchers recommended there is significant promise of AAI/therapy dog programming; however, "future studies should include focus groups and RCTs using standard stress scores [which] would help quantify the benefits of animal-assisted stress relief programs" (Haggerty & Meuller, 2017, p. 387). The dissertation study intended to expand this literature by implementing a quantitative RCT design that captures stress relief responses to intervention using standard stress score, such as those on the WHOLQOLBREF and PSS. The investigator

implemented a recommended session time of 35 minutes in a population that is largely

understudied, graduate students, and intends to capture specific responses of each participant.

Specific dosage will include recurring AAA sessions with the experimental group participants

engaging in AAA for 35 minutes + for six sessions (once a week for six weeks) + one

handler/one therapy dog/and three to five participants in each session.

Summary of Literature

Throughout the 20th century, the number of colleges and universities dramatically

multiplied, and student populations increased along with students' health needs, which included

a more extensive variety, particularly in the area of mental health (Kraft, 2011). Colleges and

universities expanded methods of data collection and implementation of health services;

however, many deficits in addressing mental health in college students still exist today.

Important factors influencing the provision of mental health services for the college population

are costs and availably of providers (Mowbray et al., 2006). Evidence suggests that the

innovative use of AAA among college campuses may provide an effective, low-cost means to

support mental health programming (Mowbray et al., 2006). Research in AAI has evolved from

medical settings to include educational settings (Connor & Miller, 2000). Numerous studies

involved specific diagnoses, especially autism, within pediatric age groups (Friesen, 2020; Fung

et al., 2014; Nimer & Lundahl, 2007). Overall, a general lack of quantitative research designs of

high rigor in educational settings exists. The investigator has not reviewed any negative results

noted from AAI intervention; however, the majority of researchers include having fears or

allergies to dogs in exclusion criteria and thus remove any students who report having either

criteria from being involved in the studies. The literature may be suggesting AAI provides

cognitive, social, and emotional benefits in educational settings (Barker et al., 2016; Binfet,

2017; Daltry & Mehr, 2015; Kotrschal & Ortbauer, 2003). However, gaps in the existing literature about AAI include a lack of studies in the graduate student population and limited studies utilizing reoccurring AAI. Binfet et al. (2017) conducted a study in which dosage was explicitly considered and suggested that approximately 35-minute intervals of AAA are most preferred among the college population. Therefore, the investigator aimed to study quality of life, stress and anxiety perception, occupational performance, and adjustment to graduate student role by implementing a research design that included reoccurring sessions of AAI over a six-week period in the graduate student population.

Chapter 3: Methodology

Research Design and Methodology

The investigator selected a quantitative, experimental, within and between subjects, pre-post randomized control trial design. The design was selected over other experimental designs as the investigator intended to measure a causal relationship between one independent variable and multiple dependent variables (Edmonds & Kennedy, 2017; Portney & Watkins, 2009). A pretest-posttest RCT group design was selected because the investigator intended to compare two or more groups formed by random assignment (Portney & Watkins, 2009). Additionally, the investigator aimed to compare outcomes within each group and between each group. The investigator utilized a pretest-posttest RCT to compare the experimental group who received the AAA dosage of a 35-minute session + once a week for six weeks + with a ratio of one handler/one therapy dog/three to five clients to a control group. The control group participants completed the pretest and were told they were on a waitlist, thus they did not receive any form of intervention for 6 weeks, and then they completed the posttest. After completing the posttest, control group participants were given the option to engage in the intervention. Procedures are discussed later in this chapter and in supplemental back matter (see Appendix I). Several selection threats to internal validity were defined and reviewed as well as threats to external validity to generalize results (Edmonds & Kennedy, 2017; Portney & Watkins, 2009). Specific procedures are discussed, including participant recruitment and intervention implementation. Lastly, reliability, validity, data analysis, and limitations are reviewed.

Study Design

The investigator selected a pretest-posttest control group design, utilizing a staggered implementation approach. A summary of the procedures is provided (see Appendix I). Research

randomizer was utilized to create a predetermined sequence for participants to be assigned to the control or experimental group (R) based on the order they contacted the investigator (Urbaniak & Plous, 2013; see Table 1). As participants contacted the investigator, screenings were completed via phone or email to determine eligibility. Any students who expressed fears or allergies of dogs as well any students that self-reported being treated by a mental health professional were excluded. The participants enrolled in the study in self-chosen groups of three to five and were assigned to the control or experimental group as they contacted the investigator based on a predetermined sequence established by research randomizer (Urbaniak & Plous, 2013). Next, as the participants were assigned to the control or experimental group, they signed up as a group for a time slot to complete informed consent and pretest outcome collection. The informed consent process included reviewing and signing the informed consent form, an animal welfare standards document, and approved activities to engage in during therapy dog intervention sessions (see Table 1). Additionally, the investigator reviewed exclusion criteria before participants in either group signed informed consent forms. Between one and seven groups, regardless of assignment, began the study each week by completing pretest outcome data, a staggered implementation approach was used (O_1; see Table 1). The number of groups beginning each week differed secondary to the investigator needing to be flexible to meet student groups' scheduling needs. Following informed consent and pretest data completion, control group participants were told they were on a waitlist, and experimental group participants were scheduled for intervention sessions and engaged in 35 minutes of therapy dog intervention, AAA, once a week for six weeks. The control group participants did not receive an intervention. At the end of week six, control and experimental group participants completed posttest outcome measures ($O_{1,\,2}$; see Table 1), and control group participants were given the option to engage in the six-week therapy

dog program. The investigator continued to enroll student groups until the number of

participants reached a minimum of 102, which was determined necessary through G*Power

program using a one-tailed a priori power analysis. After 8 weeks of enrollment, the number of

participants reached 104 to reach participants, yielding 51 participants in the control group and

53 participants in the experimental group. Participants were scheduled for a 45-minute informed

consent/pretest data collection session, 45-minute posttest data collection session, and completed

the three-minute SVAS measurement scale at the beginning and end of each session (see Table

2).

Table 1

Methodology

R	I	O_1	B-	B-	B-	B-	B-	B-	$O_{1,2}$
R	I	O_1	A+	A+	A+	A+	A+	A+	$O_{1,2}$

Note. Screenings were completed by phone or email to determine eligibility.

R = As participants contacted the PI through phone or email, they were randomly assigned to either the control group or experimental group based on numbers generated by Research Randomizer, which is a tool used to generate random assignment for participants in experimental conditions (Urbaniak & Plous, 2013).

I = Informed consent was obtained, participants were required to review animal welfare standards, and approved activities the participants were encouraged to engage in while spending time with the therapy dog and signed adherence to abiding by the standards and approved activities.

O_1 = Outcome data was be collected via pencil/paper including (a) WHOQOL-BREF, (b) PSS (c) PROMIS Emotional-Distress-Anxiety-short form (d) COPM (E) SACQ

B = Control Group

A = Experimental Group

+ = group received intervention of AAA for 35 minutes once a week

- = group did not receive AAA intervention

O_2 =Outcome data: Open ended questions

Note. Participants will complete SVAS and Engagement scale directly before and after all AAA sessions

Table 2

Instrument Completion Time

	Informed Consent Pretest Only	Pretest & Posttest Instruments					Posttest Only	Each Session
		WHOQOL-BREF	PSS	PROMIS Anxiety	COPM	SACQ	Open-ended Questions	SVAS & Engagement Scale
Time to Complete (in minutes)	10	7	2	1	1	13	10	3
Total:						38	38	3

Rationale

The investigator chose the pretest-posttest control group design to compare two randomized groups and to establish a cause-and-effect relationship (Edmonds & Kennedy, 2017; Portney & Watkins, 2009). The investigator compared the change that occurred between two groups, the control group and the experimental group, after the AAA intervention occurred (Christensen et al., 2013; Portney & Watkins, 2009; Shadish, Cook, & Campbell, 2002). Although previous studies have yielded positive results in response to AAI programming, many have lacked in detail in explaining one or more aspects of dosage and/or information about the interaction that took place between the therapy dog and participants. However, Binfet et al. (2018) recommended approximately 35 minutes as the ideal duration of time for a AAA session within the college student population. This information was used to determine the duration of time for AAA sessions in the dissertation study. Recently, a surge in the study of the impact of AAI in the undergraduate student population has occurred (Barker et al., 2016; Binfet & Passmore, 2016; Binfet et al., 2018; Crossman et al., 2015; Crump & Derting, 2015; Delgado et al., 2018; Grajfoner et al., 2017; Hall, 2018; Haggerty & Mueller, 2017; Jarolmen & Patel, 2018;

McDonald et al., 2017; Muckle & Lasikiewicz, 2017; Norton et al., 2018; Trammell, 2017;

Ward-Griffin et al., 2018; Wood et al., 2018). Of the 16 aforementioned studies, only eight are

RCTs. Additionally, only one RCT altered dosage to include more than one therapy dog session

(Binfet & Passmore, 2016). The researchers articulated dosage well by explaining that the 45-

minute sessions occurred once a week + for 8 weeks + with a ratio of one handler/one therapy

dog/with three to four students. The researchers indicated positive results, including a reduction

in homesickness and an increase in satisfaction with life (Binfet & Passmore, 2016).

Furthermore, no researcher to date has used RCT to study AAI strictly in the graduate student

population. This investigator utilized results and recommendations from previous literature,

comparing an experimental group with a control group and filled gaps, including increasing the

number of sessions for graduate students, which is an understudied population. The dosage is 35

minutes + once weekly for 6 weeks + one handler/one therapy dog/three to five participants.

Because students would be less likely to participate in the study if they understood that they

would not receive the weekly therapy dog intervention of AAA, the investigator implemented a

waitlist-control approach.

Threats to Validity

Several threats to validity were considered when attempting to establish a causal

relationship. It was critical to assess potential alternative explanations for significant changes in

outcomes (Edmonds & Kennedy, 2017; Shadish et al., 2002). The investigator used a multi-

group design, meaning at least two groups completed before and after measurements. In this

case, the critical internal validity issue was the degree to which the groups were comparable

before the dissertation study.

Internal Validity

The primary threat to internal validity was selection-bias or selection-threat, which is any factor other than the AAA intervention, leading to the posttest differences between groups (Trochim & Donnelly, 2008). To reduce the threat of selection-bias, the investigator utilized random assignment and within subjects manipulation. Selection-history refers to any event producing the outcome other than the treatment (Trochim & Donnelly, 2008). Selection-history could have been compromised in this dissertation study by students having the ability to engage in other activities outside of AAA affecting any of the dependent variables, including QOL, stress, anxiety, occupational performance, and adjustment to college graduate student role. The investigator decreased the potential for this threat by using a two-group design, allowing the investigator to compare the experimental group to the control group. Additionally, the investigator excluded any students that self-reported receiving mental health treatment at the time of the study.

Any physical or mental change occurring with the passage of time and affecting dependent variable scores is selection-maturation, which can result over the 6 weeks of intervention during this dissertation study (Christensen & Johnson, 2014). To combat selection-maturation, the investigator compared posttest scores of participants who engaged in recurring AAA to those participants in the control group (Christensen & Johnson, 2014; Shadish et al., 2002). Selection-instrumentation refers to changes occurring over time within the dependent variable. The investigator judiciously administered posttests, utilizing the same methods as pretest administration to reduce selection-instrumentation. The selection-testing effect, which is the changes in an individual's score on the second administration of a test, was reduced by having two groups in the dissertation study (Christensen & Johnson, 2014; Shadish et al., 2002).

Selection-mortality arises when a differential nonrandom dropout between pretest and posttest occurs. The investigator rewarded participants with a $30 Amazon gift card to prevent selection-mortality. Additionally, the investigator tracked the reasons for withdrawal. Selection-regression refers to a non-random sample comprised of low pretest scores and, therefore, will likely improve, regardless of an intervention being implemented. Selection-regression threats were corrected with appropriate analyses to ensure a normal distribution of data (Christensen & Johnson, 2014; Shadish et al., 2002). For example, confirming pretest scores are normally distributed was important in order to ensure one end of the data range was not overly represented by the dissertation study population. Attention to regression can substantiate claims that changes in posttest scores are due to the effect of the intervention and not the fact that the study population had low pretest scores at the start of the study (Christensen & Johnson, 2014; Shadish et al., 2002). Attrition, referring to a loss of participants because they do not show up or drop out, were addressed by explaining the details and requirements of the study to the participants up front during the information and consent process. The investigator allowed flexible scheduling for pretest data collection, intervention sessions of AAA, and posttest data collection.

Thus, selection threats can occur if a different selection procedure is used for placing research participants; however, random assignment was used to reduce selection threats (Christensen & Johnson, 2014; Shadish et al., 2002). The fact that the control group participants were not participating in a similar 35-minute weekly session with removal of the independent variable is the biggest threat to this dissertation study. Given the possibility students may choose not to participate in the study if they had an understanding that they were not receiving the weekly therapy dog intervention of AAA, the investigator chose to use a waitlist-control approach.

External Validity

Threats to external validity are directly related to sampling, the notion of randomness, and the ability to generalize study outcomes (Christensen & Johnson, 2014; Shadish et al., 2002). The recruitment procedures used to select a sample for this dissertation study, such as flyers, emails, announcements at orientation, and advertisements through social media outlets, could have potentially threatened external validity because this type of sampling is not necessarily representative of the sample population under study and, therefore, could have potentially prevented generalization of results (Christensen & Johnson, 2014; Shadish et al., 2002). Although it is not possible to generalize these results with certainty as nonprobability sampling does not involve random selection, findings are still able to provide implications for similar samples. The investigator recruited participants from a variety of graduate programs on a large Midwest campus to create a diverse sample of participants as graduate students across the country differ tremendously in age, gender, and background. Replication of this study at various colleges and universities across the country will increase generalizability. Some of the measures used in the study, WHOQOL-BREF and PSS, have been implemented in published AAI studies in educational settings, including college campuses.

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Strengths and Weaknesses of Design

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Although many situational factors make it challenging to carry out, researchers in various fields regard experimental research to be the ideal quantitative method (Mulhall, 1998). Furthermore, randomized controlled trials are perceived as the gold standard of evidence in studies, which are used to inform health care protocols (Portney & Watkins, 2009). Random sampling, inclusion/exclusion criteria, and manipulation of the independent variable are factors related to control that added to the power and strength of the dissertation study's

experimental design. Additionally, the investigator recruited participants from a highly

populated and diverse student body. The University has approximately 10,500 graduate students

from nearly every state and more than 70 countries (Office of Institutional Research and

Analysis, 2019). The investigator trained six research assistants. The assistants completed the

Collaborative Institutional Training Initiative (CITI) training modules, and the investigator

outlined the purpose and details of the study for the assistants. Additionally, the investigator

ensured that assistants were competent in reviewing participants' packets for completion during

pretest and posttest data collection periods. Furthermore, all of the handlers and therapy dogs

involved in the study were registered through a reputable therapy dog organization. Each

therapy dog handler team was required to pass testing requirements completed by the therapy

dog organization, which involved the dog demonstrating proper temperament, obedience

commands, and included proof of health from a veterinarian. Additionally, the University's

Intuitional Animal Care and Use Committee (IACUC) received a copy of each therapy dog's

health record prior to engaging in the study.

This dissertation study contained weaknesses as well. Although a rationale was provided,

the participants in the control group did not have a session that mimicked the participants in the

experimental group. The investigator chose not to have a session that mimicked the experimental

group because students were likely to drop-out of the study if required to spend 35 minutes a

week in a room without a therapy dog; therefore, they were told they were on a waitlist and

given the option to interact with the therapy dog following the collection of posttest data.

Specific Procedures

The investigator applied and received Institutional Review Board (IRB) approval from

the Midwest University (#084119B3E) and then received approval through Nova Southeastern

University before any steps of the study were initiated. Additionally, the investigator applied

and received approval through the University's Institutional Animal Care and Use committee

(IACUC, #19-08-1219). Research Randomizer was used to assign participants to groups after

recruitment and screening (Urbaniak & Plous, 2013). The investigator began recruitment using

IRB approved materials, which instructed participants to contact the investigator through phone

or email. Materials included flyers, emails, social media postings, and newsfeed postings on the

University's educational platform used by all registered students. IRB materials included the

investigator's email and phone number as contact information that was used to screen

participants. First, the investigator generated a random list of numbers through Research

Randomizer for the intervention and control group. The investigator screened participants for

inclusion and exclusion criteria as they contacted the investigator. In the order of participant

contact, participants were assigned a number, which placed them and their two to four peers in

the control or intervention group. The peers and original individual contact formed a group

under the assigned number as identified by research randomizer. The number of individuals in a

group, three, four, or five, did not affect the overall randomization order. This assignment

methodology was used for all participants. This recruitment method was selected because the

typical procedure for AAA occurs in small group settings. Moreover, if the investigator

randomly assigned participants to spend 35 minutes a week with unfamiliar peers, results would

likely be negatively skewed due to participants feeling forced to spend 35-minutes time with

students who they were unfamiliar with. Furthermore, through focus groups, graduate students

indicated a preference for participating in therapy dog programming in self-chosen groups

(Johnson & DiZazzo-Miller, 2020). Next, the investigator collected the participants' contact

information. The investigator screened each participant through phone or email to ensure they

met inclusion criteria. Any participant who expressed fears or allergies of dogs or self-reported

currently being treated by a mental health professional was excluded. Then, the investigator

completed an active consent process by reading the informed consent with the participants and

allowed them to ask any questions regarding the study before they signed the consent form.

Exclusion criteria was reviewed verbally before participants signed informed consent.

After the participants were assigned to one of the two groups, the participants in the

experimental group were required to sign-up for a weekly 35-minute AAA group session

timeslot. All participants were required to review Animal Assisted Intervention International

welfare standards and signed a contract stating they would adhere to them. After the contract

was signed, the study began.

A total of 29 groups were enrolled in the study. Participants in group one completed

pretest outcome data, including the WHOQOL-BREF, PSS, PROMIS Emotional-Distress-

Anxiety short form, COPM, and SACQ assessments at the beginning of Week 1 (see Table 3).

After completing pretest outcome data, the group was scheduled for intervention sessions.

Participants in groups two, three, four, and five completed pretest outcome data on Week 2, and

experimental groups scheduled interventions for the next consecutive 6 weeks while control

groups were told they were on the waitlist. Participants in groups six, seven, nine, 10, 13, and 14

completed pretest outcome data on Week 3, and experimental groups were scheduled for

interventions while control group participants were told they were on a waitlist. Participants in

group 11 and 15 completed pretest outcome data on Week 4, and group 11 began interventions

the following week while participants in group 15 were told they were on the waitlist. On Week

5, participants in group 12, 16, 17, and 19 completed pretest outcome data, and experimental

participants were scheduled for interventions while control group participants were told they

were on waitlist. The same procedure continued with groups 21 and 25, completing pretest data

on Week 6, groups 23 and 26 completing pretest data on Week 7, and groups 27, 28, and 29

completing pretest data on Week 8 (see Table 3). At the end of the six-week therapy dog

program, experimental participants completed the same measures for posttest data collection,

including the WHOQOL-BREF, PSS, PROMIS Emotional-Distress-Anxiety short form, COPM,

and SACQ. Similarly, control group participants completed the same posttest measures as

experimental group participants at the end of 6 weeks.

In the order of enrollment, the participants' information was stored in an Excel

spreadsheet. The Excel data file was stored on the investigator's password-protected computer

and will be destroyed according to IRB regulations. Signed informed consent documents were

stored in file-folders that were locked in the investigator's office. All participants were notified

of the required pre-intervention outcome data collection session and post-intervention outcome

data collection session prior to beginning their intervention sessions.

Table 3

Methodology by Week

Weeks of Intervention	# of participants beginning this week	Total # of Participants Enrolled	Experimental Group # Starting the Study	Control Groups # Starting the Study
Week 1	3	3	1	
Week 2	17	20	3, 4	2, 5
Week 3	28	48	7, 10, 13, 14	6, 8, 9
Week 4	6	54	11	15
Week 5	18	72	16, 17, 18	12, 19
Week 6	13	85	24	21, 25
Week 7	8	93	23	26
Week 8	11	104	27, 28	29

Participants

Inclusion and Exclusion Criteria

The participants were college students living in a Metropolitan area and attending a large Midwest university. The inclusion criteria for this study required students to have a full-time graduate or professional student status, which requires enrollment in eight or more credits each semester as well as being enrolled in a graduate or professional program. The inclusion criteria were relatively broad as students attending graduate or professional school are a diverse population, and the investigator aimed to allow all graduate or professional students interested in participating to take part in the study. Exclusion criteria included any student that reported fears or allergies of dogs. Additionally, any students who were receiving treatment by a mental health professional were excluded. This criterion helped establish internal validity by decreasing the

chance that change after the intervention was due to another form of treatment. Inclusion criteria included full-time graduate students while exclusion criteria was limited to maximize the number of students with a desire to participate in the dissertation study.

Power and Sample Size

A power analysis was not possible to complete due to the lack of previous studies. Therefore, based on a one-tailed a priori power analysis with an anticipated Cohen's *d* effect size 0.5 and a power of 0.80, results from G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) calculated a total $n = 102$ ($n = 51$ participants in each group). The investigator recruited groups of three to five students until $n = 102$ to 120.

Recruiting Procedures

The investigator for this dissertation study utilized a non-probability, purposive, sampling method as the sample was established through volunteers who contacted the investigator in response to study advertisements. A nonprobability sampling method indicated the investigator did not use random selection of participants (Edmonds & Kennedy, 2017; Portney & Watkins, 2009); however, this approach is a widely accepted approach in behavioral research. Random selection is used for researchers to state with certainty the sample is representative of the population. Although random selection is considered the gold standard and preferred, the investigator intended to study a specific group, college graduate students, thus utilized a non-probability, purpose, sampling method. The majority of the participants contacted the investigator in an established group of three to five; however, a few participants contacted the investigator individually and were directed to create a group of three to five before being able to enroll in the study. Every student who contacted the principal investigator (PI) with interest in participating in the study and met the inclusion criteria was successfully enrolled in the study.

Based on the order the participants contacted the investigator, the groups of peers were assigned a group number, and each group was placed in either the control or experimental group as predetermined by Research Randomizer. The sampling method was purposive because the goal of the study was to examine the effect of AAA on graduate students; thus a specific group, graduate students, was being targeted (Portney & Watkins, 2009). The sampling frame, or accessible population from which participants were recruited, was through collegial organizations by means of IRB approved fliers, orientation announcements, Web sites, newsletters, local media outlets, and e-mail blasts. The investigator excluded graduate students who expressed fears or allergies of dogs as well as students being treated by a mental health professional; therefore, the investigator could not determine with certainty that the population was representative of the sampling frame.

Reliability and Validity

Psychometric properties explain the quality of measurement tools and, therefore, have a significant role in research and clinical practice. Two of the most common psychometric properties are reliability and validity. Reliability addresses the consistency in an instrument measuring a variable, and validity addresses the consistency in an instrument measuring the intended measurement (Edmonds & Kennedy, 2017; Portney & Watkins, 2015). Table 4 presents each instrument used in the dissertation study by time point of implementation, listing names and developers, reliability and validity, measurement level, possible scores, data input, and a brief description of each instrument.

Table 4

Description of Measures, Time Points of Administration, Reliability/Validity, Type of Data, and Range of Scores

Measures		Reliability/Validity	Alpha coefficient	Measurement Level	Possible Scores	Data Input	Description	Used in AAI Research
Screen	Inclusion/ Exclusion Criteria	N/A		Nominal	N/A	1=yes 2=no	Questions to ensure participants meet study criteria, prior to enrollment (signing of informed consent)	
QOL	WHOQOL-BREF (Skevington, Lofty, O'Connell, 2004)	Good to excellent reliability and preliminary tests of validity (O'Connell, 2004); validity: developed through an iterative process, with centers around the world collaborating. Perceptions of quality of life from multiple cultures formed the conceptual base of the instrument and supported excellent content validity. Discriminant validity also was demonstrated.	Low of 0.65 to high of 0.93	Interval	Overall Quality of Life Domain 1 Physical Health = 2-10, Domain 2 Psychological = 7-35, Domain 3 Social Relationships = 6-30, Domain 4 Environment = 8-40	Raw scale scores transformed to a scale of 0-100	26-item measure using a five-point scale that varies in nominal descriptors depending on the question	Yes

Measures		Reliability/Validity	Alpha coefficient	Measurement Level	Possible Scores	Data Input	Description	Used in AAI Research
Stress	PSS (Cohen, 1994)	Good to excellent validity and most tested in college students and worker populations (Lee, 2013)	0.84; 0.85; 0.86 (Cohen, Kamarck, & Mermelstein, 1983)	Interval	Obtained by reviewing responses for questions 4, 5, 7, & 8	0-40 raw scores	PSS most widely used psychological instrument appraising stress influenced by daily hassles, major events, and changes in coping resources, scores expected to fall off rapidly. 0 = never and 4 = very often between four to eight weeks. 0-13 low stress, 14-26 moderate stress, and 27-40 high stress.	Yes
Anxiety	PROMIS Emotional-Distress-Anxiety-short form (NIH)	Reported by PROMIS group to be valid and reliable	0.97	Interval	7-35	Raw scores summed to get total raw score and converted to T scores	Seven-item five-point scale with 1 = never and 5 = always, t scores less than 55 = none to slight; 55-59 mild; 60-69 moderate; 70 and over = severe	No (other anxiety instruments have been used)

Measures		Reliability/Validity	Alpha coefficient	Measurement Level	Possible Scores	Data Input	Description	Used in AAI Research
Occupational Performance	Canadian Occupational Performance Measure (COPM)	Good validity, responsiveness, acceptable reliability, and good utility; Test–retest reliability at one- and 2-week intervals ranges from 0.63 to 0.89 for performance and from 0.76 to 0.88 for satisfaction		Interval	Performance = 1-10 Satisfaction = 1-10	0-10 Change in scores by two or more points is clinically significant (Law et al., 2004)	Six questions using a 10-point Likert scale rating on performance and satisfaction with education role	No

Measures		Reliability/Validity	Alpha coefficient	Measurement Level	Possible Scores	Data Input	Description	Used in AAI Research
Adaption to Graduate Student Role	Student Adaptation to College Questionnaire (SACQ)	Reliability: good Validity: moderate 0.39 to 0.60 for all subscales with high intercorrelations at 0.82 to 0.95 for full scale scores (Baker & Siryk, 1989)	Range 0.81-0.90 Academic Adjustment: 0.77 to 0.86; Personal Adjustment: 0.83 to 0.91; Social Adjustment 0.85 to 0.91; Attachment 0.92 to 0.95	Interval	1 – 9	Raw scores are converted to *t* scores based on a normative sample stratified by gender and semester and converted to percentile ranks	67- self-descriptive statements comprising four subscales that focus on aspects of adjustment to college: academic adjustment, social adjustment, personal-emotional adjustment, and goal commitment/institutional attachment	No (however is used in college student population)
Stress	SVAS (Barker et al., 2016; Binfet, 2017)	Good reliability and validity		Interval		1-5	One item stress scale measuring 1 = not at all stressed and 5= very stressed	Yes

Ethical Considerations and Review

The investigator has completed all courses required by CITI. The investigator also obtained approval through the IRB (#084119B3E) at the Midwest University where the study was carried out and Nova Southeastern University where the investigator is enrolled in a PhD program, prior to initiating the study. Additionally, the investigator applied and received approval through the Midwest University's Institutional Animal Care and Use committee (IACUC, #19-08-1219). The investigator completed informed consent with each participant prior to beginning the study. The investigator read the consent form with the participants, which explained the study's purpose, inclusion criteria, exclusion criteria, risks, and benefits. Additionally, the informed consent explained that participants were free to withdraw from the study at any time. The investigator asked the participants if they had any questions before they gave consent and answered any questions at that time. All of the dogs and handlers involved in the dissertation study were registered therapy dogs, and a copy of their registration and vaccination records were collected by the investigator and copies were provided to IACUC. The investigator strictly adhered to therapy dog organizations and Animal Assisted Intervention International's procedures for animal welfare and approved AAAs between handlers, animals, and clients. Participants were required to sign a contract, stating they would adhere to AAII's welfare standards and approved AAAs. Additionally, registered therapy dog organizations required that handlers were trained and instructed on Animal Assisted Intervention International standards and were present during all student interactions with their therapy dog. The handlers were instructed to report any violations to the investigator. No unforeseen incidents occurred, including newly developed allergies, scratches, or bites; however, the investigator was prepared to follow the University's policy, which ensured the student would have received immediate assistance and would have completed the report of injury form within 24 hours (see Appendix G).

Funding

The investigator applied for and received a grant through the Martha E. Schnebly Endowed Research Fund within the Eugene Applebaum College of Pharmacy and Health Sciences' Department of Occupational Therapy. The purpose of the funding was to promote research in the department of occupational therapy at the host University. The investigator was awarded $4,500 in funding, which was used for recruitment of participants who each received a $30 Amazon gift card. Additionally, funding was used to give each trained therapy dog/handler team a stipend of $50 for the time they dedicated to six, 35-minute intervention sessions.

Study Setting

The data collection and intervention took place at a large Midwest university. The college is a large public Tier 1 research university and has a diverse student body with international students from all five continents (Office of Institutional Research and Analysis, 2019). Currently, 9,451 graduate or professional students are enrolled at the University with 3.3% identifying as Hispanic, 0.1% as American Indian or Alaskan native, 4.1% Asian, 14.7% Black or African American, 0.0% Native Hawaiian and other Pacific Islander, 57.6% White, and 3.0% two or more races (Office of Institutional Research and Analysis, 2019). Additionally, 57.5% are female and 42.5% are male. The participants engaged in the AAA intervention in the Students That Enjoy Learning aLongside Animals (STELLA) lab, located on the first floor of the building on campus.

Data Collection Procedures

Pretest Intervention Collection

The investigator contacted participants by email to schedule the participants to come in to complete pretest intervention data. Every email used the same language with the exception of the date and time. It took participants approximately 38 minutes to complete all

five measures, including WHOQOL-BREF, PSS, PROMIS Emotional-Distress-Anxiety short

form, COPM, and SACQ form; therefore, the participants were scheduled for a 45-minute

time slot based on their availability. At the beginning of each pretest intervention data

session, the investigator completed informed consent with each group then the group

members each completed pretest intervention measures. Additionally, trained research

assistants reviewed each of the participant's packets to ensure completeness. The

investigator repeated these procedures for the participants attending each subsequent pretest

outcome data session.

Intervention Implementation

Following each pretest outcome data session, the control group participants were told

they were on the waitlist. The investigator compared experimental participants' availability

with the therapy dog handlers' availability to create a weekly schedule for intervention

sessions. The number of interventions held weekly varied based on the number of

experimental groups active at any given week during the study (see Table 3). The

experimental group participants engaged in AAA, which included a dosage of a 35-minute

session + once a week for 6 weeks + with a ratio of one handler/one therapy dog/three to five

clients with their group. Each intervention session took take place in the STELLA lab,

allowing for one intervention group to run at a time. Each group of participants interacted

with the same therapy dog at the same time each week for 6 weeks, unless a special

circumstance arose. Groups needed to reschedule a session for a few reasons, including group

member illnesses, class time changes, and/or car troubles. During the 35-minute sessions, the

list of approved activities the participants were able to engage in included petting the dog,

playing with toys with the dog, sitting with the dog, and giving treats to the dog. Each

experimental group participant completed the SVAS before each session and the SVAS and

engagement survey after each session, which took a maximum of 3 minutes to complete. The

length of each session was recorded using a stopwatch and lasted exactly 35 minutes in duration.

Posttest Intervention Collection

On the sixth week of intervention, following the experimental groups' last AAA interaction, the participants were required to complete the posttest outcome data. Participants in the experimental group were expected to take approximately 38 minutes to fill out the five measures and open-ended questions, including WHOQOL-BREF, PSS, PROMIS Emotional-Distress-Anxiety short form, COPM, and SACQ. Therefore, the participants were scheduled for a 45-minute time slot based on availability. Additionally, participants in the control group were expected to take approximately 28 minutes to complete the same posttest measures and were not required to complete the open-ended questions that pertained to experiencing the intervention, and, therefore, were signed-up for a 35-minute time slot based on availability. Furthermore, participants in the control groups were given the option to begin the therapy dog program following posttest measure completion. A trained graduate student reviewed each participant's packet for completeness. The investigator repeated these procedures for the participants attending all subsequent posttest outcome data sessions.

<div style="text-align:center">

Data Analyses

</div>

The research questions guided the analyses. In this dissertation study, the research questions and related analyses examined the significance at two-time points: pretest and posttest intervention and within and between the experimental and control group (Edmonds & Kennedy, 2017; Portney & Watkins, 2009).

Question 1

QOL, stress, and anxiety.

1. Are there significant differences between graduate students' QOL for students who participate in a recurring weekly 35-minute AAA session for 6 weeks compared with a control?

   1a. Is there a significant difference in graduate students' perceptions of stress between those who participated in AAA compared with a control?

   1b. Is there a significant difference in graduate students' perception of stress before and after engaging in an AAA intervention session within the experimental group?

   1c. Is there a significant difference in graduate students' perception of anxiety between those who participated in AAA compared with a control?

To address Question 1, participants in the experimental group, who received the weekly AAA intervention once a week, were hypothesized to have demonstrated a larger increase in QOL as well as a significant decrease in stress and anxiety when compared with participants in the control group. Additionally, participants in the experimental group are hypothesized to have demonstrated a decrease in stress directly following each AAA session as measured through the SVAS. The investigator used paired t tests to measure differences in perceived stress on the SVAS within subjects in the experimental group. The investigator used a one-way analysis of covariance (ANCOVA; Laerd Statistics, 2018), which is an extension of the one-way ANOVA with the exception of a covariate, to analyze data for QOL (WHOQOL-BREF), perceived stress, and perceived anxiety (PROMIS Emotional Distress Anxiety-short form). An ANCOVA was hypothesized to detect significant differences between the independent variable, AAA, and dependent variables, QOL, stress, and anxiety, by evaluating differences in adjusted means. The means were adjusted for the covariate, pretest scores, which had the ability to affect the results, which allowed the investigator to statistically control for this result (Laerd Statistics, 2018). The investigator ensured the dissertation study meets all nine assumptions required to implement an ANCOVA. First, the

dependent variables and covariate variables should be continuous. In this dissertation study, the investigator used interval scales, which researchers have argued can be considered interval versus ordinal to allow for data to be analyzed parametrically (Allen & Seaman, 2007; Wu & Leung, 2017). Next, the independent variable consisted of two categorical independent groups: the experimental and control groups. Finally, an independence of observations existed because no one participant was in both groups (Laerd Statistics, 2018)

Question 2

Occupational performance and graduate student role.

2. Does a recurring weekly 35-minute AAA session for 6 weeks affect occupational performance, specifically education, of the graduate college student population?

2a. Is there a difference in the ability to adapt to the college graduate student role between graduate college students that participate in a recurring weekly 35-minute AAA session compared with a control?

To address Question 2, participants in the experimental group, who received the weekly 35-minute AAA intervention, were hypothesized to have experienced a significant change in occupational performance and adjustment to the college graduate student role when compared with participants in the control group. The investigator reviewed posttest data on the COPM to assess if there was a 2 point change, which was hypothesized to demonstrate a statistically significant change in satisfaction and performance of occupation, specifically of education. Additionally, the investigator used an ANCOVA, which had the potential to detect significant differences by looking for differences in adjusted means between the independent variable, AAA, and dependent variable, adjustment to graduate student role as measured by SACQ, to analyze data for adjustment to the graduate student role (Laerd Statistics, 2018).

Summary of the Chapter

The investigator utilized a pretest-posttest control group to examine the effects of AAA on QOL, perceived stress and anxiety, occupational performance, and adjustment to graduate student role in a population that is largely understudied: graduate students. A nonprobability sampling method was used to generate a representative sample of 104 graduate college student participants. The experimental group received the intervention of 35 minutes of AAA once a week for 6 weeks, and the control group continued with their regular schedule for 6 weeks. Although threats to internal and external validity are always present, the random assignment to groups helped minimize these threats.

The investigator utilized ANCOVA to examine between group differences of QOL, stress perception, anxiety perception, and adjustment to the college graduate student role. Paired *t* tests were utilized to examine within group differences of the experimental group participants on the SVAS for stress perception and between group differences on the COPM, which measured performance and satisfaction of occupational performance, specifically education.

Chapter 4: Results

Data collected during the implementation of the dissertation study was analyzed to assess the effectiveness of the intervention. This chapter has focused on the results of those analyses. First, descriptive statistics results are presented. Next, results of the analyses of the specific research questions are presented. Preliminary tests were run to ensure data was normally distributed, thereby meeting the assumptions of the ANCOVA to ensure proper fit with the selected analyses for dependent variables, including QOL, perceived stress over time, perceived anxiety, and adjustment to the graduate student role. Next, the investigator utilized paired t tests to analyze momentary perceived stress and occupational performance. The results of the above-mentioned analyses are presented below.

Data Analysis Results

Descriptive Statistics

Although a larger percentage of females (80%) than males (20%) engaged in the study, the University's graduate and professional student population is made up of 57.5% female and 42.5% male. Ages ranged from 20 to 37 years old with the majority of participants falling into age range of 22 to 26 years old. Unfortunately, the University's graduate and professional students' ages were not available. The ethnicities represented in the dissertation closely resembled that of the University with 5.8% of participants in the study identifying as Hispanic or Latino compared with 3.5% that made up the study body. Additionally, 0% of participants identified as American Indian or Alaskan Native compared with 0.4% in the graduate and professional study body. There was 3.8% of participants identified as Black or African American, which was lower than the 13.0% of Black or African American that make up the graduate and professional student body. There was 14.4% of participants identified as Asian compared with 6.3% in the graduate and professional student body. Lastly, 80.8% identified as White compared with 57.5% that make

up the graduate and professional study body (see Table 6). The integrated postsecondary

education data system (IPEDS) is the most widely used classification system for race and

ethnicity and is recommended by the National Center for Education Statistics. Additionally,

IRB approval required the use of the IPEDS classification system. However, the investigator

noted that the region from which the dissertation population was selected had a significant

number of individuals who identified as Middle Eastern/North African, which is not a

category represented on the IPEDS classification system. The investigator would caution

readers regarding the demographics related to race and ethnicity as the tool may not have

been sensitive enough to the population in this dissertation study.

Table 6

Demographic Information of Graduate Student Participants

Variable/Category		Intervention 53 (100%)	Control 51 (100%)
Gender	Male	8 (15.1%)	12 (23.5%)
	Female	44 (83%)	39 (76.5%)
	Other	1 (1.9%)	0
Age	20–22 years	4 (7.5%)	18 (35.3%)
	23–25 years	39 (73.6%)	24 (47.1%)
	26–28 years	8 (15.1%)	7 (13.7%)
	29 + years	2 (3.8%)	2 (3.9%)
Race	Hispanic or Latino	2 (3.8%)	4 (7.8%)
	Not Hispanic or Latino	51 (96.2%)	47 (92.2%)
Ethnicity	American Indian or Alaska Native	0	0
	Asian	5 (9.4%)	10 (19.6%)
	Black or African American	3 (5.7%)	1 (2%)
	Native Hawaiian or Pacific Islander	0	0
	White	44 (83%)	40 (78.4%)
	Asian & White	1 (1.9%)	0
Education Level	High School	5 (9.4%)	4 (7.8%)
	Associates Degree	2 (3.8%)	3 (5.9%)
	Bachelor Degree	43 (81.1%)	38 (74.5%)
	Master's Degree	2 (3.8%)	6 (11.8%)
	Doctoral Degree	1 (1.9%)	0
Field of Study	Audiology	3 (5.7%)	0
	Biology	0	3 (5.9%)
	Chemistry	1 (1.9%)	0
	Engineering	0	5 (9.8%)
	Occupational Therapy	6 (11.3%)	13 (25.5%)
	Pathology Assistant	8 (15.1%)	0
	Pharmacy	9 (17.0%)	4 (7.8%)
	Physical Therapy	22 (41.5%)	22 (43.1%)
	Physician Assistant	0	4 (7.8%)
	Social Work	4 (7.5%)	0
Year of Program	First	30 (56.6%)	32 (62.7%)
	Second	15 (28.3%)	17 (33.3%)
	Third	7 (13.2%)	0
	Fourth +	1 (1.9%)	2 (3.9%)
Currently Own a Dog	Yes	25 (47.2%)	23 (45.1%)
	No	28 (52.8%)	28 (54.9%)
Previously Owned a Dog	Yes	39 (73.6%)	30 (58.8%)
	No	14 (26.4%)	21 (41.2%)

ANCOVA Assumptions

An analysis of covariance was conducted on the data from the students. An ANCOVA was most appropriate given that the investigator intended to determine statistically significant findings between AAA on graduate student well-being, controlling for pretest scores (Portney & Watkins, 2009). The investigator ensured the data met all required assumptions of ANCOVA, including normality, homogeneity of variance, random independent samples, and confirmation the relationship between dependent variables, and covariate is linear. The independent variable is categorical and consists of two independent groups: intervention and control. Independence of observations was confirmed by assuring no relationships existed between participants in the intervention and control groups. The Shapiro-Wilks test ($p > .05$) and visual inspection of the histograms, normal Q-Q plots, and box plots showed dependent variables, which included QOL, perceived stress, perceived anxiety, and adjustment to the graduate student role, were approximately normally distributed for both the intervention and control groups with no outliers identified on the box plots. Table 7 presents a list of skewness and kurtosis scores, outlining all Z values falling between -1.96 and 1.96 (Portney & Watkins, 2009), indicating that the data was normally distributed. Visual inspection of scatter plots confirmed the covariate, pretest scores were linearly related to the dependent variables at both levels: control and intervention (Portney & Watkins, 2009). The means were adjusted for the covariate, pretest, and scores, which had the ability to affect results, which allowed the investigator to statistically control for this (Laerd Statistics, 2018). Levene's test identified no significant effect for each dependent variable, meaning homoscedasticity is established (Portney & Watkins, 2009). Lastly, covariates and dependent variables need to be continuous. All four instruments in this dissertation study were comprised of Likert scales containing from seven items to 67 items, ranging from 5 to 10 rankings for each item. Although the use of ANCOVA analysis of Likert scale has been

largely debated, many researchers have agreed that treating researchers used Likert scale data

that is interval versus ordinal in order for researchers to analyze data parametrically, yielding

significantly more robust results (Allen & Seaman, 2007; Wu & Leung, 2017). Furthermore,

Likert scales can have as little as three rankings; however, researchers contended that

increasing the number of rankings will bring the scale closer to continuous (Hodge &

Gillespie, 2007; Leung, 2011; Wu & Leung, 2017). Thus, the investigator utilized Likert

scales with a minimum of 5 rankings, and some scales included a maximum of either 9 or 10

rankings.

Table 7

Tests of Normality

Dependent Variable	Group	Skewness	*SE*	*Z* value	Kurtosis	*SE*	*Z* value
QOL	Intervention	-.462	.327	-1.41	-.116	.644	-0.18
	Control	.131	.333	0.39	-.670	.656	-1.02
Anxiety	Intervention	-.014	.327	-0.04	-.487	.644	-0.76
	Control	-.045	.333	-0.14	-.763	.656	-1.16
Stress Over Time	Intervention	.010	.327	0.03	-.433	.644	-0.67
	Control	.114	.333	0.34	-.823	.656	-1.25
Adjustment to	Intervention	.217	.327	0.66	-.426	.644	-0.66
Graduate Student Role	Control	-.331	.333	-0.99	.104	.656	0.16

Question 1

QOL, stress, and anxiety.

QOL. The investigator hypothesized that participants in the experimental group

receiving the dosage of a 35 minute session + once a week for 6 weeks + with a ratio of one

handler/one therapy dog/three to five students would demonstrate a significant increase in

QOL when compared with a control group. This hypothesis was accepted for each domain:

(a) Domain 1: physical health ($p = .029$), (b) Domain 2: psychological ($p = .001$), (c) Domain

3: social relationships ($p = .009$), and (d) Domain 4: environment ($p = .030$), meaning

graduate students who participated in a six-week therapy dog program, engaging in one 35-minute therapy dog session per week, experienced a greater QOL than graduate students who not participate in the program.

Domain 1.

Physical health. The ANCOVA omnibus test, a general linear model (GLM), showed a significant difference in QOL $F(1,101) = 4.812$, $p = 0.031$, $\eta_p^2 = 0.046$ between groups while adjusting for pretest scores, which were calculated with means, standard deviations, adjusted means, and standard errors listed below (see Table 8), meaning graduate students who participate in a six-week therapy dog program, engaging in one 35-minute therapy dog session per week experienced greater QOL within the domain of physical health compared with graduate students who did not participate in the program.

Although the p value or probability value helps determine the significance of results under the assumption the null hypothesis is true, effect size shows the magnitude of difference between groups (Shadish et al., 2002). The larger the effect size, the stronger the relationship is between the two variables (Shadish et al., 2002). Partial eta squared (η_p^2) indicated standard effect sizes as being 0.01 for a small effect, 0.06 for a medium effect, and 0.14 for a large effect (Cohen, 1988). The significant finding demonstrated a small to medium effect size, $\eta_p^2 = 0.046$. Thus, the difference found between groups in research Question 1 demonstrates a significant difference as well as a small to medium effect.

Figure 2. QOL Domain 1: Physical health pretest-posttest line graph. This figure illustrates the physical health scores on the WHOQOLBREF pretest and posttest test.

Domain 2.

Psychological. The ANCOVA omnibus test, a general linear model showed a significant difference in QOL $F (1,101) = 11.743$, $p = .001$, $\eta_p^2 = 0.104$ between groups while adjusting for pretest scores, which were calculated with means, standard deviations, adjusted means, and standard errors listed below (see Table 8), meaning graduate students who participate in a six-week therapy dog program, engaging in one 35-minute therapy dog session per week, experienced greater QOL within the domain of psychological compared with graduate students who did not participate in the program. Furthermore, the difference found between groups demonstrates a significant difference as well as a medium to large effect.
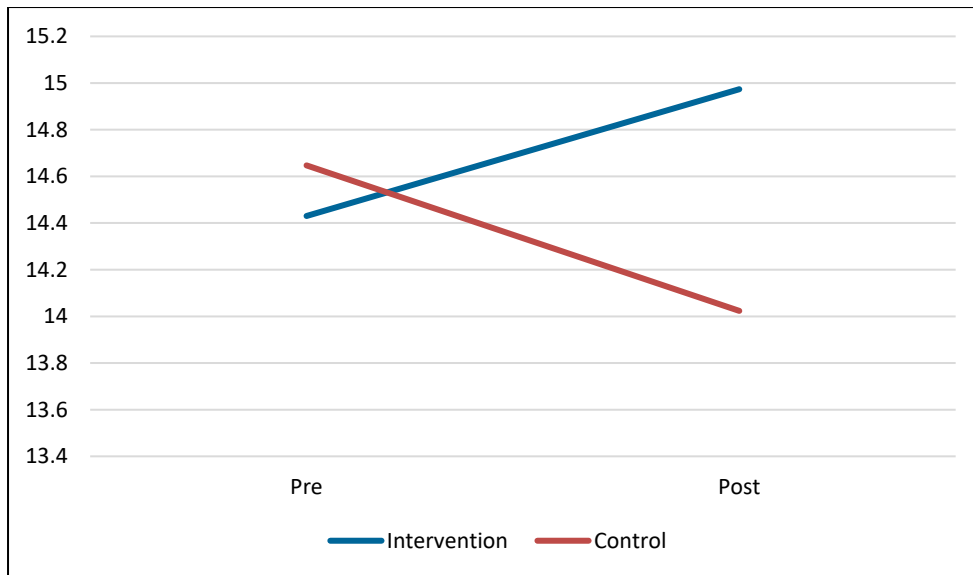
Figure 3. QOL Domain 2: Psychological pretest-posttest line graph. This figure illustrates the psychological scores on the WHOQOLBREF pretest and posttest test.

Domain 3.

Social relationships. The ANCOVA omnibus test, a general linear model, showed a significant difference in QOL $F(1,101) = 7.065$, $p = 0.009$, $\eta_p{}^2 = 0.065$ between groups while adjusting for pretest scores, which were calculated with means, standard deviations, adjusted means, and standard errors listed below (see Table 8), meaning graduate students who participate in a six-week therapy dog program, engaging in one 35-minute therapy dog session per week, experienced greater QOL within the domain of social relationships compared with graduate students who did not participate in the program. Furthermore, the difference found between groups demonstrates a significant difference as well as a medium effect.
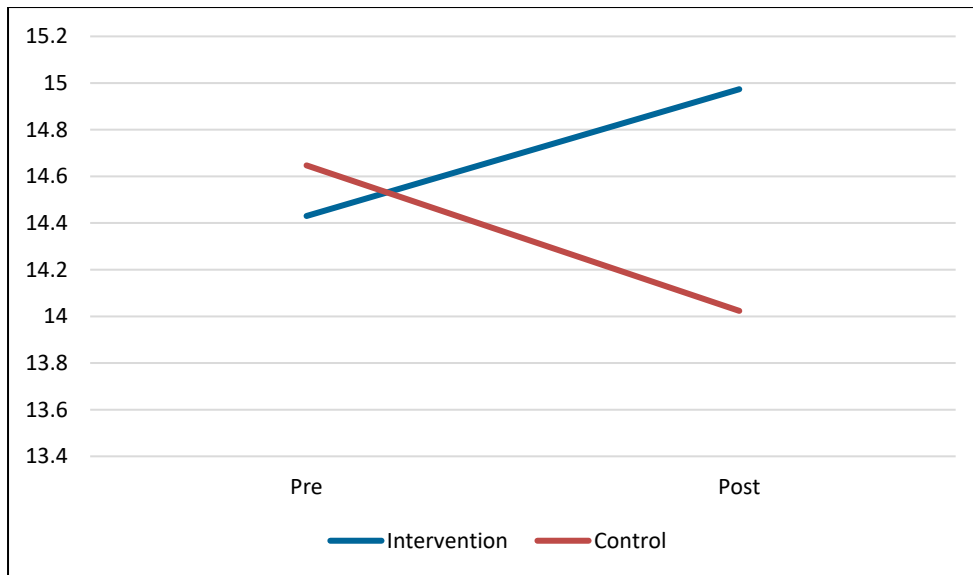
Figure 4. QOL Domain 3: Social relationships pretest-posttest line graph. This figure illustrates the social relationships scores on the WHOQOLBREF pretest and posttest test.

Domain 4.

Environment. The ANCOVA omnibus test, a general linear model, showed a significant difference in QOL $F(1,101) = 4.830$, $p = 0.030$, $\eta_p^2 = 0.046$ between groups while adjusting for pretest scores, which were calculated with means, standard deviations, adjusted means, and standard errors listed below (see Table 8), meaning graduate students who participate in a six-week therapy dog program, engaging in one 35-minute therapy dog session per week, experienced greater QOL within the domain of social relationships compared with graduate students who did not participate in the program. Furthermore, the difference found between groups demonstrates a significant difference as well as a small to medium effect.

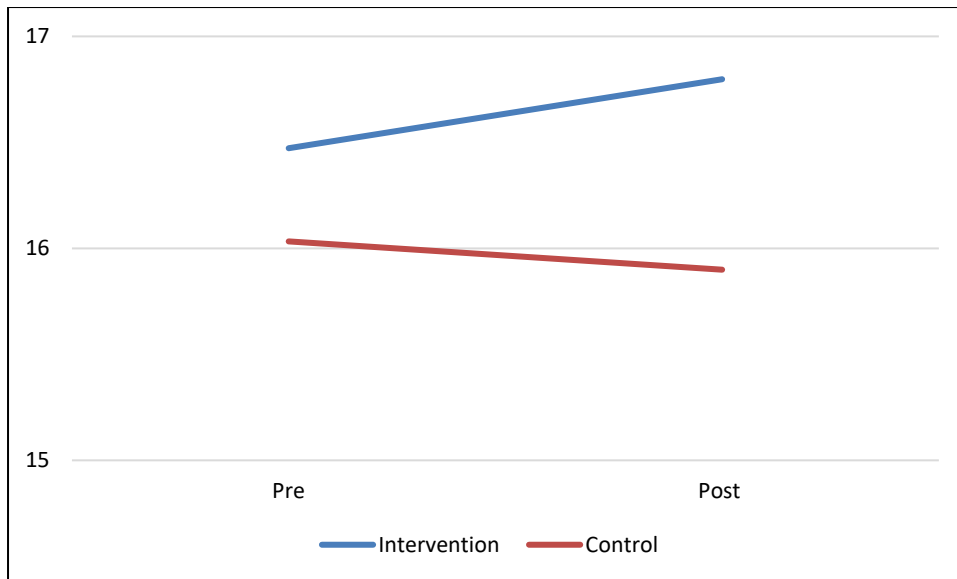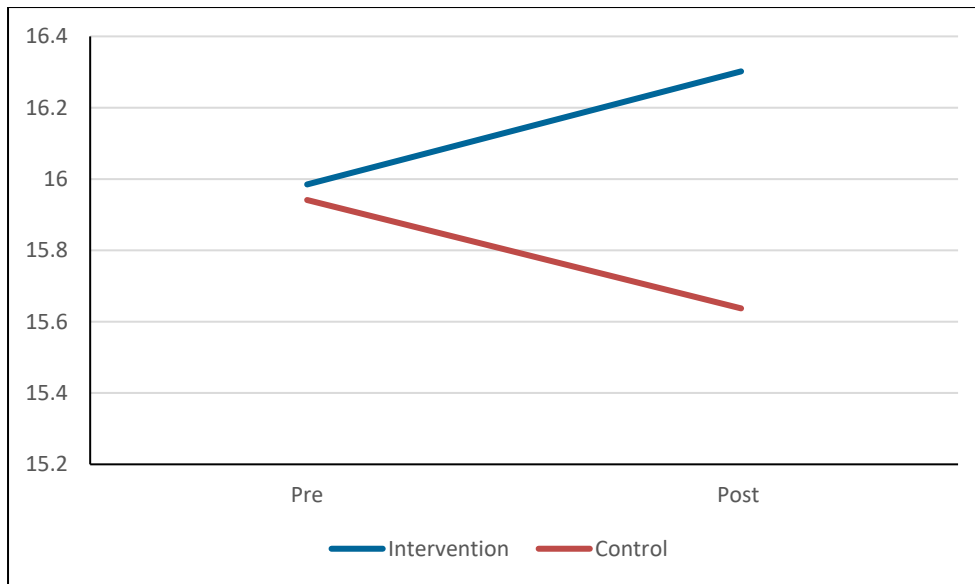*Figure 5.* QOL Domain 4: Environment pretest-posttest line graph. This figure illustrates the environment scores on the WHOQOLBREF pretest and posttest test.
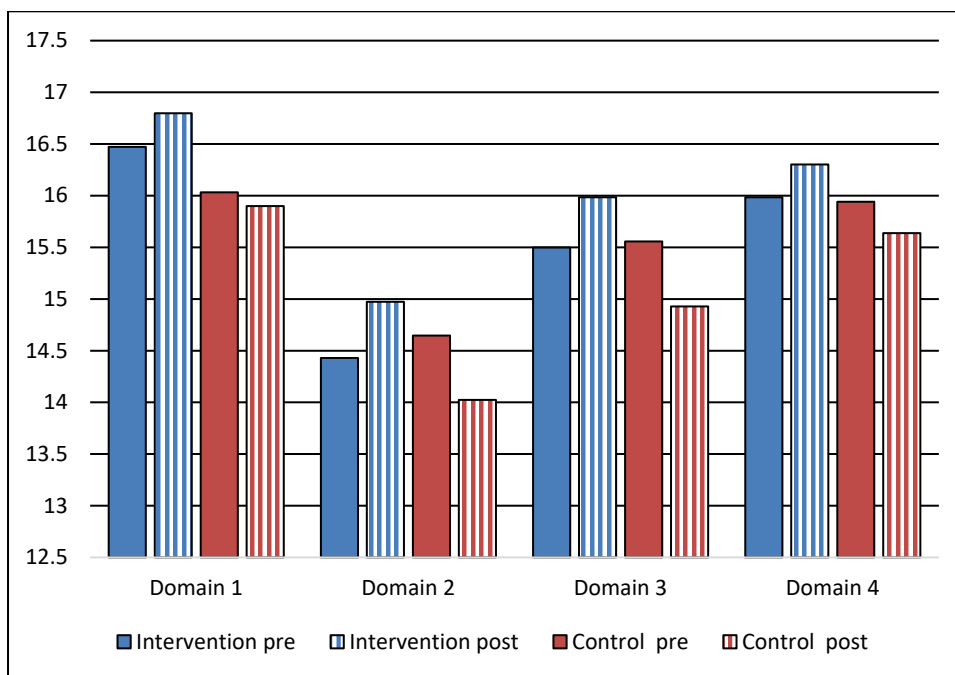
Figure 6. QOL pretest-posttest bar graph. This figure illustrates the scores on the WHOQOLBREF pretest and posttest test in each domain.

Table 8

Comparison of QOL at Posttest

	Domain				Groups			
	Control n = 51				Intervention n = 53			
	Mean	*SD*	adjusted mean	*SE*	Mean	*SD*	adjusted mean	*SE*
1	15.899	2.124	16.055	.191	16.798	1.916	16.648	.188
2	14.024	2.315	13.932	.235	14.974	2.687	15.061	.231
3	14.928	2.488	14.909	.288	15.963	2.550	15.981	.282
4	15.637	1.831	15.652	.206	16.302	2.235	16.288	.202

Stress. In the dissertation, stress was measured in two ways. The first measure, perceived stress over time, was measured using the PSS. Participants in both the experimental and control groups completed the PSS as pretest data and again 6 weeks later as posttest data. Additionally, participants in the experimental group reported momentary stress measured by the SVAS (see Appendix F) directly before and directly after each of the six sessions.

Stress over time. The investigator hypothesized that participants in the experimental group receiving the dosage of a 35-minute session + once a week for 6 weeks + with a ratio of one handler/one therapy dog/three to five clients would demonstrate a significant decrease in stress over time when compared with a control group. This hypothesis was rejected in favor of the null ($p = .892$).

The ANCOVA omnibus test, a GLM, showed F $(1,101) = .019$, $p = 0.892$, $\eta_p^2 = 0.000$ between groups while adjusting for pretest scores, which were calculated with means, standard deviations, adjusted means, and standard errors listed below (see Table 9), meaning graduate students who participated in a six-week therapy dog program, engaging in one 35-minute therapy dog session per week, did not experience a significant decrease in stress when compared with graduate students who received no intervention for 6 weeks.

Table 9

Comparison of Stress over Time at Posttest

				Groups				
	Control $n = 51$				Intervention $n = 53$			
Mean	*SD*	adjusted mean	*SE*		Mean	*SD*	adjusted mean	*SE*
22.55	3.40	22.49	.405		22.51	3.43	22.57	.398
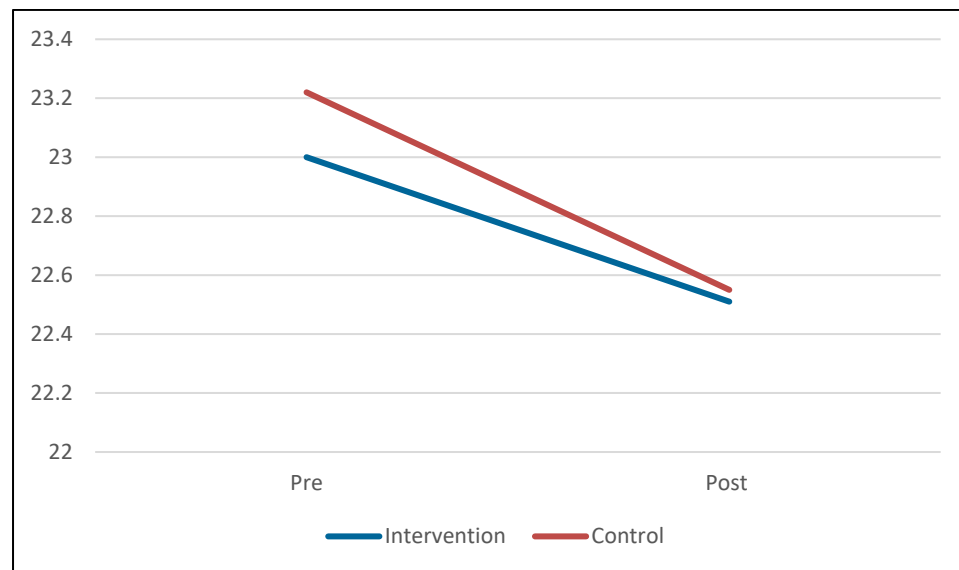
Figure 7. PSS pretest-posttest line graph. This figure illustrates pretest-posttest stress over time scores on the PSS.
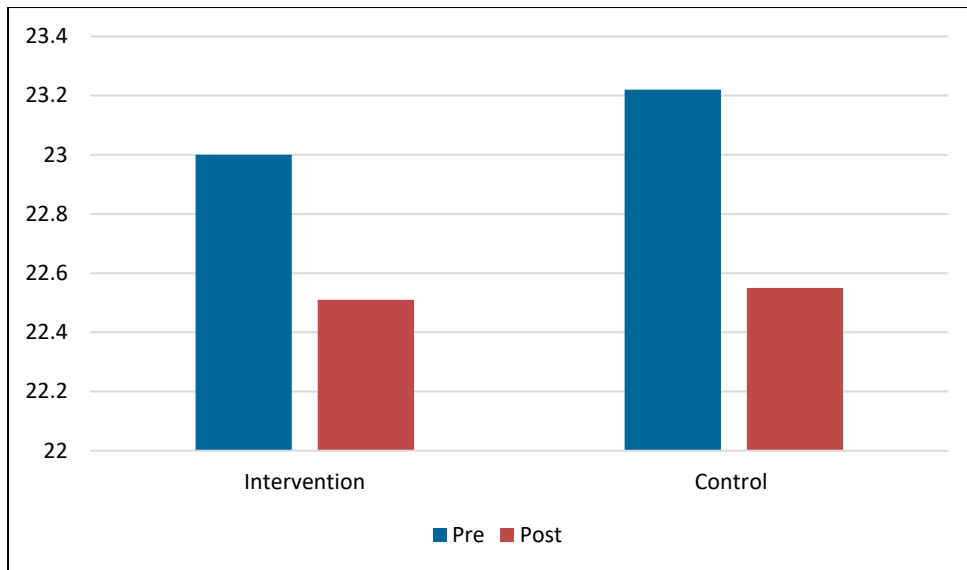
Figure 8. PSS pretest-posttest bar graph. This figure illustrates pretest-posttest stress over time scores on the PSS.

> ***Momentary stress.*** The investigator hypothesized that participants in the experimental group receiving the dosage of a 35 minute session + once a week for 6 weeks + with a ratio of one handler/one therapy dog/three to five clients would demonstrate a significant decrease in momentary stress, which was measured directly before and directly after each session. This hypothesis failed to reject the null and was accepted; there was a significant decrease in stress scores immediately following interventions each week for 6 weeks. For the first session, there was a significant decrease in stress with pre-stress scores ($M = 3.6$, $SD = 1.09$) and post-stress scores ($M = 2.40$, $SD = 1.07$); $t(51) = 10.12$, $p = .000$. Pre-stress scores for the second session revealed ($M = 3.57$, $SD = .82$) and posttest scores ($M = 2.23$, $SD = .912$), $t(52) = 10.38$, $p = .000$. The third session included pre-stress scores ($M = 3.75$, $SD = 1.1$) and posttest scores ($M = 2.25$, SD $= 1.06$), $t(51) = 11.04$, $p = .000$. The fourth session included pre-stress scores ($M = 3.48$, $SD = 1.09$) and post-stress scores ($M = 2.31$, $SD = 1.02$), $t(51) – 8.11$, $p = .000$. The fifth session included pre-stress scores ($M = 3.66$, $SD = 1.00$) and post-stress scores ($M = 2.58$, $SD = 1.05$), $t(52) = 10.03$, $p = .000$. Lastly, the sixth session included pre-stress scores ($M = 3.88$, $SD = 0.86$) and post-stress scores ($M = 2.53$, $SD = 1.12$), $t(50) = 9.90$, $p = .000$. These results suggest that a 35-minute therapy dog session affects stress levels.

Specifically, the results showed perceived stress levels decreased significantly when comparing stress levels directly before and directly after a 35-minute therapy dog intervention (see Table 10).

Furthermore, effect size shows the magnitude of difference between groups (Shadish et al., 2002). Cohen's *d*, mean divided by standard deviation, calculates effect size for paired samples *t* tests. Cohen's *d* indicated standard effect sizes being 0.2 for a small effect, 0.5 for a medium effect, and 0.8 for a large effect (Cohen, 1988). The significant findings during all six sessions of the intervention demonstrated a large effect size > 0.8 (see Table 10). Thus, the difference found between pre-stress and post-stress scores demonstrated statistical significant differences as well as a large effect.

Table 10

Comparison of Experimental Participants' Momentary Stress

Session #		*M*	*SD*	*t*	*df*	Cohen's *d*	*p* (sig 2-tailed)
1	Pre-stress	3.6	1.09	10.12	51	1.40	.000
	Post-stress	2.40	1.07				
2	Pre-stress	3.57	.82	10.38	52	1.43	.000
	Post-stress	2.23	.912				
3	Pre-stress	3.75	1.10	11.05	51	1.53	.000
	Post-stress	2.25	1.06				
4	Pre-stress	3.48	1.09	8.11	51	1.12	.000
	Post-stress	2.31	1.02				
5	Pre-stress	3.66	1.00	10.03	52	1.38	.000
	Post-stress	2.58	1.05				
6	Pre-stress	3.88	.86	9.90	50	1.39	.000
	Post-stress	2.53	1.12				
Average	Pre-stress	3.66	.61	12.75	52	1.75	.000
	Post-Stress	2.38	.76				
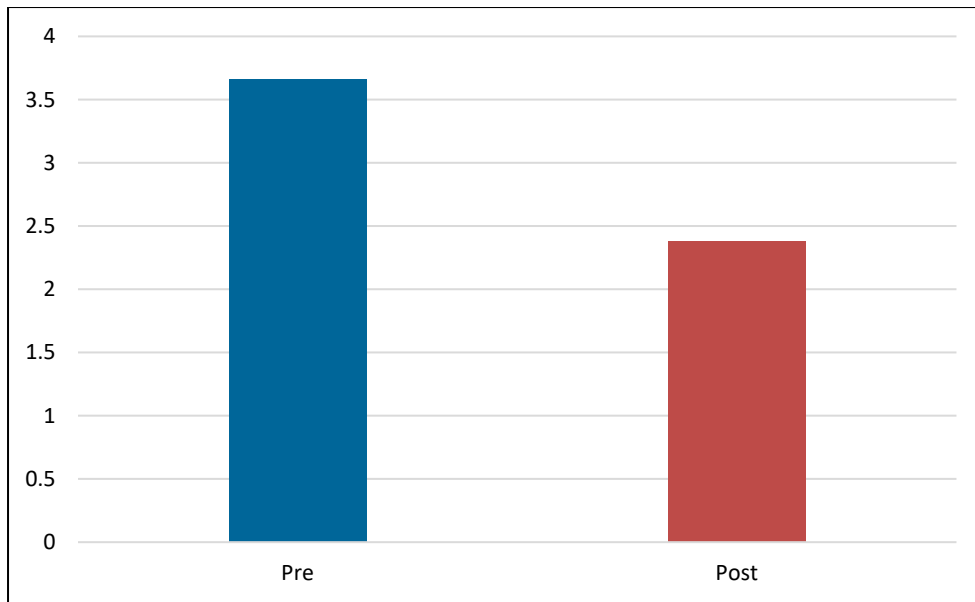
Figure 9. SVAS overall pretest-posttest bar graph. This figure illustrates the SVAS pretest means and posttest means.
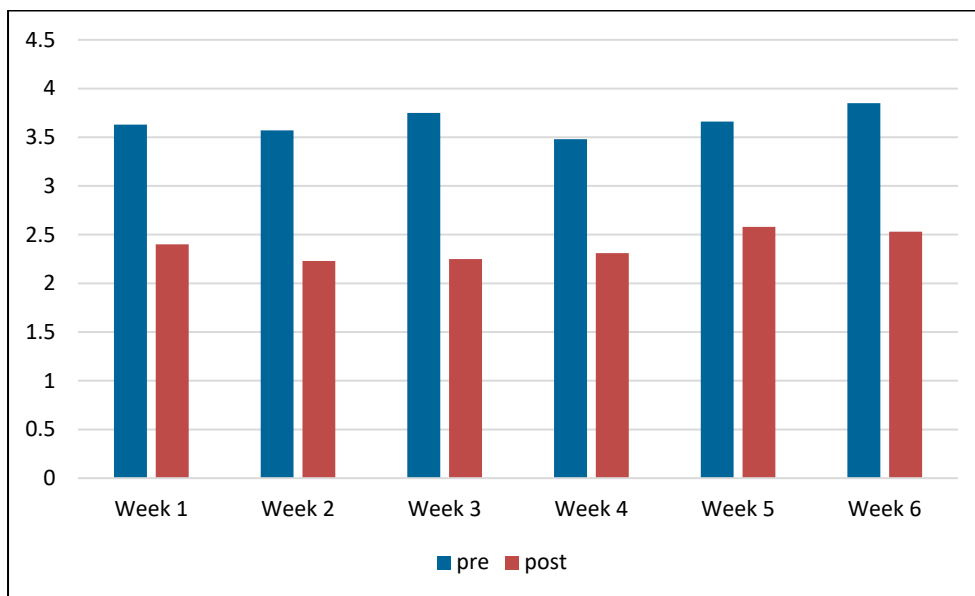
Figure 10. SVAS by week pretest-posttest bar graph. This figure illustrates the SVAS pretest-posttest means for each of the 6 weeks of the study.
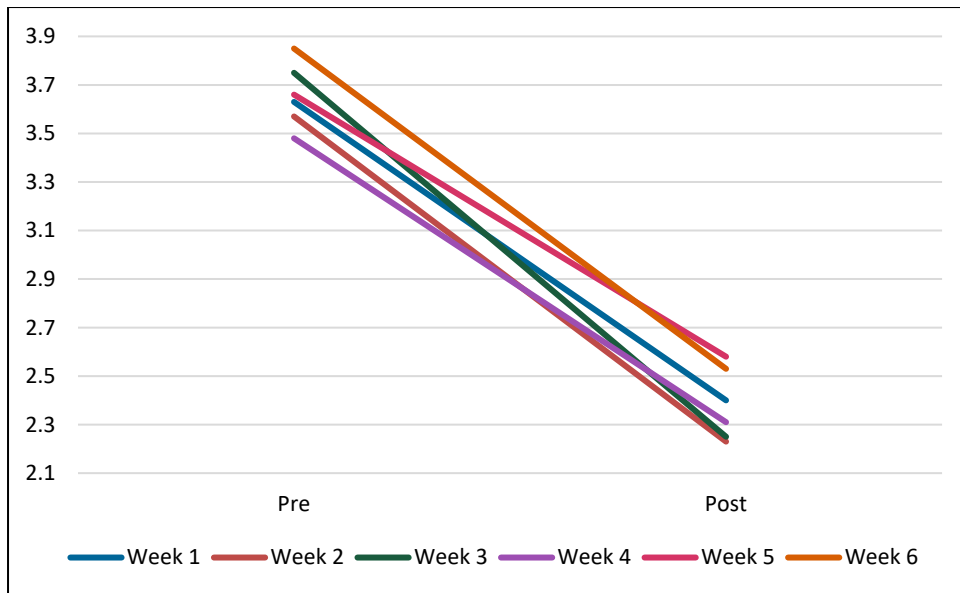
Figure 11. SVAS by week pretest-posttest line graph. This figure illustrates
the SVAS pretest-posttest means for each of the 6 weeks of the study.

Anxiety. The investigator hypothesized that participants in the experimental group
receiving the dosage of a 35-minute session + once a week for 6 weeks + with a ratio of one
handler/one therapy dog/three to five clients would demonstrate a significant decrease in
anxiety when compared with a control group. This hypothesis failed to reject the null and
was accepted ($p = .045$).

The ANCOVA omnibus test, a GLM, showed a significant difference in anxiety F
$(1,101) = 4.134$, $p = .045$, $\eta_p^2 = 0.039$; between groups while adjusting for pretest scores,
which were calculated with means, standard deviations, adjusted means, and standard errors
listed below (see Table 11), meaning graduate students who participated in a six-week
therapy dog program, engaging in one 35-minute therapy dog session per week, experienced
decreased anxiety when compared to graduate students who not participate in the therapy dog
intervention. This significant finding demonstrated a small to medium effect size, $\eta_p^2 =$
0.039.

Table 11

Comparison of Anxiety at Posttest

	Groups							
	Control n = 51				Intervention n = 53			
Mean	SD	adjusted mean	SE		Mean	SD	adjusted mean	SE
21.94	4.93	21.50	.586		19.40	5.82	19.82	.575
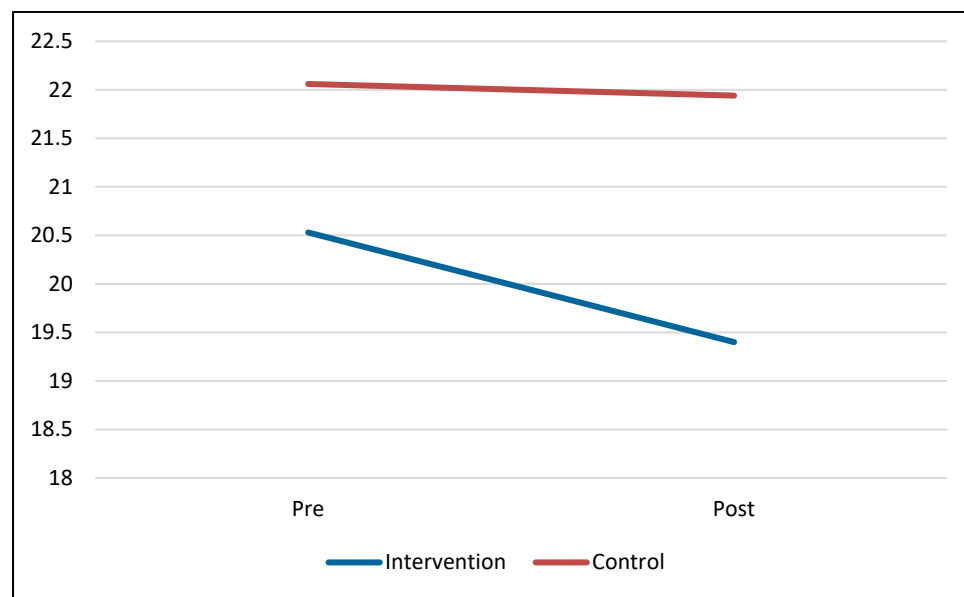
Figure 12. Anxiety pretest-posttest line graph. This figure illustrates the pretest-posttest scores on the PROMIS Anxiety scale.
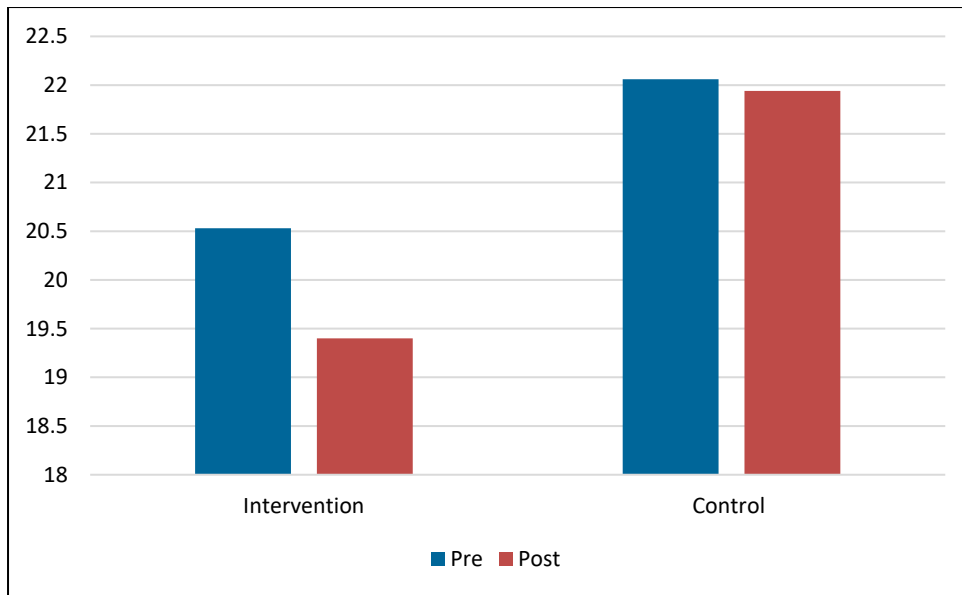
Figure 13. Anxiety pretest-posttest bar graph. This figure illustrates the pretest-posttest scores on the PROMIS Anxiety scale.

Question 2

Occupational performance and graduate student role.

Occupational performance. The investigator hypothesized that participants in the experimental group receiving the dosage of a 35-minute session + once a week for 6 weeks + with a ratio of one handler/one therapy dog/three to five would demonstrate a significant increase in occupational performance, which was measured through asking participants to rate perceived satisfaction with occupation education and perceived performance with the occupation of education at pretest and six weeks later at posttest. This hypothesis rejected the null in favor of the alternative. For perceived satisfaction with the occupation of education, pretest scores ($M = 30.42$, $SD = 6.52$) and posttest scores ($M = 31.04$, $SD = 5.20$), $t(52) = -.803$, $p = .426$. For perceived performance with the occupation of education, pretest scores ($M = 27.36$, $SD = 7.78$) and posttest scores ($M = 28.15$, $SD = 7.07$), t(52) = -1.030, $p = .308$ (see Table 12).

Table 12

Comparison of Occupational Performance

Education		M	SD	t	df	p (sig 2-tailed)
Performance	Pre	30.42	6.52	-0.803	52	.426
	Post	31.04	5.20			
Satisfaction	Pre	27.36	7.87	-1.030	52	.308
	Post	28.15	7.07			
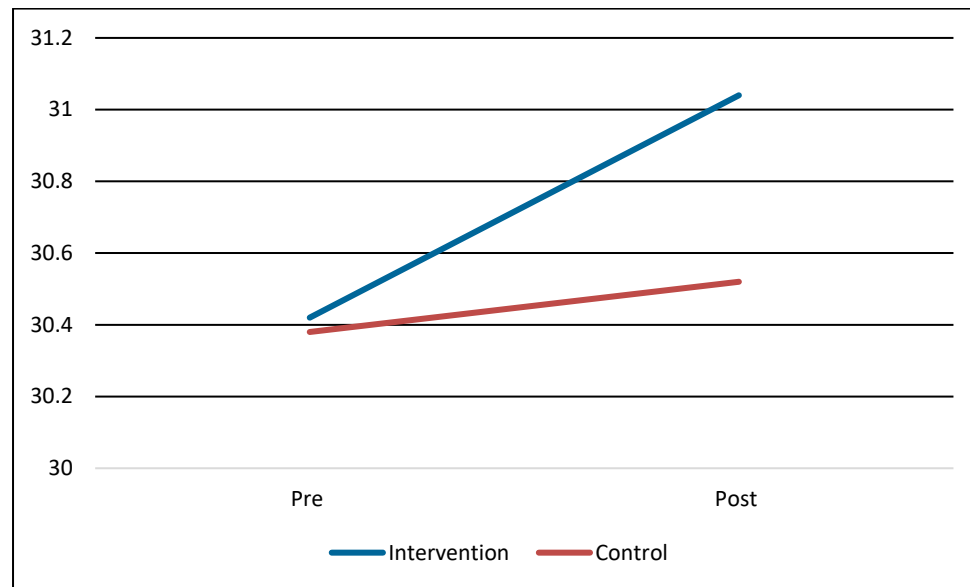
Figure 14. COPM performance pretest-posttest line graph. This figure illustrates pretest-posttest scores of occupational performance of education on the COPM.
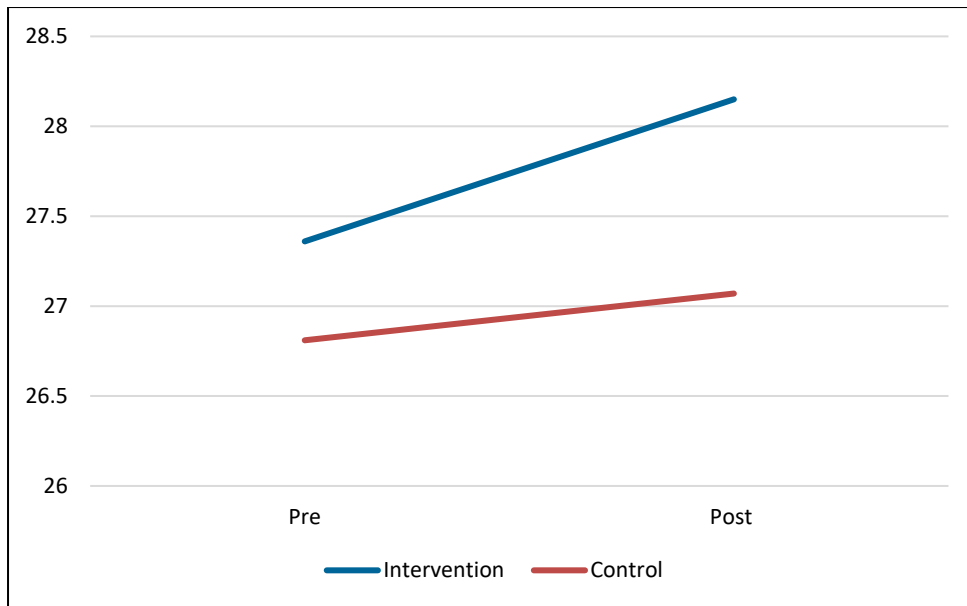
Figure 15. COPM satisfaction pretest-posttest line graph. This figure illustrates pretest-posttest scores of occupational satisfaction of education on the COPM.
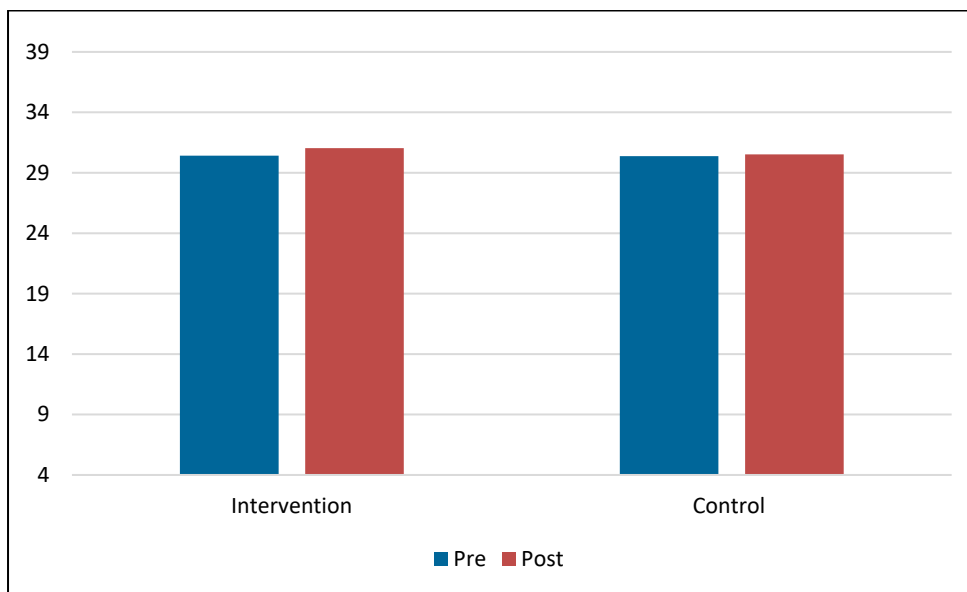
Figure 16. COPM performance pretest-posttest bar graph. This figure illustrates pretest-posttest scores of occupational performance of education on the COPM.
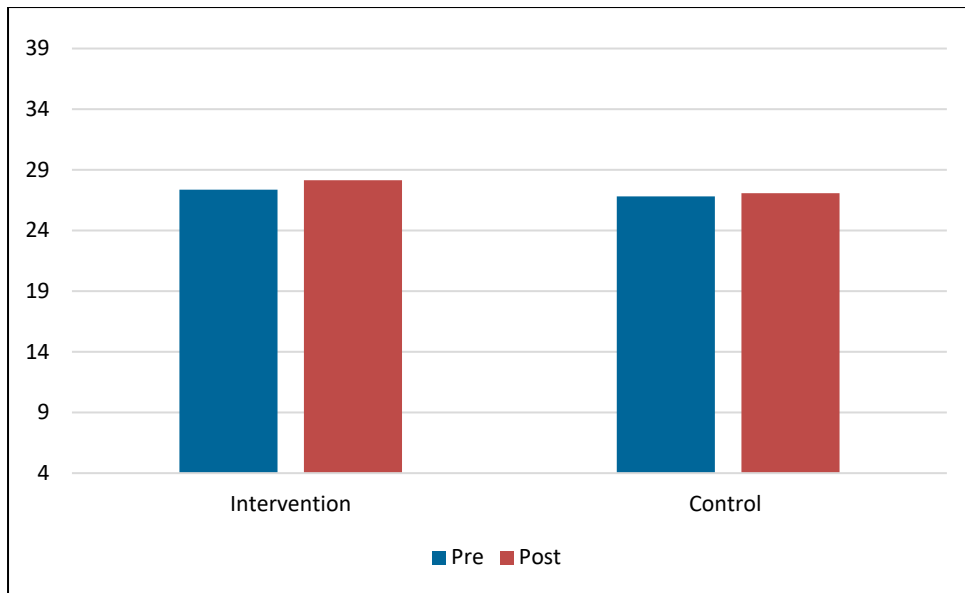
Figure 17. COPM satisfaction pretest-posttest bar graph. This figure illustrates pretest-posttest scores of occupational satisfaction of education on the COPM.

Graduate student role. The investigator hypothesized that participants in the experimental group receiving the dosage of a 35-minute session + once a week for 6 weeks + with a ratio of one handler/one therapy dog/three to five clients would demonstrate a significant increase in perceived graduate student role when compared 3 a control group, which did not engage in the intervention. This hypothesis was rejected ($p = .073$).

The ANCOVA omnibus test, a GLM, showed F $(1,101) = 3.294$, $p = 0.073$, $\eta_p^2 = 0.032$ between groups while adjusting for pretest scores, which were calculated with means, standard deviations, adjusted means, and standard errors listed below (see Table 13), meaning graduate students who participated in a six-week therapy dog program, engaging in one 35-minute therapy dog session per week, did not experience a significant increase in perception of graduate student role when compared with graduate students who received no intervention for 6 weeks.

Table 13

Comparison of Graduate Student Role at Posttest

Groups							
Control n = 51				Intervention n = 53			
Mean	*SD*	adjusted mean	*SE*	Mean	*SD*	adjusted mean	*SE*
257.49	62.81	256.89	5.98	241.11	70.86	241.69	5.87
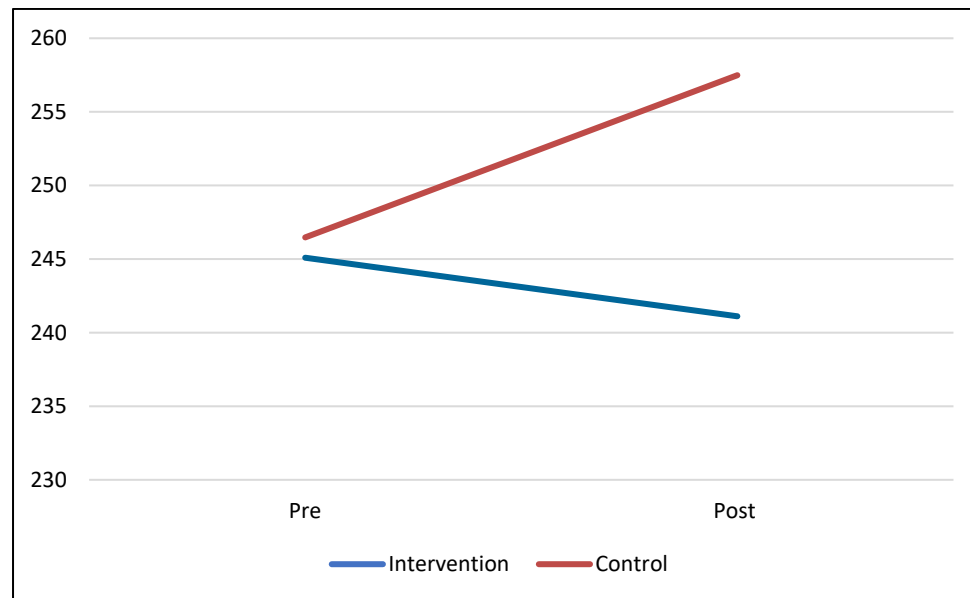
Figure 18. SACQ graduate student role pretest-posttest line graph. This figure illustrates pretest-posttest scores of adaptation to graduate student role on the SACQ.
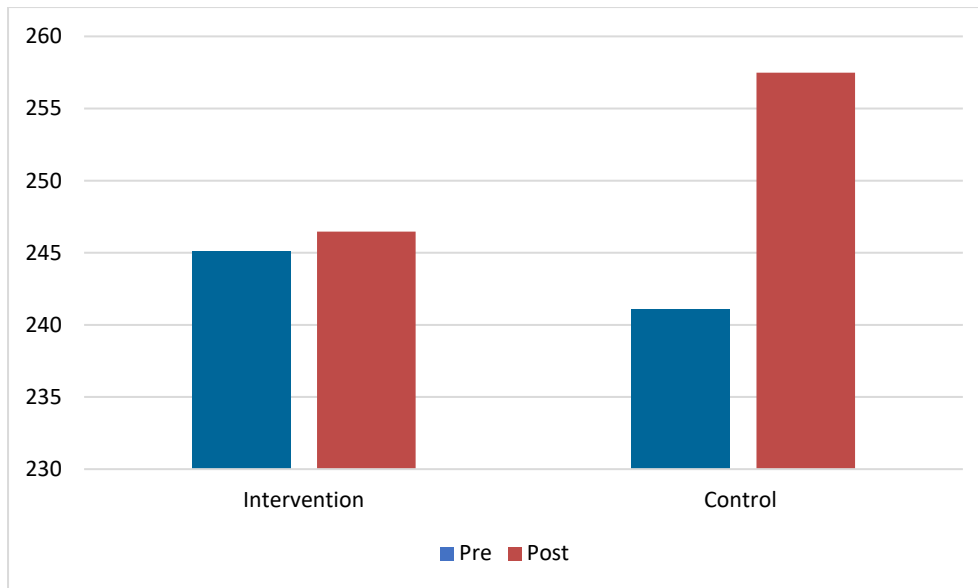
Figure 19. SACQ graduate student role pretest-posttest bar graph. This figure illustrates pretest-posttest scores of adaptation to graduate student role on the SACQ.

Summary

The graduate student population that engaged in this dissertation study was diverse in age, ethnicity, and educational background. An ANCOVA was selected to analyze the data between an independent variable, AAA, and dependent variables QOL, anxiety, stress, occupational performance, and adjustment to graduate student role while controlling for differences in the covariate, pretest data scores. Before conducting the analysis, the investigator ensured the data met ANCOVA assumptions, including normality, homogeneity of variance, random independent samples, and the relationship between dependent variables and covariate is linear. ANCOVA and paired *t* tests showed significant effects for QOL, anxiety, and momentary stress while no significant effect was noted for stress over time, occupational performance, and adaptation to graduate student role. A discussion of the results and implications of the results are discussed below.

Chapter 5: Discussion

Introduction

Therapy dog programming has expanded rapidly over the past two decades and has been implemented to alleviate mental health symptoms and associated characteristics in a variety of contexts that are perceived as stressful, including medical settings, funeral homes, courtrooms, airports, and educational settings. Theoretical frameworks, including biophilia hypothesis's inclusion of the vital relationship between humans and nature (i.e., animals) and PEO constructs, focusing on exploring personal and environmental factors that influence an individual's performance in occupation, supported further exploration of valuable effects AAI can have on many populations. As therapy dog programming expands, more research is required to better understand and promote specific factors for specific populations and contexts. Researchers have proposed that future studies should be rigorous in design to aid in developing recommendations for dosage, including "the duration of each session + the number of sessions + the ratio of handler/animal/client" (Binfet et al., 2018, p. 3). Furthermore, although a considerable amount of research in elementary schools and the undergraduate student population has been conducted, little to no research has been conducted in the graduate student population. Therefore, the investigator implemented the dissertation study in the graduate and professional student population.

The investigator conducted a pretest-posttest RCT to analyze the effects of AAA with (a) a dosage of 35 minutes + for 6 sessions (once a week for 6 weeks) + 1 handler, (b) 1 therapy dog, and (c) three to five clients in each session on the well-being of college graduate students, an understudied population. Applied research of this nature is complicated to conduct as it involves multiple and varied stakeholders, which include busy graduate students, trained therapy dog and handler teams, research assistants, among others. In this dissertation study, graduate student well-being includes QOL, perception of stress and

anxiety, engagement in occupational performance, and adjustment to the role of graduate college student. ANCVOA and paired *t*-test analysis yielded statistically significant results, indicating reduced momentary stress and anxiety and increased QOL.

Discussion and Interpretation of Results

The specific problem studied by the investigator was the growing concern regarding college student well-being, including graduate students, who required the implementation of supplementary cost-effective interventions, addressing the increasing number of students experiencing negative mental health symptoms, such as increases in self-report of stress and anxiety. Many researchers have studied the effects of animal assisted intervention on individuals in various contexts and found many health benefits (Brelsford et al., 2017; Kamioka et al., 2014; Lundqvist et al., 2017; Wood et al., 2017). Furthermore, many researchers have found AAI positively affects college students, specifically by alleviating mental health symptoms, such as stress, anxiety, homesickness, and loneliness (Barker et al., 2016; Binfet 2017; Binfet et al., 2018; Binfet & Passmore, 2016; Jalongo & McDevitt, 2015; Pendry et al., 2019). Although some researchers have allowed students from graduate programs to participate in informal AAI programming, no researcher to date has conducted research on the effect of AAI in only the graduate/professional student population.

Participation Rationale and Significant Events

The participants in the experimental group were asked a series of investigator-developed open-ended questions at the end of their posttest survey. One question asked "Why did you to participate in this study? (explain)" An example of responses included, "I have a hard time finding an outlet on campus. Gave me a nice break studying" (Group 1, Participant 1). "I enjoy dogs and have many worries in my life, so I thought I was a good fit for the study" (Group 4, Participant 1). "I was excited to have the opportunity to interact with dogs and take a break of school because I grew up never having a dog" (Group 4, Participant

3). "I wanted to do something outside of class that would be beneficial to me" (Group 7, Participant 3). "I wanted to see the impact that a therapy dog could have on my mental wellbeing in a school setting" (Group 10, Participant 2). "I participated to relieve some stress through the first semester of grad school" (Group 10, Participant 5). "I find research to be very important and try to participate when able" (Group 11, Participant 3). "I always had an interest in helping with research, but because of my financial situation I do have to work often and can't commit too much time. The least I can do is participate" (Group 14, Participant 2). "Grad school is extremely stressful. I also love dogs and miss my dog that lives far away with my parents" (Group 23, Participant 2). "I did this for volunteer hours because I value the importance of research, and I am a stressed out grad student, so I thought I fit the audience" (Group 23, Participant 3). "I've never been a part of someone's research before, and I found this particular study very interesting" (Group 27, Participant 3). In addition to many students enjoying the companionship of dogs, several students expressed interest in seeing the effect the intervention would have on them as well as being genuinely interested to participate in a research study.

The investigator also developed a question to ask "Did any significant events occur in your life during the duration of this study? If so, on which date? Please explain." Many students (47%), 25 out of 53 participants reported no significant events. Eight (15%) of participants reported positive significant events, such as going on a date, becoming engaged, and qualifying for cross country nationals. Twenty one (40%) of participants reported negative significant events occurring. Many of the responses, eight participants stated significant events were related to school, work, and exams. Four students mentioned having ill family members, and one participant reported her great grandmother's passing away. Several students mentioned that the therapy dog helped or sensed something was wrong during the negative significant events. "Last Wednesday, I had a terrible practical, and it

seemed she could sense it" (Group 1, Participant 1). "The only significant event was midterm week, which the therapy dog helped tremendously" (Group 10, Participant 5). "My dog at home in CT passed away on [date]. Seeing the therapy dog for the last session gave me peace. She was so comforting, and it was like she knew since she came up and laid against me right away" (Group 23, Participant 1). The responses to significant events helped the investigator to understand that there was not an overwhelming number of significant events that would have skewed the results, and the therapy dogs positively affected some participants who did unfortunately experience a negative significant event.

Summary of Results

A RCT was conducted to better understand the effect of AAI, more specifically AAA, on the well-being of graduate students. Well-being was measured using several tools, including a QOL scale, perceived anxiety scale, perceived momentary stress scale, perceived stress over time scale, occupational performance of education scale, and an adjustment to college scale, intended to measure adjustment to graduate student role. Participants in the experimental and waitlist control group completed all of the measures at beginning and end of 6 weeks with the exception of the momentary stress scale, which was completed at the beginning and end of each intervention session; however, the waitlist control participants did not complete the momentary stress scale because they did not engage in the intervention. The investigator expected the experimental participants to have significant increases in QOL, occupational performance of education, and ability to adjust to graduate student role when compared with control group participants. Additionally, the investigator expected experimental group participants to experience a significant decrease in perceived stress over time and anxiety compared to control group participants. Furthermore, the investigator expected experimental group participants to have significantly lower momentary stress at the

end of each intervention session compared with perceived stress reported at the beginning of the session.

The results indicated that participants in the experimental group, engaging in the therapy dog programming, reported significantly increased QOL and significantly decreased anxiety, which were measured at pretest and 6 weeks later at posttest when compared with control group participants who did not engage in the therapy dog program. Unexpectedly, the results showed that participants in the experimental group did not experience a statistically significant decrease in stress on the PSS, measured at pretest and 6 weeks later at posttest. However, both groups experienced a decrease in stress over time. Additionally, as hypothesized, participants in the experimental group demonstrated a significant decrease in momentary stress when rating stress perception at the end of each session compared with stress levels at the beginning of each session. Finally, no significant difference in experimental group participants' occupational performance of education or adjustment to graduate student role was indicated when compared with control group participants.

Interpretation of Results

Question 1.

QOL, stress, and anxiety.

QOL. Quality of life was measured using the WHOQOL-BREF, which required students to rate their QOL in domains, including aspects of their physical, psychological, level of independence, social relationships, and environment. As the investigator hypothesized, the results indicated that the participants in the experimental group reported a significantly higher QOL compared with control group participants. The authors of the WHOQOL-BREF defined QOL as a broad ranging concept, including the domains listed above, and considered the individuals' perspective of their position in life relative to their goals, which makes this dependent variable particularly significant (WHO, 2020). When

comparing experimental participants with control group participants not only was the overall total QOL statistically significant, but each domain was statistically significant as well. In addition to the WHOQOL-BREF, the investigator developed open-ended questions that the experimental participants were asked to answer at the end of their posttest survey. The investigator found experimental group participant responses to the investigator-developed question "Generally across all six visits, what are words that describe how you felt before and after visiting with the therapy dog?" intriguing and to qualitatively provide further support the quantitative results of the WHOQOL-BREF. The investigator included a chart that allowed the participants to list three words to describe their feelings before and after each visit (see Appendix H). The third most common word reported by experimental participants to describe their feelings after a therapy dog session was "happy," reported by 45% of participants. Participants submitted responses that the investigator felt were related to increased QOL when participants were asked to reflect on the investigator-developed question "what stood out to them or was especially memorable about the therapy dog programming," including "When it was clear she [therapy dog] remembered us. "When she [therapy dog] was especially friendly on a day that was super bad for me" (Group 1, Participant 3). "I looked forward to it every week" (Group 18, Participant 4). The feeling of "happy" and quotes from students provided additional support for the statistically significant effect on students' perception of increased QOL.

Few researchers have specifically measured QOL in the college student population; however, mood and wellbeing (Grajfoner et al., 2017), happiness and energy levels (Ward-Griffin et al., 2018), and satisfaction with life (Binfet & Passmore 2016), which are closely related to QOL, were measured, and each demonstrated statistical significance in the respective studies. The results from this dissertation study aligned with the research mentioned above demonstrating statistically significant increases in QOL in participants

engaging in therapy dog programming compared to graduate student participants who did not engage in therapy dog programming.

Another interesting point includes Binfet and Passmore's (2016) study, which is the only other study RCT design that included AAI over multiple sessions. Forty-four first year undergraduate students were enrolled, including 22 in the experimental group and 22 in the waitlist-control, which were given the option to engage in the intervention at the end of the eight weeks. The experimental group participants engaged in a 45-minute therapy dog session once a week for 8 weeks. Participants were randomly placed in groups of three or four and randomly assigned to a different therapy dog/handler team each week for the first 35 minutes, and for the remaining 15 minutes, dogs and participants could interact freely (Binfet & Passmore, 2016). The investigator of this dissertation study utilized a similar design with changes being the intervention spanning 6 weeks in duration, 35 minutes for each session and allowing for self-selection of groups. The investigator chose 35 minutes based on Binfet et al. (2018), which recommended college students preferring therapy dog sessions of approximately 35 minutes. Moreover, because graduate/professional student schedules varying immensely from program to program and nature of graduate students studying in self-selected cohorts, the investigator allowed students to self-select cohorts. Overall, this dissertation study aligned with Binfet and Passmore in results, showing increased QOL in graduate students and increased satisfaction with life in college freshman when both groups engaged in weekly therapy dog programming during a semester.

Stress. The investigator was initially surprised that graduate student participants in the experimental group experienced a significant decrease in perceived stress on the stress visual analog scale (SVAS) but completed the pretest and posttest each therapy dog session, perceived stress over time as measured by the perceived stress scale (PSS), and did not yield significantly lower perceived stress levels when compared with control group participants.

Graduate students may have developed a skillset from previous experiences in successfully graduating from high school and undergraduate programs that helped them cope with stress. A possible explanation could lie in the advanced skill set graduate students have developed temporally to deal with stress. The PSS instrument has students reflect on feelings experienced over the past month related to stress, handling problems, controlling important things, and coping with required task load, thus the potential advanced skillset students may have developed could have aided in managing feelings in order to be successful in previous school experiences, such as completing high school and undergraduate work.

The PSS instrument specifically cues students to think about stress in terms of "the last month," whereas the PROMIS Emotional distress-anxiety form assessment and SVAS allows students to rate how they are feeling. Students may interpret these tests as rating how they feel in that moment. For example, a statement on the PSS scale is "In the last month, how often have you been upset because of something that happened unexpectedly, and students are asked to choose never, almost never, sometimes, fairly often, or every often" (Cohen et al., 1983). A statement from the PROMIS Emotional distress-anxiety form is "I felt worried and students are asked to select from never, rarely, sometimes, often, and always" (APA, 2013). It is interesting to think about the potential difficulty level of measuring stress over time. If one is experiencing stress in the moment, one feels it; however, to think about how that stressor affects a person after time has passed, stress levels may have the potential to be perceived as lower. Thus, based on the findings of the dissertation it may be easier for students to assess their perceived stress directly before or directly after an event and potentially more difficult for students to assess their perceived stress over time. The aim of research that is investigating the temporal impact on stress in future studies may further illuminate this discussion.

Additionally, the momentary stress scale, SVAS, captured situational or episodic perceived stress changes from the beginning to end of each intervention session. As discussed in the previous section, participant responses to "how you felt before and after visiting with the therapy dog," showed additional support for reduced stress. The most common description used to describe how the person felt before the intervention was the word "stressed" by 37 participants or 70% of the experimental group participants, and the most common feeling reported to describe how the participant felt after the session was "relaxed" by 27 participants or 51% of the participants. An additional common description of how participants felt before sessions was "overwhelmed," which can be associated with the feeling of stress. Additionally, other common responses submitted to describe feelings after a therapy dog session, included less stressed, focused, and content as reported by 12 participants. Although the PSS instrument, which is designed to measure stress over a four-week period, did not show statistically significant results when experimental participants were asked to reflect on their feelings before and after each session over the six-week period, participants reported feeling stressed before and not stressed after spending time with the therapy dog. Furthermore, at the end of six sessions, the students in the experimental group were asked the following open ended question developed by the investigator, "when you think of your six visits and interactions with the therapy dog, describe what stands out for you. What is especially memorable?" Responses from participants included, "how drastically my mood changed" (Group 1, Participant 1), "leaving less stressed," (Group 3, Participant 3), and "[therapy dog] was so lovely, and I always felt much less stress after" (Group 3, Participant 1). These findings may suggest therapy dog programming has a larger effect on episodic and situational stress versus broad stress over time.

Students' perception of decreased momentary stress has the potential to positively impact students' occupational engagement throughout the school day. The occupational

therapy profession is based on the principal that engaging in meaningful occupation improves health outcomes (Wilcock, 2006) and student participants engagement in a therapy dog intervention reduced momentary stress levels during each of the six visits reflected through the use of the SVAS. Based upon the responses in the open ended questions, this reduction in stress has the potential to allow for students to be more present and engaged during educational lecture and lab activities during their school day. For example, one participant stated she felt the intervention increased her occupational performance because "getting a short break of doing something I like allowed me to relieve stress before doing school stuff again which allowed me to focus better studying" (Group 16, Participant 2). Another participant stated, "I feel like this was a much needed break between classes and studying. A lot of times I wouldn't give myself a break when I needed to but this kind of forced me to. It allowed me to really focus after a visit" (Group 18, Participant 1). A reduction in stress may also increase ability to engage in occupational activities with a more clear and focused mind for completing course readings and homework.

Researchers have studied the effect of AAI on student stress using self-report measures, including PSS and SVAS, and physiological measures, including blood pressure, heartrate, and saliva cortisol levels (Barker et al., 2016; Binfet, 2017; Blender & Ryan, 2009; Crump & Derting, 2015; Delgado et al. 2018; Jalongo & McDevitt, 2015; Ward-Griffin et al., 2018; Wood et al., 2018). The majority of researchers reported positive results in perceived stress scales and mixed results utilizing psychological measures. The investigator in this dissertation study utilized two self-report measures: SVAS and PSS. The investigator found statistically significant decreases in perceived stress on the SVAS, which aligns with results reported by other researchers utilizing visual analog scales (Barker et al., 2016; Binfet et al., 2018; Delgado et al., 2018)

The PSS scale is intended to be used to assess perceived stress changes over a four-week period and has been used in four studies on the college student population (Barker et al., 2016; Binfet, 2017; Crump & Derting, 2015; Delgado et al., 2018). Researchers in all four studies examined the effect of AAA on students engaging in one AAA session (Barker et al., 2016; Crump & Derting, 2015; Delgado et al., 2018). Binfet (2017) used the PSS to measure perception of stress changes before and after a one-time intervention and explained the intended use of the PSS to measure stress over the past month as a limitation in this study. Barker et al. (2016) and Crump and Derting (2015) both utilized the PSS scale to compare baseline stress levels between control and experimental groups. Although the intension of PSS is to measure long-term stress over a four-week period, Delgado et al. (2015) adapted the scale and asked participants to rate their perceived stress "at this time" instead of "over the past month." Delgado did report statistically significant differences in perceived stress using the adapted scale. However, the investigator in this dissertation study is the first to utilize the PSS scale according to recommended procedures in measuring stress over a four-week period and did not find statistically significant stress reductions in experimental group participants compared with control group participants. These results may suggest that AAI is most effective in reducing episodic or situational stress levels.

Anxiety. Anxiety and stress are related but different. Mental health specialists describe stress as situational or episodic in nature, including the body's reaction to a trigger or overwhelming demands placed on a person, whereas anxiety is described as emotions experienced as a reaction to stress (Anxiety and Depression Association of America [ADAA], 2018). The results indicated that the participants in the experimental group experienced significantly lower perceived anxiety when compared with control group participants. The investigator proposed a possible explanation that students felt supported by engaging in the therapy dog program, which contributed to reassurance or security, thereby

lessening their anxiety. "Anxious" was the second most common feeling reported by 29 participants or 55% of experimental group participants when asked to reflect on how the participant felt before each visit, and "calm" was the second most common response reported by 24 participants or 45% of participants to describe how they felt after an intervention session. Other common feelings that may be associated with anxiety include words, such as "nervous" and "worried," that were submitted by 10 participants, and other common words that described feelings after intervention sessions included "eased," "relieved," and "refreshed," submitted by nine participants.

At least eight participants submitted responses related to lessened anxiety when asked to reflect on an event or moment that stood out to them or was especially memorable. "How happy the therapy dog was to see us every week, which just makes me feel good" (Group 11, Participant 3). "What stands out for me is how comforting it felt to pet the therapy dog especially when I started to miss my family and my own dog at home" (Group 13, Participant 1). "The calming nature of petting a dog" (Group 13, Participant 2). "I always felt relaxed during the sessions and really enjoyed my time with the therapy dog and the handler" (Group 14, Participant 1). "Really nice social/down time. I noticed that my thoughts didn't wander, and I was very present with the company I had" (Group 14, Participant 2). "I felt significantly more relaxed once I leave the session" (Group 14, Participant 3). "She [therapy dog] was a comforting presence in the room with us even if we weren't petting her; it was nice for her to be nearby" (Group 14, Participant 3). "How calm the therapy dog is, her mellowness helped me to calm down each session (Group 24, Participant 1). The aforementioned open-ended responses regarding a moment that stood out to participants and words reported to describe the feelings of participants before and after intervention sessions provided additional support for the statistically significant effect on participants' anxiety perception.

Students' perception of decreased anxiety also has the potential to positively affect occupational engagement. Researchers have connected health science students' anxiety with poor mental health and decreased occupational performance (Larijani, Aghajani, Baheiraei, & Neiestanak, 2010). One student reported the perception that the AAI intervention improved occupational performance, stating "I felt like it allowed me to clear my mind, so when I went back to studying, I was able to focus better. I always had a lot to do after each session, so my stress and anxiety was never gone completely, but I found I was able to be more productive" (Group 18, Participant 4). Another student reported, "I think the time I spent with a therapy dog not only eased some of my anxiety, but it made me reflect on things I could be doing differently/better. It also made me acutely aware of my anxiety and ways I can change it" (Group 23, Participant 2). Students' perceived decreased anxiety has the potential to allow for increased occupational performance with peers and instructors during lecture and lab activities as well as increased occupational performance on tests and quizzes throughout their school day.

Six out seven researchers who have studied anxiety in the college student population also found a significant decreases in anxiety levels for students engaged in therapy dog programs (Crossman et al., 2018; Grajfoner et al., 2017; Hall, 2018; Jarolmen & Patel 2018; Stewart et al., 2014; Wood et al., 2018). Many researchers have measured anxiety before and after a brief one-time interaction with therapy dogs with therapy dog sessions lasting 20 minutes or less in four of the seven studies (Crossman et al., 2015; Grajfoner et al., 2017; Jarolmen & Patel, 2018; Wood et al., 2018). Blender and Ryan (2009) measured anxiety of participants who completed a semi-structured interview with and without a therapy dog present. Stewart et al. (2014) measured anxiety of participants before and after interacting with a therapy dog through a drop-in session with students spending variations of 2 minutes to 120 minutes with the therapy dog (Stewart et al., 2014). Hall (2018) measured anxiety

over the course of the semester using the Hospital Anxiety and Depression scale HADS for nursing students enrolled in a community college program; however, because participants could interact with the therapy dog freely during the 2 days a week the dog was on campus, the amount of time each person spent with therapy dog during each session or over the course of 13 weeks was unknown.

The investigator of this dissertation study also measured anxiety over multiple therapy dog sessions with a prescribed dosage of 35 minutes + once weekly for 6 weeks + one handler/one therapy dog/three to five participants using the PROMIS Emotional Distress-Anxiety short form. This time was the first time this instrument was reported to have been used to measure anxiety following interaction with a therapy dog.

Question 2.

Occupational performance and adjustment to graduate student role.

Occupational performance of education. Results of occupational performance were surprising as experimental group participants did not report significantly higher performance and satisfaction of education compared with control group participants. There are many facets that require investigation regarding this unexpected result. In both the experimental and control groups, several participants rated their performance and satisfaction of activities within education as very high, creating a ceiling effect, which limited the ability for further improvement. The high performance and satisfaction levels make sense because students who have been successful in both high school and undergraduate work may have developed advanced skills in the occupation of education.

Experimental participants were asked to reflect on the moments that stood out to them or were especially memorable, and several participants reported the value of taking time away from school/coursework to give their mind a break from the occupation of education, reporting: "I always left feeling better and wasn't thinking about school" (Group 1,

Participant 1). "Being able to be close to the therapy dog and talking with classmates that helped my mind off school" (Group 10, Participant 2). "The good conversation we have as a group that isn't school related while the therapy dog makes us all feel good when petting her" (Group 10, Participant 5). "Having the time to talk and play with [therapy dog] and not focusing at all on school during that time (Group 10, Participant 1). "[therapy dog] definitely made me more relaxed and kind of distracted me (from schoolwork) during the visits" (Group 18, Participant 1). "The experience forced me to take time out of my day and dedicate it to not studying. I will remember how relaxing it was to just allow myself to just sit with the dog and put school away" (Group 18, Participant 2). The investigator still believes therapy dog programming has the potential to effect occupation; however, she believes it may be more appropriate to investigate how or if therapy dog programming can promote occupational balance as many students hinted at needing a break from the occupation of education during the school day. The investigator believes therapy dog intervention has the potential to positively affect occupational performance; however, due to the student participants rating their performance and satisfaction of the occupation of education, the results did not demonstrate a statistically significant increase. The investigator is interested in potentially creating a tool that is sensitive enough to capture areas of occupation that are affected by therapy dog intervention. Furthermore, using additional qualitative methods could provide insight for categories of occupation that are affected by therapy dog intervention.

Adjustment to graduate student role. The investigator was initially surprised experimental group participant results did not show a greater adjustment to graduate student role when compared with control group participants; however, this dependent variable is related to the occupational performance of education; therefore, the same possible explanations can be applied. Specifically, students may have previously developed a skillset

when transitioning from high school to college and may have applied this skillset when transitioning from undergraduate work to graduate/professional level work. Furthermore, the SACQ instrument was the last instrument in the packet and very lengthy, including 67 questions. It may be reasonable to hypothesize that participants may have dedicated less energy to thinking about and responding to each question. There has been a growing concern in higher education regarding survey fatigue and researchers have expressed the longer a survey is, quality in completing the survey drops among participants (Porter, 2005).

Although no specific researchers have studied *adjustment* to student role, Jalongo and McDevitt (2015) mentioned students' perceptions of environment (library) and approachability of staff improved. Additionally, Binfet and Passmore (2016) measured connectedness to campus and found first year college students felt more connected to their academic environment after engaging in an eight-week therapy dog program. Binfet (2017) found participants who engaged in a therapy dog program experienced a significant increase in affinity to campus compared with students who did not engage in the therapy dog program. It can be argued that perceptions of environment, approachability of staff, connectedness to academic environment, and increased affinity to campus may be related the ability to adjust to graduate student role; however, the results of the dissertation study did not show a statistical significance in adjustment to graduate student role for participants in the experimental group compared with participants in the control. In reviewing previous studies, it may be important to concentrate more specifically studying effects of AAI on the graduate student environment versus the graduate student role. The investigator believes that a lack of significant findings may be a result of students not having a problem in the area of *role* when transitioning from an undergraduate student to graduate/professional student. The investigator does believe that therapy dog programming has the ability to positively affect students' perception of the environment. In response to the open ended question, When you

think of your six visits and interactions with the therapy dogs, describe what stands out for you? What is especially memorable? One participant reported, "I like the casual environment and how calming the therapy dog was. I looked forward to it every week" (Group 18, Participant 4). Another participant stated, "Friendly environment and the therapy dog is very mellow and comforting" (Group 28, Participant 4). Finally, a participant reported "being able to have one on one time with the therapy dog in a calming/relaxing environment" (Group 19, Participant 1). An increase in comfortability and fit with the environment will increase overall occupational performance (Law et al., 1996). Future studies should explore the use of occupational therapy tools that are used to evaluate environmental perceptions.

Dosage. Although the investigator did not set out to study or measure dosage, researchers consistently recommended including a description of each element of dosage (Adams et al., 2017; Binfet, 2017; Binfet & Passmore, 2016; Barker et al., 2016), including "the duration of each session + the number of sessions + the ratio of handler/animal/client" (Binfet et al., 2018, p. 3). The investigator has paid careful attention to describe each element of dosage of the intervention throughout the dissertation report, including a 35-minute session + once a week for 6 weeks + with a ratio of one handler/one therapy dog/three to five clients. Binfet (2017) coined the term dosage and then studied students' preferences regarding the duration of each session (Binfet et al. 2018). Hillen (2020) explored the existing literature regarding AAI on college campuses that included a chart that has summarized that AAI has taken place on college campuses, including authors, sample size, inclusion criteria, design, program characteristics, and design/total sessions. The chart shows the inconsistencies in describing each element of dosage as well as the researchers who have analyzed AAI over more than one session (Hillen, 2020).

In this dissertation study, the investigator developed an open-ended question in which participants in the experimental group responded to "What is your feedback regarding the

length of 35 minutes with the therapy dog?" Five participants felt they wanted the duration of the session to be longer, four participants reported wanting the duration to be shorter, and 44 reported it was an adequate length. Examples of responses from participants include: "I always wanted more time" (Group 1, Participant 1). "Good amount of time to relax with the dog without getting too stressed that you spent too much time not focusing on school (Group 1, Participant, 2). "This was an adequate amount of time to provide student with a therapy dog for them to let their minds take a break" (Group 7, Participant 2). "I think this could have been cut a little shorter and still have the same benefit" (Group 11, Participant 3).

The investigator developed an additional question asking "What is your feedback regarding the *length* of the six-week program?" Twenty-two participants wanted the program to go longer than 6 weeks, 30 participants said it was an adequate length, and one participant expressed it could be shorter. Many participants reporting a desire to have a therapy dog intervention for the entire semester, "wish it was throughout the semester" (Group 1, Participant 3). Even participants who felt it was an adequate length reported, "good length, however, I would prefer to have this throughout the semester" (Group 11, Participant 1) "Good length–interesting to see if it was all semester" (Group 17, Participant 3). Overall, it appears the majority of participants were satisfied with the duration of a 35-minute session; however, they would prefer the program to continue the entire semester versus ending at 6 weeks.

Theory. PEO and the biophilia hypothesis presented strong support to examine the impact of animal-student relationships on graduate student well-being, including QOL, stress, anxiety, occupational performance of education, and adjustment to graduate student role. Theoretical constructs with the PEO model have explored personal and environmental factors influencing an individual's performance in occupation (Law et al., 1996). Constructs within

the biophilia hypothesis help to explain the importance of the relationship between humans

and animals (Kellert & Wilson, 1993).

  Biophilia hypothesis. The biophilia hypothesis is used to explain the significance of

the relationship between humans and nature and the positive effect the relationship can have

on overall well-being. The investigator believes this relationship was evident in the results of

the study as evidenced by experimental group participants experiencing statistically

significant increased QOL and decreased stress and anxiety. The main adaptive benefits

described that an individual can gain as an outcome of the biophilia hypothesis include

emotional sustenance and security, sociability and affiliation, self-esteem and self-respect,

and physical healing and mental restoration. Furthermore, the open-ended question, asking

experimental participants to report moments that stood out most or was most memorable to

them included the following responses, which captured aspects of each of these benefits.

"Feeling calm but also the conversations and release I felt emotionally with group members.

A chance to let out things on my mind with people going through similar experiences (Group

17, Participant 1). "The calming nature of petting a dog" (Group 13, Participant 2). "How

calm the therapy dog is, the conversations we have while surrounding the therapy dog"

(Group 17, Participant 3). "I realized I felt more connected, even to other humans with a dog"

(Group 17, Participant 4). The open-ended responses that explained the moments that stood

out most to the participants were used to explain the main adaptive benefits, which make up

this theory.

  PEO. The PEO model is used to explore personal and environmental factors

influencing an individual's performance in occupation. In the dissertation, the investigator

aimed to explore the fit between the person, graduate student, environment, college, and the

occupational performance of education. Personal factors included measuring stress and

anxiety, which significantly increased following the intervention; however, performance and

satisfaction of the occupation and education did not. The intervention appeared to have a positive effect on fit by affecting the environment as one participants reported, "friendly environment and the therapy dog is very mellow and comforting" (Group 28, Participant 4). "She [the therapy dog] was a comforting presence in the room with us even if we weren't petting her. It was nice for her to be nearby" (Group 23, Participant 1). When asked "when you think of your six visits and interactions with the therapy dog, describe the moments that stand out most to you. Which is most memorable?" The biophilia hypothesis and PEO model should continue to be used by researchers as theoretical frameworks to support the study and exploration of how AAI effects and predicts individuals' behaviors

Implications

Implications for Practice

The field of occupational therapy is science-driven, and clinicians are required to apply updated research to service delivery (AOTA, 2020). Although many interventions are selected for individuals with limitations or participation restrictions, interventions can also be selected for individuals with a goal to or using the approach of prevent, maintain, or enhance client factors or skills (AOTA, 2014). Occupational therapists determine progress with individuals based on response to intervention, or outcomes, including, well-being, occupational performance, participation, prevention, quality of life, and role competence, (AOTA, 2014).

Well-being. The investigator of this dissertation study intended to measure graduate students' well-being on a broad scale. AOTA (2014) defines the outcome of well-being by adopting Hammell's description "health, self-esteem, sense of belonging, security, and opportunities for self-determination, meaning, roles, and helping others" and includes the WHO's definition including physical, mental, and social aspects. The investigator's definition of well-being aligned well with AOTA in including measurement of health and

self-esteem (QOL), mental aspects (stress and anxiety), and roles (occupational performance and adjustment to graduate student role). Additionally, the investigator believes students' increased mental health, demonstrated by decreased stress and anxiety, resulted in an increased overall well-being. An increased well-being has the potential for students to demonstrate higher occupational engagement. Implications for the field of occupational therapy are explored further by discussing specifically at outcomes from the occupational therapy practice framework, including occupational performance, participation, prevention, quality of life, and role competence.

Occupational performance and participation. If an existing performance limitation presents, a clinician would measure improvement in occupational performance; however, if no performance limitation exists, enhancement of occupational performance is measured (AOTA, 2014). One aim of this study was to measure the individuals' perception of performance and satisfaction of occupational performance, specifically of education. The results of this study presented information that AAI may not have an effect on the occupation of education; however, results from open-ended questions showed preliminary information that suggested students may need a break of educational activities during the school day in order to maximize performance in education. Conceivably, AAI may have an effect on or promote occupational balance or routine. Future studies should be focused on studying the effect of AAI on graduate students' occupational balance and routine as a leisure occupation should be explored in future studies. Additionally, the outcome of participation is defined as "engagement in desire occupations in ways that are personally satisfying and congruent with expectations within the culture" (AOTA, 2014, p. S35). It would be interesting to study the effect of AAI on participation of education or in the academic environment.

Prevention. Prevention is defined by AOTA (2014) as activities "designed to identify, reduce . . . the onset and reduce the incidence of unhealthy conditions, risk factors

. . ." (p. S34). The ACHA's NCHA assessment presented the mental health concerns in the college student population by identifying over 50% of students reporting negative mental health symptoms (ACHA, 2016) and 78% of students expressing comfortability from seeking help from informal programming (or nonprofessionals; Eisenberg et al., 2011; Martin et al., 2018). The results from this study showed an increased QOL and decreased stress and anxiety and showed a significant potential for informal AAI programming to continue to make a substantial contribution to the prevention of negative mental health symptoms, which have the potential to manifest into serious mental health diagnoses.

Quality of life. The occupational practice framework, official framework guiding occupational therapy clinicians, defines QOL as the "dynamic appraisal of clients life satisfaction . . . hope . . . self-concept . . . health and functioning . . ." (AOTA, 2014, p. S35). The definition of this OT outcome aligns with operational definition for QOL from the WHOQOL instrument utilized to measure QOL as a dependent variable in this dissertation study. The participants who engaged in the six-week therapy dog program experienced a significant increase in QOL compared with individuals who did not engage in the program, demonstrating a significant implication of AAI as an intervention for OT practitioners. Future research should study QOL measures when using AAI as an intervention in varying populations.

Role competence. The outcome of role competence is defined simply as the "ability to effectively meet the demands of roles in which the client engages" (AOTA, 2014, S35), and the investigator intended to measure role competence through the student adjustment to college questionnaire. However, statistically significant results were not obtained. This finding may be suggesting AAI may not have a major effect adjusting to graduate student role; however, additional tools should be researched in order to gain a better understanding of the effect of changes in overall role competence. Although role competence had not been

measured in the college population, previous research has suggested AAI had an effect on college students' perceptions of their environment, connectedness to campus, affinity for campus, and increased perception of environments AAI was conducted in (i.e., library; Binfet, 2017; Binfet & Passmore, 2016; Jalongo & McDevitt, 2015). Future studies should focus on studying changes perception of the environment and if or how this affects overall role competence as a student.

Implications for practice overview. Results from this dissertation study may be suggesting a niche area of need for occupational therapists to practice in the context of higher education. AAI is a cost effective informal program that college students can participate in and has the potential to increase individuals' well-being, participation, and quality of life while preventing negative mental health symptoms from manifesting into a more severe diagnosis. AAI programming is an example of one type of program; however, occupational therapy clinicians could work to develop a variety of informal programs on college campuses to battle the current mental health concerns

Implications for Further Research

Stress and anxiety. Researchers have used a variety self-report and physiological measures to assess the effect of AAI on college students' stress and anxiety levels. Researchers have demonstrated some disagreement between the tools that are used to measure stress and anxiety. For example, researchers in four studies concentrated on measuring stress through physiological measure of blood pressure (Blender & Ryan, 2009; Crump & Derting, 2015; Delgado et al., 2018; Wood et al., 2018) while it was mentioned in another study, anxiety was measured using blood pressure (Jarolmen & Patel, 2018). The PSS was used to compare baseline measures of stress two studies (Barker et al., 2016; Crump & Derting, 2015), and a variation of the PSS scale was used to measure change in stress perception after a single AAI session and found statistically significant decreases in stress

compared with controls (Binfet, 2017; Delgado et al., 2018). The investigator in this study used the PSS scale to measure changes in stress perception over a month as specified in the instructions; however, the investigator did not find statistically significant decreases in stress compared with controls in the graduate student population. Additional studies should use the PSS to measure a change in stress over time (4 weeks) in varying populations to better understand this variable. Results of this dissertation study were consistent with visual analog scales in other studies identifying statistically significant changes in stress or anxiety levels for participants engaging in therapy dog programming (Barker et al., Binfet et al., 2018; Stewart et al., 2014). Future studies should continue to use visual analog scales to measure situational or episodic stress and anxiety as well as to measure stress and anxiety over time and compare results with those found on VAS to better understand the efficacy of AAI on short-term versus long-term stress/anxiety levels.

Occupational performance. The effect of AAI on occupational performance of education has not been studied in the college student population. Furthermore, performance and satisfaction of the occupation of education using the COPM was not found to be statistically significant when comparing participants who engaged in therapy dog programming compared with those who have not. After reviewing statements from participants described above in the occupational performance section of Interpretation of Results, participants hinted at needing to take break from the occupation of education. Boyt and Schell (2014) describe social participation as an interweaving of occupations to support engagement involving friends, and Parham and Fazio (1997) defined leisure as "nonobligatory activity that is intrinsically motivated and engaged in during discretionary time, that is, time not committed to obligatory occupations such as work, self-care, or sleep" (p. 250). Future studies should consider studying therapy dog programming as leisure occupation or to support social participation. The investigator still believes therapy dog

programming has the potential to affect occupation; however, it may be more appropriate to investigate how or if therapy dog programming can affect or promote occupational balance as many students hinted at needing a break from the occupation of education during the school day. An additional suggestion may be to study involvement of therapy dog programming as part of graduate student routine.

Adjustment to graduate student role. At first, the investigator was surprised experimental participants did not show significant increases in adjustment to graduate student role; however, upon further reflection, it is likely graduate students developed a skillset that assisted them when transitioning from high school to undergraduate work and was applied when adjusting from undergraduate work to graduate/professional level work. Although students in the experimental group did not experience a significant increase in adjustment to graduate student role compared with participants in the control group, previous research has demonstrated therapy dog programming to affect students' perception of the environment and connectedness to campus. However, this research was only completed in the undergraduate population. Future investigators should investigate the effect of therapy dog programming on graduate students' perception of their environment and connectedness to campus.

Qualitative methods. Over the past 10 years, the number and rigor of quantitative studies of animal assisted intervention research has expanded greatly. Specifically, in the college student population, research has aligned in demonstrating positive outcomes of decreased mental health symptoms and increased well-being, mood, and satisfaction with QOL. Looking ahead, researchers need to conduct rigorous qualitative studies that answer *how* and *why* animal assisted intervention works. Qualitative information will present valuable progress toward the explanation of animal assisted intervention in this population and has the potential to assist in developing population-specific tools to be used for AAI programming.

Limitations and Delimitations

Although the ultimate goal was to develop a rigorous dissertation study, every research design has limitations and delimitations. The fact that the control group participants were not participating in a similar 35-minute weekly session with removal of the independent variable is the biggest threat to this study; however, it is highly likely students would choose not to participate in the study if they had an understanding that they were not receiving the weekly therapy dog intervention of AAA. Therefore, the students in the control group were told they were on the waitlist after completing pretest data. They were given the option to engage in the intervention 6 weeks later after being told they were off the waitlist and completing posttest data. The time constraints of semesters put an additional limitation on the study as the investigator needed to ensure it was possible to allow for 6 weeks due to potential of students' schedules changing, beginning clinical/intern work, or graduating. Future researchers may want to consider ways to incorporate flexibility in scheduling to combat schedule changes. Additionally, future studies should consider measuring the intervention at a variety of different size campuses in different geographical regions. An additional delimitation is the quantitative nature of the research design. Additional qualitative information, such as interviews, focus groups, or journaling, could provide further insight of student experiences adding value to this content area. Lastly, a delimitation is the specific activities allowed during AAA intervention that differed from participant to participant and group to group. The investigator listed accepted activities during informed consent, giving the participants the choice to interact freely (within accepted activities); therefore, the frequency and type of interaction varied from group to group.

Summary

The investigator in this dissertation study contributed significant findings to better understand the effect of AAI on graduate student well-being through presenting statistically

significant results in QOL, stress, and anxiety and providing a rich discussion surrounding

occupational performance and adjustment to graduate student role, which did not demonstrate

statistical significant results. The investigator's results in increased QOL and decreased stress

and anxiety aligned with results from researchers that explored these variables in the

undergraduate college population. It was suggested that different aspects of occupational

performance be explored in future studies, such as therapy dog as a leisure occupation, social

participation, routine, and occupational balance. Furthermore, it may be interesting to study

the effect of therapy dog programming on graduate students' environment versus adjustment

to graduate student role. It is likely graduate and professional students have developed a

skillset related to transitions that enables them to adjust with limited difficulties based on past

experiences. Additionally, the difference between stress and anxiety should be explored as

well as the effect of AAI on short-term and long-term stress and anxiety levels. Finally, the

biophilia hypothesis and PEO theories are very appropriate frameworks for further

exploration of the effect of AAI on college students. The results from this study demonstrate

significant potential for inclusion of a low-cost intervention and therapy dog programming on

college campuses, specifically in graduate programs, to reduce growing mental health

concerns in this population.

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Appendix A

WHOQOL-BREF

Instructions:
This assessment asks how you feel about your quality of life, health, or other areas of your life. **Please answer all the questions.**
If you are unsure about which response to give to a question, **please choose the one** that appears most appropriate. This can often
be your first response. Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last two weeks.** For
example **(as practice),** thinking about the last two weeks, a question might ask:

You should circle the number that best fits how much support you got from others over the last two weeks. So you would circle the number 4 if you got a
great deal of support from others as follows.

	Not at all	Not much	Moderately	A great deal	Completely
Do you get the kind of support from others that you need?	1	2	3	4	5

You would circle number 1 if you did not get any of the support that you needed from others in the last two weeks.

	Not at all	Not much	Moderately	A great deal	Completely
Do you get the kind of support from others that you need?	1	2	3	4	5

Please read each question, assess your feelings, and circle the number on the scale for each question that gives the best answer for you

		Very poor	Poor	Neither poor nor good	Good	Very good
1	How would you rate your quality of life?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last two weeks

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2	How satisfied are you with your health?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	An extreme amount
3	To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4	How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
5	How much do you enjoy life?	1	2	3	4	5
6	To what extent do you feel your life to be meaningful?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
7	How well are you able to concentrate?	1	2	3	4	5
8	How safe do you feel in your daily life?	1	2	3	4	5
9	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about **how completely** you experience or were able to do certain things in the last two weeks.

		Not at all	A little	Moderately	Mostly	Completely
10	Do you have enough energy for everyday life?	1	2	3	4	5
11	Are you able to accept your bodily appearance?	1	2	3	4	5
12	Have you enough money to meet your needs?	1	2	3	4	5
13	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
14	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5

		Very poor	poor	Neither poor nor good	Good	Very good
15	How well are you able to get around?	1	2	3	4	5

The following questions ask you to say how **good or satisfied** you have felt about various aspects of your life over the last two weeks.

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16	How satisfied are you with your sleep?	1	2	3	4	5
17	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18	How satisfied are you with your capacity for work?	1	2	3	4	5
19	How satisfied are you with yourself?	1	2	3	4	5
20	How satisfied are you with your personal relationships?	1	2	3	4	5
21	How satisfied are you with your sex life?	1	2	3	4	5
22	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23	How satisfied are you with the conditions of your living place?	1	2	3	4	5
24	How satisfied are you with your access to health services?	1	2	3	4	5
25	How satisfied are you with your transport?	1	2	3	4	5

The following question refers to **how often** you have felt or experienced certain things in the last two weeks.

		Never	Seldom	Quite often	Very often	Always
26	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	1	2	3	4	5

Appendix B

Perceived Stress Scale

Instructions

The questions in this scale ask you about your feelings and thoughts during the last month.
In each case, you will be asked to indicate by circling *how often* **you felt or thought a certain way.**

	NEVER	ALMOST NEVER	SOMETI MES	FAIRLY OFTEN	VERY OFTEN
In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
In the last month, how often have you felt nervous and "stressed"?	0	1	2	3	4
In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
In the last month, how often have you felt that things were going your way?	0	1	2	3	4
In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
In the last month, how often have you felt that you were on top of things?	0	1	2	3	4
In the last month, how often have you been angered because of things that were outside of your control?	0	1	2	3	4
In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Appendix C

PROMIS Emotional Distress–Anxiety-Short Form

Anxiety in your Life

Instructions: Listed below are symptoms you **may** have felt in the past seven days. Indicate (by circling) how often you experienced each statement in the past seven days.

IN THE PAST SEVEN DAYS….	NEVER	RARELY	SOMETIMES	OFTEN	ALWAYS
1. I felt fearful.	1	2	3	4	5
2. I felt anxious.	1	2	3	4	5
3. I felt worried.	1	2	3	4	5
4. I found it hard to focus on anything other than my anxiety.	1	2	3	4	5
5. I felt nervous.	1	2	3	4	5
6. I felt uneasy.	1	2	3	4	5
7. I felt tense.	1	2	3	4	5

Appendix D

Occupational Satisfaction and Performance Rating Scale

Modeled after the COPM with permission

Please circle the appropriate number for your **performance** and **satisfaction** for each question.

Questions	Performance										Satisfaction									
	Not Able To Do It									Able To Do It Extremely Well	Not Satisfied At All									Extremely Satisfied
How well are you able to complete coursework for your classes?	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
How well are you able to participate during lectures?	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
How well do you do on examinations in your classes?	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
How well do you do in extracurricular activities?	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

Appendix E

Student Adaptation to College Questionnaire

Purchased SACQ assessment and scoring sheets–Do not have permission to reproduce

Appendix F

Stress Visual Analog Scale (SVAS) & Engagement Measure

Participant ID Number: __ __ __

Stress When You Arrived:

| Not At All Stressed | Not Very Stressed | Neutral | Somewhat Stressed | Very Stressed |

Stress Level When You Left:

| Not At All Stressed | Not Very Stressed | Neutral | Somewhat Stressed | Very Stressed |
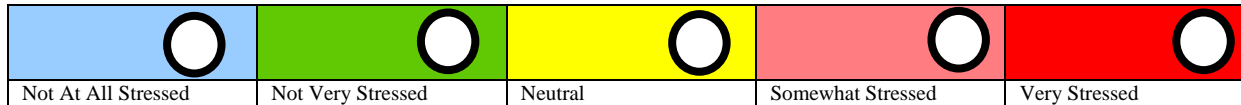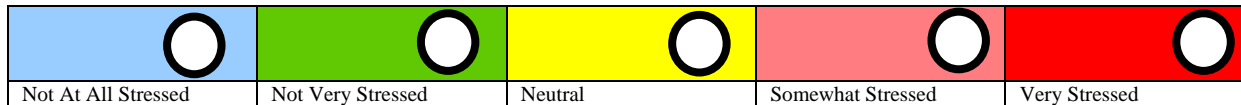
Engagement Scale

Help us understand your interaction with the therapy dog. For this session, how engaged were you? Engagement is demonstrated through eye contact, physically touching, and proximity to the therapy dog.

Rate each of these engagement dimensions for your session today:

Circle one	Not at all	Not often	Neutral	Somewhat often	Very often
I made **eye contact** with the therapy dog	1	2	3	4	5

I **physically touched** (petted) the therapy dog	1	2	3	4	5
	Not at all close	Not very close	Neutral	Somewhat close	Very close
My **physical proximity** to the dog was	1	2	3	4	5

If your engagement was high, what contributed to that?

If it was low, why was the case?

If you found yourself having neutral engagement, why do you think that is?

Appendix G

University Report of Injury Form

Report of Injury

NAME (Last, First, Middle):	SOCIAL SECURITY NO:
RESIDENTIAL ADDRESS (Street Address, City, State, Zip)	TELEPHONE NO(S).

DATE OF INJURY:	TIME OF INJURY:	☐ A.M. ☐ P.M.	WORK START TIME:	☐ A.M. ☐ P.M.

Accident Reported to (name & title):

Witnesses:	Full Name	Address (Street, City, State, Zip)	Telephone No.
1.			
2.			

Treating Physician: Full Name   Address

Hospital (if hospitalized): Full Name   Address

DESCRIPTION OF ALLEGED INJURY–WHAT ITEM CAUSED THE INJURY, BODY PART, AND EVENTS LEADING UP TO AND INCLUDING THE INJURY (PLEASE ATTACH A SECOND PAGE IF NECESSARY):

EXACT LOCATION AND/OR BLDG (including floor, room, etc.):_____

Birthdate (mm/dd/yy)   Sex: ☐ Female
                                             ☐ Male

Employees MUST also complete the following / Injured Students only complete above this line

Tax Filing Status (circle one):	Single Single, Head of Household	Married, Filing Jointly Married, Filing Separately	☐ If married, spouse s supported at least 50% by injured.

No. of Dependent (under age 16) : _____   Other family members supported at least 50% by injured (specify on line below):

Lost Day(s) Due to Injury:☐ Yes ☐ No	Date of Last Day Worked:	Date returned to work/ estimated length of disability:

Your Classification	Your Department	# of Hours Worked Per Week:	DATE OF HIRE:

Do you have a SECOND EMPLOYER?: ☐ Yes ☐ No: If yes, Company Name and Complete Address:

Public Safety Contacted: ☐ Yes☐ No Case # _____

I Am Currently Enrolled As A Medicare (Not Medicaid) Beneficiary: ☐ No ☐ Yes, HCN# _____

Your WSU Supervisor's Complete Name, Phone Number and E-mail Address:

Appendix H

Participant Packet

Participant number _____   DOB (month/date) _____   Date _____

Before you begin, we would like to ask you a few general questions about yourself: by circling the correct answer or filling in the space provided.

What is your **gender?**   Male   Female   Other: _____

How would you describe your racial/ethnic   White

affiliation?   Black
                                                         Latino
                                                         African-American
                                                         Asian-American
                                                         Arab-American
                                                         Mixed Race
                                                         Other: _____

What is the highest **educational level** you   Associates Degree
received?

                                                         Bachelor Degree

                                                         Master's Degree

                                                         Doctoral Degree

What was the field of study for your
undergraduate degree?

_____

What is the field of study for your graduate
degree?

_____

Current academic standing:

_____

(ex: PY1)

Semester: Fall   Winter   Spring
          Summer

Do you currently own a pet dog?   _____

Have you previously owned a pet dog?   _____

"Feelings about Your Life"

Instructions:

This assessment asks how you feel about your quality of life, health, or other areas of your life. **Please answer all the questions.**
If you are unsure about which response to give to a question, **please choose the one** that appears most appropriate. This can often be your first response. Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last two weeks.**
For example, thinking about the last two weeks, a question might ask:

Practice Question

		Not at all	Not much	Moderately	A great deal	Completely
	Do you get the kind of support from others that you need?	1	2	3	4	5

You should circle the number that best fits how much support you got from others over the last two weeks. So, you would circle the number 4 if you got a great deal of support from others as follows.

		Not at all	Not much	Moderately	A great deal	Completely
	Do you get the kind of support from others that you need?	1	2	3	4	5

You would circle number 1 if you did not get any of the support that you needed from others in the last two weeks

The following questions ask about **how much** you have experienced certain things in the last two weeks

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2	How satisfied are you with your health?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	An extreme amount
3	To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4	How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
5	How much do you enjoy life?	1	2	3	4	5
6	To what extent do you feel your life to be meaningful?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
7	How well are you able to concentrate?	1	2	3	4	5
8	How safe do you feel in your daily life?	1	2	3	4	5
9	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about **how completely** you experience or were able to do certain things in the last two weeks.

		Not at all	A little	Moderately	Mostly	Completely
10	Do you have enough energy for everyday life?	1	2	3	4	5
11	Are you able to accept your bodily appearance?	1	2	3	4	5
12	Have you enough money to meet your needs?	1	2	3	4	5
13	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
14	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5

		Very poor	poor	Neither poor nor good	Good	Very good
15	How well are you able to get around?	1	2	3	4	5

The following questions ask you to say how **good or satisfied** you have felt about various aspects of your life over the last two weeks.

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16	How satisfied are you with your sleep?	1	2	3	4	5
17	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18	How satisfied are you with your capacity for work?	1	2	3	4	5
19	How satisfied are you with yourself?	1	2	3	4	5

20	How satisfied are you with your personal relationships?	1	2	3	4	5
21	How satisfied are you with your sex life?	1	2	3	4	5
22	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23	How satisfied are you with the conditions of your living place?	1	2	3	4	5
24	How satisfied are you with your access to health services?	1	2	3	4	5
25	How satisfied are you with your transport?	1	2	3	4	5

The following question refers to **how often** you have felt or experienced certain things in the last two weeks.

		Never	Seldom	Quite often	Very often	Always
26	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	1	2	3	4	5

Stress in Your Life

Instructions: The questions in this scale ask you about your feelings and thoughts during the last month. **In each case, you will be asked to indicate by circling** *how often* **you felt or thought a certain way.**

	NEVER	ALMOST NEVER	SOMETI MES	FAIRLY OFTEN	VERY OFTEN
1. In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3. In the last month, how often have you felt nervous and "stressed"?	0	1	2	3	4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
5. In the last month, how often have you felt that things were going your way?	0	1	2	3	4
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
7. In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
8. In the last month, how often have you felt that you were on top of things?	0	1	2	3	4
9. In the last month, how often have you been angered because of things that were outside of your control?					

	0	1	2	3	4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Anxiety in your Life

Instructions: Listed below are symptoms you **may** have felt in the past seven days. Indicate (by circling) how often you experienced each statement in the past seven days.

IN THE PAST SEVEN DAYS….	NEVER	RARELY	SOMETI MES	OFTEN	ALWAYS
1. I felt fearful.	1	2	3	4	5
2. I felt anxious.	1	2	3	4	5
3. I felt worried.	1	2	3	4	5
4. I found it hard to focus on anything other than my anxiety.	1	2	3	4	5
5. I felt nervous.	1	2	3	4	5
6. I felt uneasy.	1	2	3	4	5
7. I felt tense.	1	2	3	4	5

Student Adaptation to College Questionnaire

Purchased SACQ assessment and scoring sheets–Do not have permission to reproduce

Posttest Data Open Ended Questions: Graduate College Student Role / Occupational

Engagement

1. Is there anything else you would like me to know?

2. Why did you choose to participate in this study? (explain)

3. When you think of your six visits and interactions with the therapy dogs, describe what stands out for you? What is especially memorable?

4. Generally, across all six visits, what are words that describe how you felt before and after visiting with the therapy dog?

Before	After
1.	1.
2.	2.
3.	3.

5. Spending time with a therapy dog made me a better student. (circle one)

Strongly Disagree   **Strongly Agree**

1   2   3   4   5

Why or why not:

6. In which clinical professions is the use of therapy dogs most applicable. (List the top 3; with 1 being the most important)

    1. _____

    2. _____

    3. _____

7. After spending six sessions with a therapy dog, what are three adjectives that describe a therapy dog? For each word, circle if the adjective is a positive, negative, or neutral descriptor?

    1. _____   Positive   Neutral   Negative

    2. _____   Positive   Neutral   Negative

    3. _____   Positive   Neutral   Negative

8. What is your feedback regarding the **length** of 35-minutes with the therapy dog?

9. What is your feedback regarding the **length** of the six-week program?

10. Did any significant events occur in your life during the duration of this study? If so, on what date? Please explain.

End of Packet

Stress Scale

Participant ID Number: __ __ __

Stress When You Arrived:

Not At All Stressed	Not Very Stressed	Neutral	Somewhat Stressed	Very Stressed

Stress Level When You Left:

Not At All Stressed	Not Very Stressed	Neutral	Somewhat Stressed	Very Stressed

Help us understand your interaction with the therapy dog. For this session, how engaged were you? Engagement is demonstrated through eye contact, physically touching, and proximity to the therapy dog.

Rate each of these engagement dimensions for your session today:

Circle one	Not at all	Not often	Neutral	Somewhat often	Very often
I made **eye contact** with the therapy dog	1	2	3	4	5
I **physically touched** (petted) the therapy dog	1	2	3	4	5
	Not at all close	Not very close	Neutral	Somewhat close	Very close

My **physical proximity** to the dog was	1	2	3	4	5

If your engagement was high, what contributed to that?

If it was low, why was the case?

If you found yourself having neutral engagement, why do you think that is?

Appendix I

Study Procedures

1. The PI submitted an IRB to the host University for approval. The approval included the host University's IRB Authorization to be the IRB of Record for Collaborating Entity Protocol Approval Agreement form signed by both the host University and Nova Southeastern University's IRBs.

2. The PI used research randomizer to develop a randomized sequence of numbers identifying a predetermined sequence for participant cohorts to be assigned to the control or experimental groups based on the order they contacted the investigator (Urbaniak & Plous, 2013). The investigator screened the participants in each self-chosen group for inclusion and exclusion criteria. The participants enrolled in the study in self-chosen groups of three to five, and this grouping did not affect the order of assignment for the next participant group that contacted the investigator. This process was repeated until the investigator reached a minimum of 104 participants (a minimum of 102 participants were needed). This method of randomization was selected to allow for randomization to occur and for students to engage in the intervention under typical AAA circumstances: small group interaction.

3. The PI entered the date of enrollment, participant IDs, and contact information into an excel spreadsheet in order of enrollment. The subject excel data file was stored on the investigator's password-protected computer. Signed informed consent documents were stored in a file and locked in the investigator's office.

4. Next, all participants were required to review and sign a packet, including animal welfare standards that were developed by Animal Assisted Intervention International, basic

obedience commands, and approved activities to engage in during therapy dog

intervention sessions.

5. Between one and seven groups completed pretest outcome data and began the study each

    week, and a staggered implementation approach was used. The number of groups

    beginning each week differed because the investigator needed to be flexible to meet

    student groups' scheduling needs. Pretest data measures completed by participants before

    the first intervention session in a packet and included demographic data, WHOQOL-

    BREF, PSS, PROMIS Emotional Distress-Anxiety short form, and SACQ. Participants

    remained in the same groups with the same therapy dog/handler team and engaged in 35-

    minute interventions on the same day at the same time throughout the duration of the six-

    week therapy dog program. Following informed consent and pretest data collection, the

    control groups were told they were on a waitlist, and the experimental groups engaged in

    35 minutes of therapy dog intervention, AAA, once a week for 6 weeks.

6. The weekly 35-minute intervention session included three to five participants, a therapy

    dog, and handler. The activities participants were allowed to engage in were discussed in

    the informational packet signed by each participant and included petting, talking,

    walking, sitting, and playing with toys with the therapy dog. All participants in the

    experimental group completed the SVAS at the start and end of each intervention session.

    A stopwatch was be used to start and end the intervention to ensure the intervention was

    exactly 35 minutes in duration.

7. At the end of Week 6, experimental participants and control group participants completed

    posttest data, including WHOQOL-BREF, PSS, PROMIS Emotional Distress-Anxiety

short form, and SACQ. Additionally, participants in the experimental group completed

open-ended questions that pertained to engagement in the therapy dog program.

8. After posttest data from control group participants were collected, they were given the

option begin the six-week therapy dog program.