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The Effects of a Therapy Animal on College Student Stress and Arousal

Michelle Bjick
St. Catherine University

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The Effects of a Therapy Animal on College Student Stress and Arousal

Submitted by

Michelle Bjick, BA, LSW

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MSW Clinical Research Paper

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Committee Members:

Katharine Hill, Ph.D., MSW, LISW (Chair)
Patti Anderson, M.Ed., C.P.D.T.
Tanya Bailey, MSW, LICSW

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

Abstract

Colleges are facing increasing levels of distressed students and need a wide variety of tools to assist them. One such modality is animal-assisted interaction; an integrative practice with minimal side effects. This study attempted to demonstrate that spending time with animals will decrease a college student's stress level. It was based on a 2004 study by Charnetski, Brennan and Riggers which studied the effect of a dog on college students' immune systems. This study consisted of four groups: the control group, a group that experienced explicit observation of a therapy rabbit, a group that experienced implicit observation of the therapy rabbit, and a group that stroked a stuffed rabbit. The 32 participants in this study were all female, primarily baccalaureate students between 18 – 20 years old, from a small, private, Midwestern university. Before and after the experience, students indicated their stress and arousal level using the Stress Arousal Checklist (MacKay, Cox, Burrows & Lazzarini, 1978). All four groups demonstrated a statistically significant decrease in stress level after their experience. An interesting pattern occurred in their arousal levels; the control groups' arousal level decreased, the stuffed rabbit group experienced no change, and both of the groups who were exposed to the rabbit had an increase in their arousal level. The enthusiasm college students demonstrate toward animals may mitigate some of the excuses students use for not engaging in traditional mental health techniques. Incorporating registered therapy animals for this work offers an effective way to assist students who are experiencing stress.

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Table of Contents

| | |
|--|-----|
| Abstract..... | i |
| Acknowledgements..... | ii |
| Table of Contents..... | iii |
| List of Tables..... | v |
| List of Figures..... | vi |
| Introduction..... | 2 |
| Literature Review..... | 4 |
| History..... | 4 |
| Definition of Terms..... | 6 |
| Risks..... | 8 |
| Social Benefits..... | 10 |
| Physical Health Benefits..... | 11 |
| Mental Health Benefits..... | 11 |
| Animals in a College Setting..... | 13 |
| Conceptual Framework..... | 15 |
| Attachment Theory..... | 15 |
| Social Support Theory..... | 16 |
| Biophilia Hypothesis..... | 16 |
| Methods..... | 18 |
| Subject..... | 18 |
| Setting..... | 19 |
| Procedure..... | 20 |
| Data Collection..... | 21 |
| Analysis Technique..... | 22 |
| Limits of Research..... | 23 |
| Findings..... | 23 |
| Descriptive Statistics..... | 23 |
| Student Stress Pre-test and Post-test Information..... | 26 |
| Student Arousal Pre-test and Post-test Information..... | 28 |
| Student Follow-up Stress and Arousal Information..... | 30 |
| Inferential Statistics..... | 32 |
| Paired T-test of Pre- and Post-Test Scores for all Participants..... | 33 |
| Correlation between PAS and Stress and Arousal Post-test Change..... | 36 |

| | |
|---|----|
| Independent Samples T-tests Comparing Stress and Arousal Changes between Two Different Groups..... | 37 |
| Paired Samples T-test Comparing Stress and Arousal Post-test and Follow-up Scores | 38 |
| Paired T-test Post and Follow-up Scores for Stress and Arousal by Group | 39 |
| Discussion | 41 |
| Limitations of this Study..... | 43 |
| Implications for Social Work Research | 44 |
| Implications for Social Work Practice | 47 |
| Conclusion | 48 |
| References..... | 50 |
| Appendix A. Consent Form | 56 |
| Appendix B. Pre-test Questionnaire | 59 |
| Appendix C. Post-test/Follow-up Questionnaire | 62 |
| Appendix D. Recruitment Notice Materials | 63 |

List of Tables

| | |
|---|----|
| Table 1. Participant Year in College..... | 23 |
| Table 2. Age Range of Participants | 24 |
| Table 3. Race of Participants | 24 |
| Table 4. Student Pet Attitude Scale | 25 |
| Table 5. Student Stress Pre-test and Post-test Scores | 27 |
| Table 6. Student Arousal Pre-test and Post-test Scores | 28 |
| Table 7. Student Stress Follow-up Scores | 30 |
| Table 8. Student Arousal Follow-up Scores | 31 |
| Table 9. Statistics of All Student Stress & Arousal Pre-test and Post-test Scores..... | 33 |
| Table 10. T-test of All Student Stress & Arousal Pre-test and Post-test Scores..... | 33 |
| Table 11. Student Stress and Arousal Change by Group..... | 35 |
| Table 12. Descriptive Statistics..... | 36 |
| Table 13. Correlations between Pet Attitude and Stress Change..... | 36 |
| Table 14. Correlations between Pet Attitude and Arousal Change | 36 |
| Table 15. Statistics of All Student Stress and Arousal Post-test..... and Follow-up Scores | 39 |
| Table 16. T-test of Student Stress and Arousal Post-test Scores and Follow-up..... | 39 |
| Table 17. Statistics of Student Stress Post-test and Follow-up Scores | 40 |
| for Group 1 & 2 | |
| Table 18. T-test of Student Stress Post-test and Follow-up Scores | 40 |
| for Group 1 & 2 | |

List of Figures

| | |
|--|----|
| Figure 1. Student Pet Attitude Scale | 26 |
| Figure 2. Student Stress Pre-test | 27 |
| Figure 3. Student Stress Post-test | 28 |
| Figure 4. Student Arousal Pre-test | 29 |
| Figure 5. Student Arousal Post-test | 30 |
| Figure 6. Student Stress Follow-up..... | 31 |
| Figure 7. Student Arousal Follow-up | 32 |
| Figure 8. Student Stress and Arousal Change by Group | 35 |

Introduction

College is a stressful time for many students. While adjusting to new social and educational environments, students need to perform well academically, carefully manage their time and finances, and begin creating a framework for their future (Misra & Castillo, 2004). Currently nearly 20 million Americans attend college (Chronicle of Higher Education, 2012). Many of these students are struggling. While in the midst of transitions, and facing an array of academic, financial and social challenges, students are at an increased risk of mental illness. According to the annual UCLA survey of the nation's college freshman, students reported the lowest emotional health since the survey first measured this in 1985, an 11.7 percent drop (Hurtado, 2010). According to the National Institute of Mental Health, 18.1% of the U.S. adult population have anxiety disorders in any given year, with almost three fourths of those individuals experiencing their first anxiety episode before the age of 21.5; the traditional age for college students (Kessler, Chiu, Demler & Walters, 2005).

Even emotionally savvy students will face increased stress as they find themselves away from their lifelong support systems. The current generation of college students has been raised in a culture of overly-involved parents and a highly structured childhood full of activities and programs, making the transition to autonomy and freedom even more challenging than for previous generations (Bland, Melton, Welle & Bigham, 2012). This stress can be compounded as college students are vulnerable to stress “carry-over,” a condition where stress experienced in one area of their life, whether at home, in a class, at work, or with a roommate, can increase the stress in other areas (Pederson, 2012). The stress of college students has major implications on health care costs.

According to the latest research in the *Journal of Clinical Psychiatry*, health costs for treating anxiety alone are more than \$42 billion dollars a year (Greenberg, Sisitsky, Kessler, Finkelstein, Berndt, Davidson, Ballenge & Fyer, 1999). Currently, colleges are facing increasing levels of distressed students and will need to have a wide variety of tools to assist them.

One such modality is animal-assisted interaction; a low-cost, low-risk, integrative practice with minimal side effects. The relationship between human beings and animals has existed almost since the beginning of recorded time. The practical advantages of co-existing with animals have long centered on animals as a source of food or labor, with companionship being simply a bonus. It is relatively recent that the intrinsic benefits of animal companionship have surfaced and begun to be explored. Contemporary research has documented the holistic effect animals have on human beings (Becker, 2002; Chandler, 2005; Fine, 2006; Miller, 2010; Saxton, 2009). Broadly defined as Animal-Assisted Interactions (AAI), the benefits animals provide can be harnessed in a structured way to assist individuals who are facing a crisis or desire growth in their physical, emotional, social, cognitive, or spiritual realm.

Young adults are a cohort where current AAI research has not focused, in spite of the high prevalence of stress in college students (Bland et al., 2012; Pedersen, 2012). Yet, there remains incredible interest in AAI on the part of these students. One study found 96% of the students surveyed expressed a positive interest in a “pet therapy” program on campus (Adamle, Riley & Carlson, 2009, p. 546). A need remains for justification to allow the benefits of AAI, but alleviate any potential risks. As Beck & Katcher (2003) caution, “To justify any risk associated with animal contact, we must

demonstrate a value to the patient.” Therefore, the purpose of my research is to document whether spending time with a therapy animal decreases a college student’s self-reported stress level. Rather than being based “on warm fuzzy feelings and not on scientific data,” this study attempted to document that short-term exposure to a therapy animal can reduce the stress level of a college student (Rovner, 2012).

Literature Review

History. Florence Nightingale was the first prominent clinician to observe the positive influence of animals in a health care setting. She documented the many benefits of small companion animals on her chronically-ill patients (Fine, 2006; Hooker, Holbrook Freeman, & Stewart, 2002; Morrison, 2007; Pichot & Coulter, 2006; Rovner, 2012; Sorrell, 2006). Her contemporary, Boris Levinson, is considered by many to be the founder of AAI in a therapy setting. In the early 1960’s, he unintentionally discovered the benefits of an animal as a co-therapist when his dog, Jingles, facilitated a breakthrough to a disturbed child who previously had been uncommunicative (Chandler, 2005; Fine, 2006; Hooker et al., 2002; Havener, Gentes, Thaler, Megel, Baun, Driscoll, Beiraghi & Agrawal, 2000; Thompson, 2005).

One of the pioneers of modern research is Erika Friedmann, an expert in the field of human-animal interactions. Friedmann created some of the most frequently cited studies of AAI, which scientifically documented the impact of animals on humans (Brodie & Biley, 1999; Giaquinto & Valentini, 2009; Havener et a., 2000; Herzog, 2011; Hooker et al., 2002; Johnson & Meadows, 2002; Morrison, 2007; Rovner, 2012; & Wilson & Barker, 2003). A 1980 study reviewed the one-year survival rate of 92 individuals who experienced a heart attack, comparing patients who owned a pet and

those who did not. The pet owners had a greater survival rate than those without pets (Friedmann, Katcher, Lynch, & Thomas). A separate 1980 study found a meditative reaction in individuals petting a dog, which lowered the person's state of arousal, allowing the body to relax (Katcher & Friedmann). In 1983, Friedmann's study measured the impact of a dog's presence on children, both while resting and during a mildly stressful activity. The study found a significantly lower blood pressure for children engaged in both activities when the dog was present (Friedmann, Katcher, Lynch, Thomas & Messent).

Since then, the beneficial effect of animals on various aspects of a human's physical, mental and emotional health have been studied in a myriad of settings, often focusing on locations where individuals have some degree of permanence, such as long-term care facilities, hospitals, schools, or prisons (Brodie & Biley, 1999; Jordan & Brady, 2004; Kawamura, Niiyama & Niiyama, 2007; Morrison, 2007; Rovner, 2012). Other studies have focused on the benefits to specific audiences such as the elderly, children, families, military personnel, psychiatric patients, those who are dying, and those who have been abused (Barker, Barker, & Knisely, 2012; Brodie & Biley, 1999; Kawamura, et al., 2007; Morrison, 2007; Muschel, 1984; Ruiz, 2012). Research has also documented the positive impact of animals on individuals with specific disorders such as autism, dementia, mental disorders, neurological disorders, physical disabilities and substance abuse issues (Barker et al., 2012; Kawamura, et al., 2007; Morrison, 2007; Muschel, 1984; Ruiz, 2012).

Today, Pet Partners (formerly Delta Society) is a leading organization in AAI. A national, non-profit organization founded in 1977, Pet Partners seeks to be, "the leader in

demonstrating and promoting positive human-animal interaction to improve the physical, emotional and psychological lives of those we serve” through communication of research, education of professionals, and training programs for therapy animals and their handlers (Pet Partners, 2012). Pet Partners is attempting to create some uniformity in this relatively new and rapidly growing field by establishing a training certification process that registers therapy animals and therapy animal handlers, as well as working to standardize the terms for this developing field. The typical therapy animal is a dog, although Pet Partners registers many species of non-farm, domesticated animals such as cats, rabbits, miniature horses, guinea pigs, and birds (Pet Partners, 2012).

Definition of Terms. There is a continuum of services which incorporate animals into a healing relationship with humans. Service animals are animals “individually trained to provide assistance to an individual with a disability” (Americans with Disabilities Act, 1990). There is an important distinction between a service animal and a therapy animal. Service animals are understood to be a tool for their owner, whereas the therapy animal is viewed as a treatment intervention (Fine, 2006). Because service animals are viewed as a tool, they are not legally viewed as pets. An animal owned by an individual for companionship is often referred to as a pet, companion animal or domesticated companion (Giaquinto & Valentini, 2009). Animal companions can offer their owners a sense of non-verbal reassurance and tactile comfort that may help fend off symptoms of loneliness and social isolation (Brodie & Biley, 1999). Even in this conventional relationship, companion animals have an impact on the health of their owner, as W.P. Anderson’s (1992) study on cardiovascular disease found. Of the 5,741 Australians who were screened for this disease, pet owners had significantly lower

systolic blood pressure and triglyceride levels than non-pet owners (cited in Brodie & Biley, 1999 and Stanley-Hermanns & Miller, 2002).

As a nascent field, terminology is not universally accepted. AAI may also be referred to as pet therapy, pet-facilitated therapy, animal-assisted therapy, or animal companionship. For clarity, this paper will use the terms as offered by Pet Partners. AAI is the overarching term under which there are two structured types of AAI: animal-assisted activities (AAA) and animal-assisted therapy (AAT). AAA is understood as a casual “meet and greet” by a trained animal and animal handler team to provide “opportunities for motivational, educational, recreational, and/or therapeutic benefits to enhance quality of life” (Pet Partners, 2012). AAA has neither treatment expectations nor a specific time frame for the interactions. Best practices limit overall time spent to two hours a day or less for the health and well-being of the animal. Similar activities are repeated with many people, such as playing, walking, feeding treats, stroking or other close physical contact (Chandler, 2005; Fine, 2006; Pichot & Coutler, 2006; Van Pelt, 2010). A study compared two groups of elderly residents in a long-term care facility. One group of residents was exposed to AAA; whereby they interacted with puppies and their handlers, and the other group spent an equal amount of time with only human visitors. The study showed marked improvement in the social interaction, psychosocial function, life satisfaction, mental functioning, level of depression, social competence and psychological well-being in the animal-interaction group compared with the group who only interacted with humans (Cusack & Smith, 1984).

Alternatively, AAT is a therapeutic, goal-directed interaction between the animal-human team and the patient (PetPartners, 2012). Each visit has individualized treatment goals and a set amount of time for each visit based on the patient’s needs. Treatment can

relate to physical or mental health. Typical mental health goals would be rapport building, stress reduction, and increasing trust. Physical goals might be related to fine motor coordination, such as brushing the fur of the therapy animal a certain number of strokes during physical therapy, or speaking commands to the animal in speech pathology (Anderson, 2011). AAT sessions are conducted by a licensed professional, who practices within the scope of his or her profession, such as a social worker, psychologist, or rehabilitation therapist. The professional facilitates the session, maintains written progress notes, and aims to improve the social, cognitive, physical, or emotional needs of the patient through individualized care. The animal handler may be the licensed professional or the professional may coordinate services with a trained therapy animal handler (Anderson, 2011; Chandler, 2005; Delta Society, 2012; Fine, 2006; King, 2007; Pichot & Coutler, 2006; Thompson, 2005; Van Pelt, 2010). Barker & Dawson (1998) compared the effect of AAT with more traditional recreational therapy on 231 acute psychiatric patients. After a single session, both types of therapy positively impacted the level of anxiety in patients with mood disorders. However, patients who experienced psychotic, cognitive and other mental disorders only benefitted from the AAT session (Barker, Barker & Knisely, 2012).

Risks. Of all the literature that exists about AAI, there is relatively little mention of risk to the human. The only severe danger reported was a dog bite to a young child which resulted in the suspension of a study examining the affect of trained PTSD service dogs for military veterans (Huus, 2012; Ruiz, 2012). Most dangers focus on possible allergic reaction or increase in stress from individuals who are afraid of dogs (Haubehofer & Kirchengast, 2006; St. Onge, 2000; Sorrell, 2006). Zoonosis, or

interspecies transmission of disease between humans and animals, is a potential risk from interacting with animals (Brodie & Biley, 1999; Coughlan, Olsen, Boxrud & Bender, 2010, and Fine, 2006). However, there are few documented reports of zoonoses during AAI. Registered therapy animal handlers are taught of this risk, and proper hand hygiene is encouraged (Anderson, 2011). Registered therapy animals are required to be free of disease as part of the registration process, and animals must be properly groomed prior to each session (PetPartners, 2012). By following these best practices, using a registered therapy animal, and adequately screening participants as to allergies or animal fears prior to introducing the animal to a human during a study, these are manageable risks.

More difficult to control is risk to the animal. In certain psychiatric or corrections settings, without close supervision, a therapy animal may be at risk for intentional harm (Chandler, 2005; King, 2007; Pichot & Coulter, 2006). Visiting high-intensity care facilities or hospitals, an animal is at risk for accidental harm as it quietly crosses paths with feet, a wheelchair, or walker. An animal is also at risk of ingesting dropped medication or other hazardous or toxic items (Pichot & Coulter, 2006). A 2006 study demonstrated participating in therapy increases the cortisol secretions of a therapy dog, indicating a state of elevated stress (Haubenhofner & Kirchengast, 2006). How does the handler know when their therapy animal reaches a dangerous level of stress? Different species demonstrate various behaviors to indicate stress. Registered therapy animal handlers are taught what behaviors to watch for in their species. It is crucial for the handler to know the indications for the species, as well the signs of their individual animal (Anderson, 2011; Pet Partners, 2012). All these potential risks to a therapy animal fuel the debate of whether it is ethical to allow an animal to participate in AAI, or

if it is exploitation of the animal (Zamir, 2006). In an effort to prevent animal exploitation, some research institutions, such as the University of Minnesota, have established committees whose role parallels that of the Institutional Review Boards for human subjects. At the University of Minnesota, this group is called the Institutional Animal Care and Use Committee (IACUC). This group “reviews all projects involving animals to ensure that they are justified by their benefits and minimize any animal pain or suffering that might occur” (UMN, 2010).

Social Benefits. While benefits to therapy animals are questionable, numerous studies have documented the many positive benefits of AAI with various human populations. As Friedmann (1980) found, animals impact human beings in an integrative way: socially, physically, and mentally. According to Brodie and Biley, animals have the ability to incorporate nine enhancements into the life of their human counterpart, which include “providing companionship and pleasurable activity, facilitating exercise, play and laughter, being something to care for and a source of consistency, allowing feelings of security, being a comfort to touch and pleasurable to watch” (1999). Animals increase socialization and alleviate loneliness through their friendliness, openness, and ability to be present. Partially, as King (2007) states, it is because “animals are nonjudgmental, accepting, attentive, don’t talk back, [and] don’t criticize” (p. 2). People do not fear rejection by an animal, and they begin to build trust which spills out into their relationships with people (King, 2007). In addition, animals draw people together by providing an enjoyable yet neutral topic of conversation (Hart, 1995). As Dr. Levinson initially found, therapists can harness this ability to assist in forming a link between

themselves, the animal, and the client, as well as to build rapport (Havener et al., 2000; Hooker et al., 2002).

Physical Health Benefits. A human receives many physical benefits from an animal's presence. A 1983 study by Friedmann, Katcher, Thomas, Lynch and Messent, found when people speak to people, their blood pressure almost always rises. However, when people speak to animals, their blood pressure typically falls and can even fall below the level recorded when a subject is resting quietly (cited in Muschel, 1984; Pichot & Coulter, 2006). In addition to the decrease in blood pressure, animals can lower heart rate and have a calming effect (Brodie & Biley, 1999; Crawford & Pomerinke, 2003; King, 2007; Stanley-Hermanns, M. & Miller, J. 2002). Similarly, AAI has been shown to improve cardiopulmonary health, and have a calming effect on individuals who have suffered from heart failure (Barker, Barker & Knisely, 2012; Cole, Gawlinski, Steers, & Kotlerman, 2007; Friedmann, Katcher, et al. 1980). AAI has also shown positive and statistically significant results with reducing pain levels and improving respiratory rates in a pediatric acute care environment (Braun, Stangler, Narveson, & Pettingell, 2009). Because physical health is closely tied to mental health, human emotional states also show a positive impact from AAI.

Mental Health Benefits. There are many advantages for an individual who is facing mental health issues to take part in AAI. Interacting with an animal can reduce anxiety, despair, depression and stress levels (Becker, 2002). King (2007) also identified that "animals can indirectly make individuals feel better by making strange settings or unfamiliar people seem less threatening" (p. 2). This effect is supported by a study of an adolescent inpatient facility where AAT with a therapy dog was introduced. Analysis

showed the interaction of the dog helped create a sense of calm, safety and protection in adolescents. They viewed the dog as a friend, listener, comforter, teacher, distracter, and therapist (Bardill & Hutchinson, 1997).

Mental health is closely tied to an overall sense of well-being. The well-being of 50 psychiatric patients who took part in AAT was studied by researchers. Data analysis found 47 of the 50 participants improved significantly in the areas of responsibility, physical activity, socialization, self-reliance and general psychological well-being. Researchers attributed the increase to the animals' ability to help "fulfill the two basic psychological needs of patients: to love and be loved, and to feel worthwhile to self and others" (Blankley, 2003). The importance of love and safe, non-threatening affection is a key advantage of AAT (King, 2007; Pichot & Coulter, 2006).

One way of demonstrating affection is through touch. Animals allow a human to "fulfill a person's fundamental need for touch in an uncomplicated way" (Sakson, 2009). The tactile stimulation of stroking a pet offers additional benefits. A study of ten elderly residents at a Texas care facility found that those engaged in petting and cuddling a dog for five minutes a day demonstrated decreased anger, hostility, tension and anxiety (Herzog, 2011; Stanley-Hermanns & Miller 2002). Another study exposed elderly care center residents to farm animals at a "Back-to-the-Farm Day." Observers found "the tactile experience appeared to produce dramatic changes. Very withdrawn or reclusive patients started talking and communicating when given animals to hold, including grinning, laughing and making eye contact" (Kerr & Pratt, 1982). Perhaps fulfilling this need for touch and affection is the key. Dr. Andrew Weil, a pioneer of integrative medicine, stated "one of the most fundamental advantages of AAT over other therapeutic

modalities is that it provides the patient a much-needed opportunity to give affection, as well as receive it. It is this reciprocity - rare among medical therapies - that makes AAT a unique and valuable route to healing” (Pet Partners, 2012). This ability to offer and receive safe, non-threatening, affectionate touch is an intrinsic need many college students are lacking.

Animals in a College Setting. Today’s college students might have even greater needs than previous generations. According to the National Center for Education Statistics, there is a greater percentage of women than men in college, (43 vs. 40 percent), which is true across all racial and ethnic groups (2012). Several studies indicate that college women report higher levels of overall stress than their male counterparts. Additionally, women indicate feeling greater academic pressure than men (cited in Pedersen, 2012). This pressure is compounded by the knowledge that students are graduating with record debt levels. A study by the independent, non-profit Institute for College Access & Success (TICAS) found approximately two-thirds (66%) of college seniors who graduated in 2011 had student loan debt, with an average of \$26,600 for those with loans. Minnesota students graduate with the third highest debt in the nation, with an average of \$29,800. In addition, the students face a challenging job market, with a post-graduation unemployment rate of 8.8 percent, slightly lower than the record high of 9.1 percent on record in 2010 (Reed & Cochrane, 2012).

At a time of growth and transition, faced with the pressures of deadlines, grades and financial worries, while away from their traditional support system, a student can feel overwhelmed. An animal’s presence may offer a comforting alternative, a sense of home; making the environment less fearful or threatening (King, 2007; Thompson, 2005).

Because “animals are living examples of being present and living in the moment,” they can provide an important example to the student (Thompson, 2005). An animal’s natural ability to engage a human provides stimulation and a feeling of connection for the stressed college student, many of whom may be experiencing some degree of loneliness. This gentle contact with an animal draws the student’s focus outside of themselves to interact with the world around them. Their attention is focused on the positive of the animal, instead of ruminating on their own worries or troubles (Pichot & Coulter, 2006). Often when people speak to animals, they unconsciously touch them as well. This is significant as Katcher (1982) has found, “Touching can be highly effective in reducing stress.”

Animals can help alleviate more than stress. In 2004, Charnetski, Brennan & Riggers studied the effect petting a dog had on the immune system of 55 college students. Students were individually exposed to one of three settings: sitting in a quiet room alone, sitting in a quiet room while stroking a stuffed animal, and sitting in a quiet room while stroking a live dog. Saliva samples were taken before and after the time in the room. Results indicated a significant correlation between increased immunity and petting the live dog. The result was consistent whether or not the student previously had a positive attitude toward pets. Using the Charnetski and colleagues (2004) study as a basis for this study, college student participants in this study will spend time in a quiet room, in a quiet room with a stuffed animal, in a quiet room with a live animal visible, and in a quiet room while stroking the animal. This research will attempt to demonstrate a correlation of decreased stress levels by students who have spent time with the live animal; particularly those who actually engaging in stroking it.

Conceptual Framework

As a new and growing field, a nominal amount of literature exists in which researchers and AAI professionals reference theory to guide their work. There are three theories which offer help interpreting this study: attachment theory, social support theory and the biophilia hypothesis. Those will be explored here.

Attachment Theory. Bowlby's Attachment Theory suggests a biological function of protection and security beginning with a mother and her infant. The mere proximity of the mother brings comfort to the child. Once formed, this bond is not easily severed. As the child grows, the attachment continues, but can be generalized to others such as grandparents or a teacher (Sable, 1995). As adults, attachment is more flexible. Individuals may redirect their bond to build an attachment relationship with a network of others. Because of their constant, nonjudgmental presence and responsive behaviors, pets can offer the closeness, stability, and reciprocation an individual requires to form an attachment bond. At times the animal may be a bridge to other human relationships, or in the absence of others, can be a substitute for human attachment. (Brodie & Biley, 1999; Fine 2006; Geist, 2011; Sable 1995). Brodie & Biley suggest humans have an innate reaction to bond with young children, particularly when the young human is dependent on that adult. Animals, who often demonstrate childlike behaviors, can easily activate this response (1999).

There is some disagreement on whether forming bonds with animals, long term, is desirable for humans. To explore this fully is beyond the scope of this study, but briefly, Fine, citing a study by A.J. Cwik (1991), suggests animals should play the role of a transitional object, rather than a substitute for a human relationship (2006). However,

existing literature is relatively unanimous in supporting that during AAI, certain animals can offer the benefit of transitional object, as it is often easier for the client to build trust with the animal, which eventually spreads to the relationship with the client and therapist (Becker, 2002; Brodie & Biley, 1999; Fine, 2006; Havener et al., 2000; Hooker et al., 2002; Sable, 1995).

Social Support Theory. Similar to the Attachment Theory, Social Support Theory speaks to the innate need humans have for relationship in order to maintain psychological well-being. Social companionship offers an individual a feeling of connectedness. Being connected to others illuminates one's self-identity, offers stimulation, provides a venue to give and receive affection, and can serve as external validation (Brodie & Biley, 1999; Fine, 2006). There are positive health benefits associated with these experiences (Beck & Katcher, 2003; Brodie & Biley, 1999). Companion animals, by their continuous presence, have the opportunity to act as a confidante. The uncomplicated nature of this relationship between different species means the animal does not react in a negative way to painful secrets shared or a failure to keep promises (Fine, 2006). The stability of this unconditional positive regard supports a human's sense of well-being, as well as offers a positive model of relational skills.

Biophilia Hypothesis. According to McCulloch (1984), a relatively new hypothesis stems from the "Green Revolution" (cited in Brodie & Biley, 1999). The Green Revolution is defined as "society trying to re-establish links with nature, including plants and animals." E.O. Wilson (1984) posited evolutionary survival was linked to the ability to secure food in hunting animals and gathering plants. Humans developed an innate response to pay attention to the natural world (cited in Beck & Katcher, 2003). At

that same time, Ulrich (1984) produced a landmark study that combined nature and health. He compared hospital stays of those who were exposed to nature and those who were not. His study found patients who had the ability to view nature had a decrease in length of stay, infection rate, need for pain medication, and stress level. Patients, and the staff who tended to them, also had a higher satisfaction level of the experience (cited by Bailey, 2010).

The Biophilia Hypothesis has important ramifications for today's young students. Without the influence of the natural world, Richard Louv, child-advocacy expert and journalist, suggests that this highly technical generation suffers from what he terms as Nature Deficit Disorder. His research posits a correlation between time spent with televisions, computers, video games and smartphones, and increased incidents of obesity, depression, and other behavioral disorders. The lack of interaction with nature impacts the physical and emotional health of this generation (Louv, 2008). Marti Erickson, development psychologist and University of Minnesota professor, agrees. After engaging 5,000 ethnically-diverse, low-income, urban high school students in an outdoor experience, Erickson surveyed their teachers and found 70% of them witnessed a deeper engagement in the school work of these students after the experience, as well as improved classroom attendance (Dooley, 2012).

College students face many stressors while being separated from their traditional support network. Today's college students are facing additional stress with escalating loan debt and an uncertain post-graduation job market. It is no surprise they are experiencing the lowest emotional health on record. If, as Louv's Nature Deficit Disorder suggests, there exists a correlation between time spent with technology instead

of nature and increased incidents of obesity, depression, and other behavioral disorders, the research posits intentional interaction with nature will increase college students' mental health by mitigating some of the stress they experience.

A national study by S.R. Kellert (1980) of 3,107 randomly selected respondents found a strong positive correlation between an individual's educational level and their attitude toward animals; the higher the education level, the more positive the view. Conversely, there was relative disinterest and lack of affection for animals among those least educated (Hoage ed., 1989). If animals can decrease stress and those with more education have a higher level of interest and affection for animals, it would seem animals should be able to decrease the level of stress faced by college students. This study hoped to demonstrate that spending time with animals will positively impact the level of stress experienced by college students.

Methods

Subject. The sample for this study was a nonprobability, convenience sample of college students at a small, private, female-only Midwestern university. This study solicited participation of students who are pursuing an Associate, Bachelor or Graduate degree. All students were invited to participate without regard to age, ethnicity, area of study, or any other characteristic. Information was communicated to potential participants through on-campus flyers, email, electronic campus bulletin board, faculty invitation, and personal invitation. There was a goal of a minimum of 40 participants; 10 participants for each of the four groups. However, only 32 students actually participated, eight in each of the four groups.

Setting. A meeting room on campus was reserved. This same room was used for all groups to minimize any potential influence by the surroundings on the results of the study. The environment of the room included comfortable seating, soft lighting, music, and a window. The music played during the experience was electronic spa music (Balder & Inhofer, 2000). The window was covered so viewing nature outside the window would not impact the results. Individual participants remained in this setting for 18 minutes, the same time allotted by the Charnetski (2004) study on which this project was based.

Group one, the control group, experienced the room as described above. The second group experienced the same setting, but the opportunity to interact with a live Dutch-breed rabbit was added. A rabbit was chosen for several reasons (Anderson, 2011). As a prey animal, it is content to sit still. Rabbits are small and gentle, so a fear of this species is assumed less likely. Rabbits are acceptable to Muslim individuals who practice Islam, and there are a number of Muslim students at this University. The rabbit is a two-year old, therapy rabbit registered by Pet Partners. As Pet Partners requires, the rabbit was held in a small, soft lapbed while wearing a harness attached to a leash. The participant was handed the bed and invited to pet the rabbit. The proper way to stroke a rabbit was demonstrated. This type of direction interaction with an animal which involves focused attention, direct conversation and touch is called Explicit Observation (MacNamara & Moga, 2012).

A third group used the same setting and had the same live therapy rabbit in the room. However, for this group the rabbit remained in her wire cage with food, water and toys, becoming a part of the room's environment. Called Implicit Observation, the rabbit was not discussed nor was direct interaction encouraged, but should serve to externalize

participants' attention (MacNamara & Moga, 2012). The fourth group experienced the same setting; however, a stuffed rabbit was offered to the participants and they were invited to touch it in a manner that felt natural to them. A stuffed rabbit was used so species of animal did not impact the participants' perception of their experience. The purpose of this group was to negate the tactile stimulation of stroking something soft impacting stress level, rather than the interaction of stroking a live animal.

Procedure. Students were randomly assigned to one of the four groups, based on the student's schedule and available appointment times. At the time students volunteered to participate, they were questioned if they had known allergies to rabbits or timothy hay. Those who had allergies were placed in one of the groups without the live rabbit. As an incentive for participation, students were given a \$5 gift card to their choice of two local retailers as compensation.

At the time of scheduling their appointment, students were emailed an electronic copy of the consent form, which had prior approval by the St. Catherine University Institutional Review Board (IRB), as well as by the researcher's instructor and advisor, Dr. Katharine Hill (see Appendix A). The consent form clarified the purpose of the assignment, as well as steps taken to ensure no harm would come to the subject for participating; including maintaining confidentiality. A special note was made that the researcher, who is a staff member at this University, may see the student on campus after participating. Prior to participating in the session, the subjects were offered a printed version of the consent form. The researcher asked participants about their understanding of the study and answered any questions the participants had about it. All volunteers then chose to participate, and signed the consent form.

Students were invited to leave their belongings with the researcher, as they spent time in three different rooms. Students met the researcher at a gathering area in the hallway to complete the consent form. From there the students moved into a computer lab to complete the online questionnaire. After completing their pre-test questionnaire, the participants were led into the research setting. All participants were invited to just sit, listen to the music and try to relax. The students in Group Two who experienced AAI were shown how to hold the rabbit's bed on their lap or cradle it in their arms. They were instructed and shown how to pet the rabbit on her nose, on and between her ears, as well as the top of her back. They were told not to touch her feet or her back near the tail. The participants of Group Four were handed the stuffed rabbit and instructed to touch it in any way that felt natural or enjoyable. After the research experience, the participants returned to the computer lab to complete the post-test.

Data Collection. The subjects were asked to complete an online questionnaire using Qualtrics software (see Appendix B). The questionnaire collected basic demographic information. In addition, they completed The Pet Attitude Scale (PAS), an 18 question survey using a 7-point Likert scale to describe an individual's attitude toward pets (Templer, Salter, Baldwin, Dickey & Veleber, 1981).

The PAS flowed directly into the Stress Arousal Checklist (SACL). The SACL is a 30-item list of adjectives used in the differential measurement of stress and arousal (MacKay, Cox, Burrows & Lazzerini, 1978). This measure defines stress as "an individual's subjective perception of the current situation as unpleasant or threatening" and arousal, in this case, is defined as "a generalized state of increased physiological activity without implication of positive or negative valuation of that state" (Duckro,

Korytnyk & Vanderberg, 1989). An individual may experience stress or arousal independent of each other (Duckro et al., 1989; King, Burrows & Stanley, 1983; MacKay et al., 1978).

Participants were asked to rate their feelings on a 4-point scale at the moment they took the survey. After spending time in the room, each individual was again asked to rate their feelings using the same SACL scale. The PAS questions were not included in the post-test. Each student spent approximately 30 minutes participating in the study, including time spent completing the questionnaires and the time in the room. An additional SACL was emailed to the participant the following day to see if the time spent with the animal offered any enduring buffering effect.

Analysis Technique. The data from the participants' responses was collected by Qualtrics software. Qualtrics was able to match the pre-test, post-test and follow-up test by participant. Data was converted for use in IBM SPSS statistics software. Data was used to determine descriptive statistics, such as gender, degree-level, age range, and race. Histograms were used to describe the range of the student participants' PAS scores, stress level and arousal pre-tests, stress level and arousal post-test, as well as stress and arousal follow-up scores. Inferential statistics were analyzed using t-tests. Paired t-tests compared the pre- and post-test scores for stress and arousal for all the students. A paired t-test also compared the stress and arousal post-test scores to the follow-up scores of the participants. Independent t-tests were used to analyze pairs of data within the four different groups to determine if any relationship existed between the group experience and change in stress or arousal level.

Limits of Research. There were limits to this research. This study was done at only one college, whose population is almost entirely female. Only one species of animal was used. The sample size was small and lacked diversity. Stress and arousal levels were based entirely on student self-report measures. Students were involved in this study at only one point in the academic year, between mid-February and mid-March, just following a six-week break that ended the beginning of February. This is a relatively low stress time of the academic year.

Findings

Descriptive Statistics. The focus of this study was on the relationship between college students' stress level and interaction with a therapy animal. The 32 college student participants in the study were all female (100%), which is understandable as 31 of the students (96.875%) were bachelor-degree seeking students at a baccalaureate college that only admits women. Although the study was open to all degree levels, only one graduate student (3.125%) participated and no associate-degree seeking students opted to take part in the study. The majority of students were in their first, second, and third year. Table 1 depicts the participant by year in college.

Table 1. *Participant Year in College*

| Answer | # of Responses | % of Respondents |
|------------|----------------|------------------|
| Associate | 0 | 0 |
| First Year | 11 | 34% |
| Sophomore | 8 | 25% |
| Junior | 9 | 28% |
| Senior | 3 | 9% |
| Graduate | 1 | 3% |
| | 32 | 100% |

The age of participant was also recorded. Students' ages ranged from 18 years to over 56 years. Students were asked to indicate their age from a pre-selected range of options provided. Table 2 demonstrates the age ranges provided, as well as the count of participants by age. The majority of the students were under 25, with the highest number of students between age 18 and 20 years.

Table 2. *Age Range of Participants*

| Answer | # of Responses | % of Respondents |
|--------|----------------|------------------|
| 18-20 | 18 | 56% |
| 21-25 | 7 | 22% |
| 26-35 | 2 | 6% |
| 36-45 | 3 | 9% |
| 46-55 | 1 | 3% |
| 56+ | 1 | 3% |
| | 32 | 100% |

Students were also asked to indicate their ethnicity/race. No labels were provided, allowing the students to choose how to identify themselves. This question was not required, but all students chose to answer it. Of the 32 students who participated, students identified the following categories: Caucasian, white, Asian, Asian Hmong, Hispanic, Hispanic/Latino, and Black/African American. Because of the small sample, similar labels were combined to assist in calculating relationships. Caucasian and white were combined; Asian and Asian Hmong were combined, and Hispanic and Hispanic/Latino were combined. Table 3 illustrates the participants by race.

Table 3. *Race of Participants*

| Race | # of Responses | % of Respondents |
|----------------------------|----------------|------------------|
| Black / African American | 1 | 3% |
| Hispanic / Hispanic Latino | 2 | 6% |
| Asian / Asian Hmong | 6 | 19% |
| Caucasian | 23 | 72% |

All participants were asked to complete the Pet Attitude Scale (PAS) prior to participation (Templer, Salter, Dickey, Baldwin, & Veleber, 1981). This scale indicates a person's affinity toward animals. PAS score can range from 18 to 126, with the correlation that the higher the score, the higher the person's regard of animals. The student's in this study had scores which ranged from 60 to 122. Table 4 shows that, of the 32 respondents, the mean is 101.50 with a standard deviation of 14.188. The histogram in Figure 1 shows the responses are positively skewed, because the data is concentrated to the right of the histogram. This indicates more of these students hold a positive attitude toward pets.

Table 4. Student Pet Attitude Scale

| | N | Minimum | Maximum | Mean | Std. Deviation |
|--------------------|------------------|------------------|------------------|------------------|-----------------------|
| | Statistic | Statistic | Statistic | Statistic | Statistic |
| Pet Attitude | 32 | 62 | 122 | 101.5 | 14.188 |
| Valid N (listwise) | 32 | | | | |

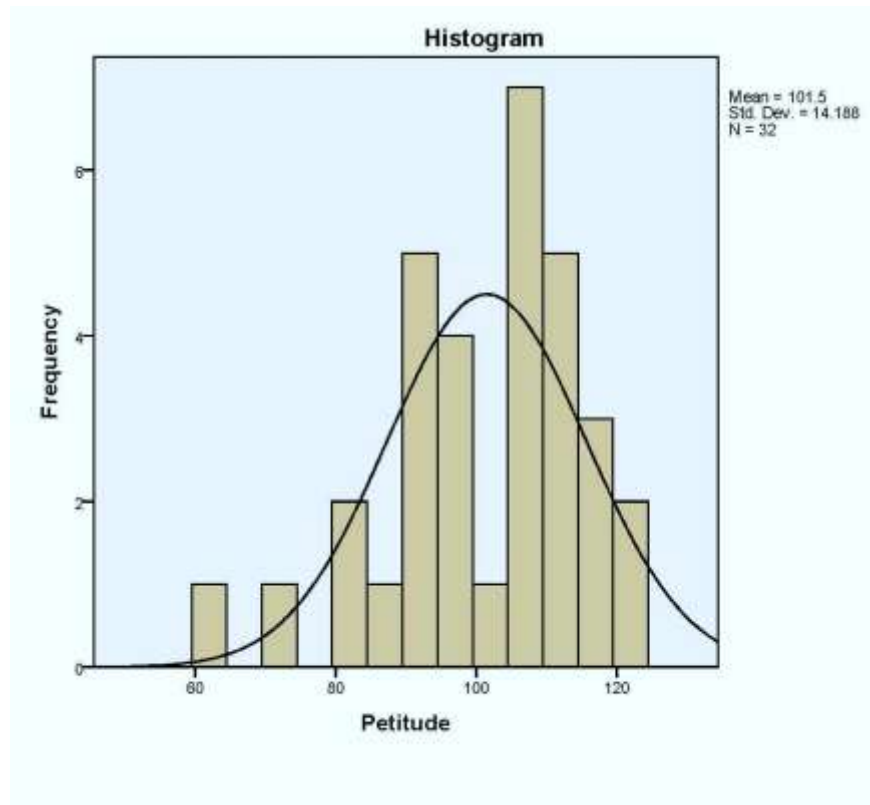


Figure 1. Student Pet Attitude Scale

Student Stress Pre-test and Post-test Information. In addition to the PAS, students rated their stress and arousal level using the Stress-Arousal Checklist (SACL) prior to participation (MacKay et al., 1978). The scale has two different scores; a stress score which can range from 0 to 18, and an arousal score which has a range from 0 to 12. Higher scores reflect more stress and higher arousal. In the stress pre-test, the 32 students scores ranged from 1 to 15 ($M = 8.72$, $sd = 4.252$) as shown in Table 5. The histogram in Figure 2 shows a normal bell curve for student stress, but the data is slightly skewed to the left.

Table 5. Student Stress Pre-test and Post-test Scores

| Descriptive Statistics | | | | | |
|------------------------|-----------|-----------|-----------|-----------|----------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| | Statistic | Statistic | Statistic | Statistic | Statistic |
| Stress Pre-test | 32 | 1 | 15 | 8.719 | 4.252 |
| Stress Post-test | 32 | 0 | 11 | 2.313 | 2.389 |
| Valid N (listwise) | 32 | | | | |

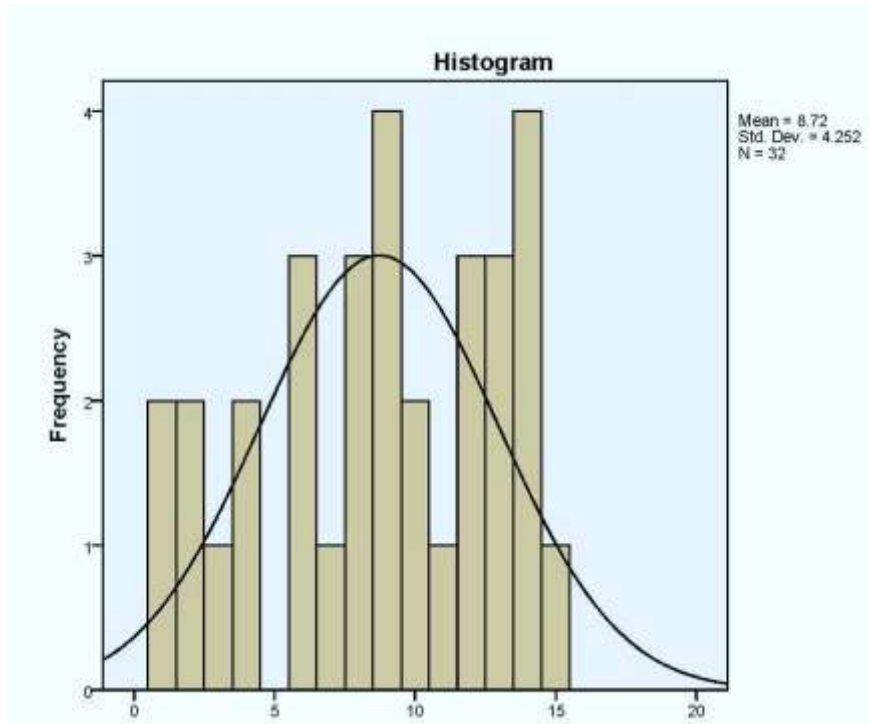


Figure 2. Student Stress Pre-test

Following their experience, students were again asked to complete the SACL. In the post-test, students stress scores ranged from a low of 0 to a high of 11 ($M = 2.31$, $sd = 2.329$), as shown in Table 5. All but three of the students' (9.375%) scores showed a reduction in stress. Two of those students, one participant from Group 2 and one from Group 4, had a score of 1 in the pre-test, indicating a very low stress level prior to the research experience. Following the experience, their score remained at 1. A third student, from Group 4, had a high pre-test stress score of 11 and it remained 11 on the

post-test. The histogram in Figure 3 shows a negative skew to the data, with most of the scores between 0 and 3 indicating the majority of the students were less stressed following their research relaxation experience.

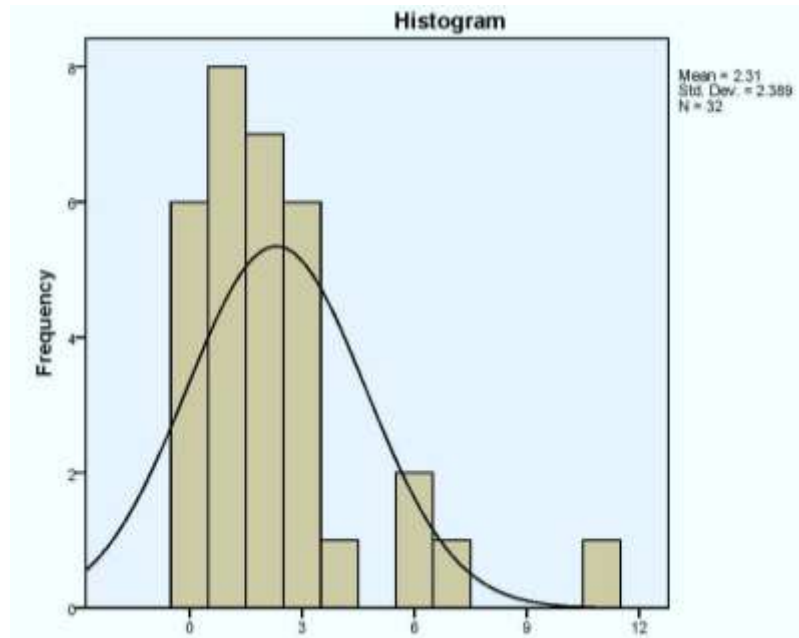


Figure 3. Student Stress Post-test

Student Arousal Pre- and Post-test Information. The SACL measured 32 students’ arousal level prior to the experience. Pre-test scores ranged from 0 to 11 (M = 4.47, sd = 2.874), as show in Table 6. The histogram in Figure 4 indicates a standard bell curve for the student arousal score data in the SACL pre-test.

Table 6. Student Arousal Pre-test and Post-test Scores

| Descriptive Statistics | | | | | |
|------------------------|-----------|-----------|-----------|-----------|----------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| | Statistic | Statistic | Statistic | Statistic | Statistic |
| Arousal Pre-test | 32 | 0 | 11 | 4.469 | 2.874 |
| Arousal Post-test | 32 | 0 | 11 | 4.594 | 3.378 |
| Valid N (listwise) | 32 | | | | |

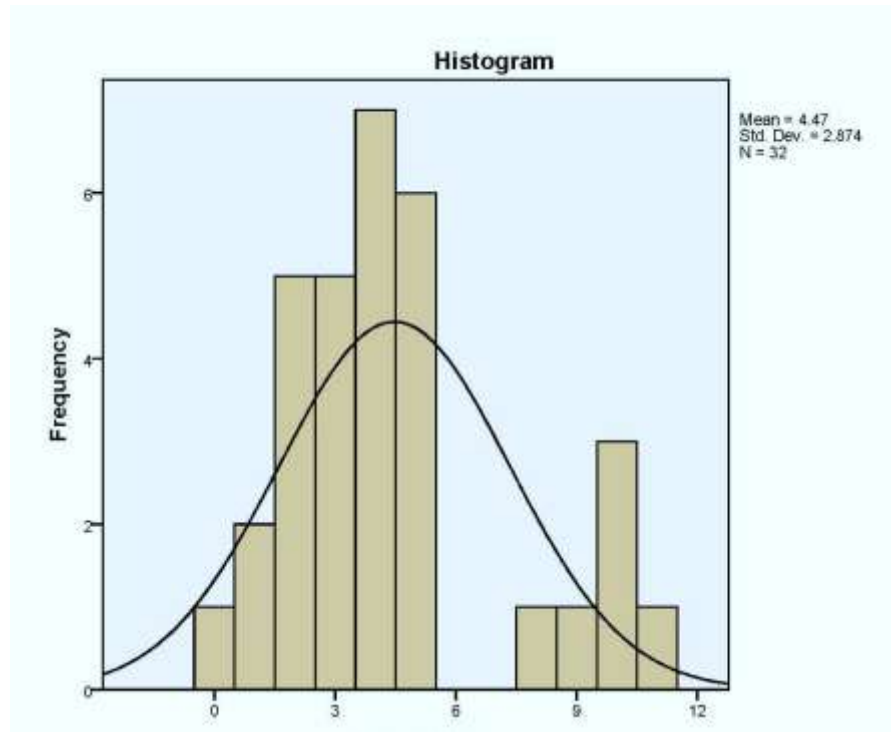


Figure 4. Student Arousal Pre-test

The arousal score range in the post-test remained the same, with scores ranging from 0 to 11 ($M = 4.59$, $sd = 3.378$), as shown in Table 6. However, as the Histogram in Figure 5 shows, the scores were more evenly distributed with a notable exception of a spike in the score of 2.

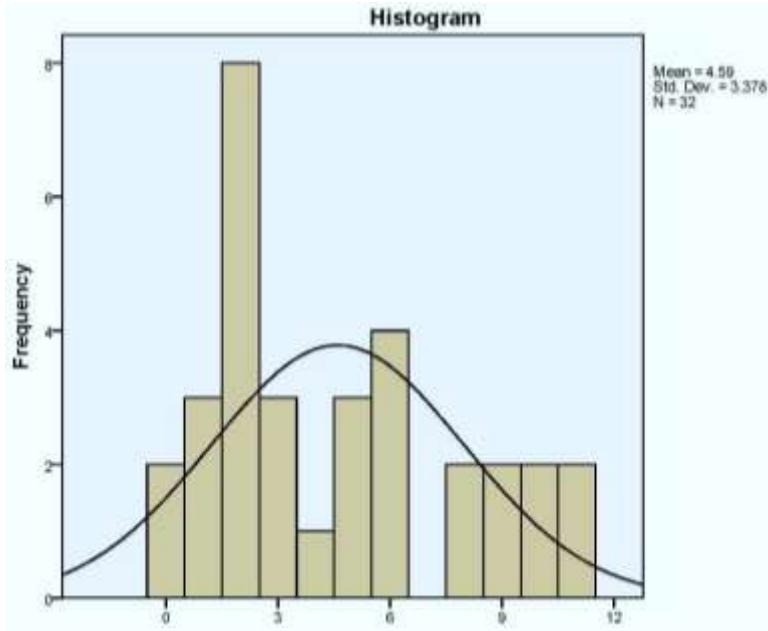


Figure 5. Student Arousal Post-test

Student Follow-up Stress and Arousal Information. Students were asked to complete the SACL one additional time, approximately 24 hours after their experience. Only 28 of the 32 students completed this additional scale (87.5%). For this follow-up test, the stress scores ranged from 0 to 15 ($M = 7.5$, $sd = 5.07$), as shown in Table 7.

Figure 6 shows a standard bell curve.

Table 7. Student Stress Follow-up Scores

| Descriptive Statistics | | | | | |
|------------------------|-----------|-----------|-----------|-----------|----------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| | Statistic | Statistic | Statistic | Statistic | Statistic |
| Stress Follow-up | 28 | 0 | 15 | 7.5 | 5.066 |
| Valid N (listwise) | 28 | | | | |

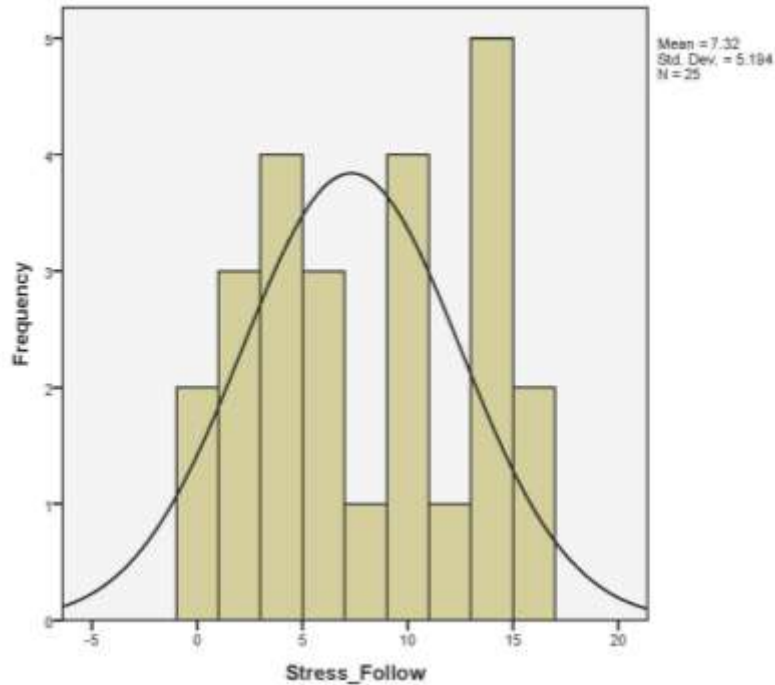


Figure 6. Student Stress Follow-up

The 28 students who participated in the follow-up survey had arousal scores which ranged from 1 to 12 ($M = 4.68$, $sd = 3.28$), shown in Table 8. The histogram (Figure 7) was negatively skewed with the data collected to the left side of the graph, indicating most students were experiencing a lower level of arousal.

Table 8. Student Arousal Follow-up Scores

| Descriptive Statistics | | | | | |
|------------------------|-----------|-----------|-----------|-----------|----------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| | Statistic | Statistic | Statistic | Statistic | Statistic |
| Arousal Follow-up | 28 | 1 | 12 | 4.679 | 3.278 |
| Valid N (listwise) | 28 | | | | |

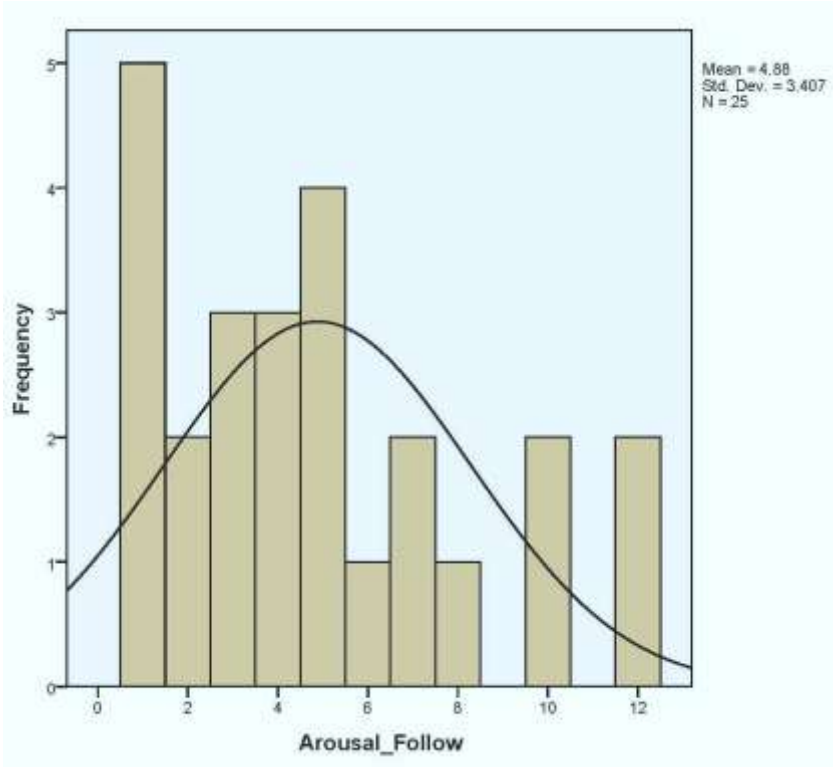


Figure 7. Student Arousal Follow-up

Inferential Statistics: The research question for this study is: *What is the effect of a therapy animal on college students' stress and arousal level?* There were four groups, each with a different experience.

- Group 1 was the control group; they sat on a comfortable chair in a softly-lit room with soft music.
- Group 2 was the therapy rabbit group; participants were able to hold, stroke and talk to the live therapy rabbit, while sitting in the same environment as Group 1.
- Group 3 was the rabbit observation group in which participants sat in the same environment as Group 1, but the therapy rabbit was added. The

participants did not interact with the rabbit, as the rabbit in her wire cage was just part of the environment.

- Group 4 was the touch control group in which participants were asked to stroke a stuffed rabbit while sitting in the same environment as Group 1.

Paired T-test of Pre- and Post-test Scores for All Participants. A paired t-test was used to analyze the pre- and post-test for both stress and arousal for the combined mean of all participants. Table 9 and 10 show the results of these t-tests comparing the students’ mean pre-test score with the students’ mean post-test score for both stress and arousal. The respondents’ mean pre-test stress score was 8.72. After their research experience, the students’ mean stress score was 2.31. The difference of these mean scores is 6.41. Therefore, the students’ reported feeling less stress after their experience. The respondents’ arousal mean pre-test score was 4.47. In their post-test score, the students’ mean arousal score was 4.59. This difference is a .12 increase, indicating only a slight rise in arousal after the research experience.

Table 9. Statistics of All Student Stress and Arousal Pre-test and Post-test Scores

| Paired Samples Statistics | | | | | |
|----------------------------------|-------------|-------------|----------|-----------------------|------------------------|
| | | Mean | N | Std. Deviation | Std. Error Mean |
| Pair 1 | StressPre | 8.72 | 32 | 4.252 | .752 |
| | StressPost | 2.31 | 32 | 2.389 | .422 |
| Pair 2 | ArousalPre | 4.47 | 32 | 2.874 | .508 |
| | ArousalPost | 4.59 | 32 | 3.378 | .597 |

Table 10. T-test of Student Stress and Arousal Pre-test and Post-test Scores

| Paired Samples Statistics | | | | | | |
|----------------------------------|-------------------------|---|--------------|----------|-----------|------------------------|
| | | Paired Differences | | t | df | Sig. (2-tailed) |
| | | 95% Confidence Interval of the Difference | | | | |
| | | Lower | Upper | | | |
| Pair 1 | StressPre-StressPost | 4.947 | 7.865 | 8.955 | 31 | .000 |
| Pair 2 | ArousalPre-Arousal Post | -1.581 | 1.331 | -.175 | 31 | .862 |

The paired samples t-test for the stress pre-test and post-test is $p = .000$.

Therefore, the p-value for this t-test is $p < .05$, showing a statistically significant decrease in all students' reported stress level after their experience, regardless of which group they were a part. The paired samples test for the arousal pre- and post-test is a p-value of .862. Since the p-value is greater than .05, the results of this data are not statistically significant. As a whole, there was not a significant change in the students' arousal level after their experience.

These overall student results remained fairly consistent when stress and arousal pre-tests and post-tests were compared by group experience. For Group 1, the control group, the p-value for the stress score was .003, indicating a statistically significant relationship. The p-value for the arousal score was greater than .05, at $p = .195$, indicating it is nonsignificant. The stress pre- and post-test comparison for Group 2, the interactive therapy rabbit group, had a p-value of .001; therefore $p < .05$, indicating a statistically significant difference in stress level. The arousal pre- and post-test comparison for Group 2 had a p-value of .386, or $p > .05$, indicating it was not statistically significant. Group 3, the therapy rabbit observation group, had a p-value of .005, again indicating a statistically significant relationship between the pre- and post-test stress level. The arousal score was .609, indicating it was not statistically significant. For Group 4, the stuffed rabbit group, the p-value for the stress pre-test and post-test comparison was .014, or $p < .05$, indicating a statistically significant difference. The difference in the arousal score was $p = 1.0$, or statistically nonsignificant.

Table 11 and Figure 8 illustrate the change in stress and arousal by group. The bar chart shows the control group, Group 1, had a significant average decrease in stress (-

6.875) and arousal (-2.125). While the average of all students' stress levels decreased, the most significant decrease was in Group 2, those that spent time interacting with the therapy rabbit (-7.5). Interestingly, this same group also had an average increase in arousal (1.375). Not only were these students more relaxed on average, but they were also more alert. Group 3 had the rabbit as part of their environment. Those participants had less of an average decrease in stress than the other groups (-5.25), but this group also had an increase in their average state of arousal (1.25). Group 4, whose participants interacted with a stuffed rabbit, had an average decrease in stress (-6) and no change to their arousal level.

Table 11. Student Stress and Arousal Change by Group

| Descriptive Statistics | | |
|------------------------|-----------------------|------------------------|
| | Avg. Change in Stress | Avg. Change in Arousal |
| Group 1 | -6.875 (sd = 4.454) | -2.125 (sd = 4.190) |
| Group 2 | -7.500 (sd = 3.964) | 1.375 (sd = 4.207) |
| Group 3 | -5.250 (sd = 2.493) | 1.250 (sd = 4.528) |
| Group 4 | -6.000 (sd = 4.047) | 0 (sd = 2.726) |

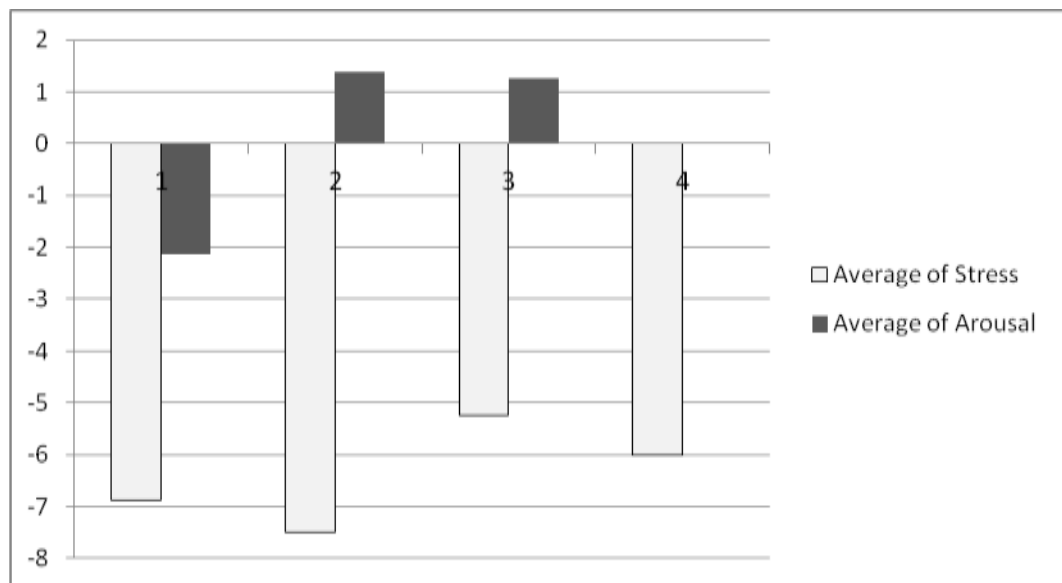


Figure 8. Student Stress and Arousal Change by Group

Correlation between PAS and Stress and Arousal Post-test Change. Students were given the Pet Attitude Scale to determine if a relationship potentially exists between an individual’s feelings about animals and a change in their stress or arousal level after exposure to an animal. The interval variable of PAS have a potential score range from 18 to 126. The second, ratio variable was the stress and arousal scores from the SACL. These score have a range from 0 to 12 (arousal) and 0 to 18 (stress).

The research hypothesis for this section is: there is no relationship between a student’s attitude about pets and the impact of an animal on the stress and arousal level of college students. The inferential statistics of the relationship between the two variables, Pet Attitude and Stress/Arousal level, are illustrated in Table 12, 13 and 14.

Table 12. Descriptive Statistics

| | Mean | Standard Deviation | N |
|----------------|--------|--------------------|----|
| Pet Attitude | 101.50 | 14.188 | 32 |
| Stress Change | -6.41 | 4.047 | 32 |
| Arousal Change | .13 | 4.038 | 32 |

Table 13. Correlations between Pet Attitude and Stress Change

| | | Pet Attitude | Stress Change |
|---------------|---------------------|--------------|---------------|
| Pet Attitude | Pearson Correlation | 1 | .201 |
| | Sig. (2-tailed) | | .269 |
| | N | 32 | 32 |
| Stress Change | Pearson Correlation | .201 | 1 |
| | Sig. (2-tailed) | .269 | |
| | N | 32 | 32 |

Table 14. Correlations between Pet Attitude and Arousal Change

| | | Pet Attitude | Arousal Change |
|----------------|---------------------|--------------|----------------|
| Pet Attitude | Pearson Correlation | 1 | .040 |
| | Sig. (2-tailed) | | .828 |
| | N | 32 | 32 |
| Arousal Change | Pearson Correlation | .040 | 1 |
| | Sig. (2-tailed) | .828 | |
| | N | 32 | 32 |

Table 13 illustrates the calculated correlation between Pet Attitude and the change in the student stress level ($r = .201, p = .269$). Table 14 shows the inferential statistics of

Pet Attitude and the change in student arousal level ($r = .040$, $p = .828$). The p-value is greater than .05; therefore, the results of this study support the hypothesis that there is not a significant relationship between a person's attitude about pets and whether their stress level or arousal level is impacted by exposure to an animal.

Independent Samples T-tests Comparing Stress and Arousal Changes

between Two Different Groups. Independent samples t-test were run between several different pairs of groups. Comparing the control group (Group 1) to the combined scores from the two live animal groups (Group 2 & 3) found a nonsignificant difference ($p = .762$) between the change in stress scores from the control group ($m = -6.88$, $sd = 4.454$) to the groups with the live rabbit ($m = -6.38$, $sd = 3.403$). Therefore, interacting with a live rabbit did not significantly change a participant's stress score, which decreased either way.

An independent samples t-test was run on the arousal scores of these same groups. The control group ($m = -2.13$, $sd = 4.190$) and the groups with the animal present ($m = 1.13$, $sd = 4.222$) showed a nonsignificant difference ($p = .073$) in the change, although the control group decreased in their arousal and both animal groups increased arousal after their experience.

When comparing the stress scores from the control group (Group 1) ($m = -6.88$, $sd = 4.454$) and only those students who had contact with the therapy rabbit (Group 2) ($m = -7.50$, $sd = 3.964$), an independent samples t-test again found a nonsignificant difference ($p = .771$) between the change in the two groups. The change in arousal scores from the control group ($m = -2.13$, $sd = 4.190$) and the therapy rabbit group ($m = 1.38$, $sd = 4.207$)

found there was not a significant statistical difference ($p = .118$) between the students who had no contact with an animal and those who petted a therapy rabbit.

Comparing the change in stress scores of Group 2, students who interacted with the therapy rabbit ($m = -7.50$, $sd\ 3.964$), and Group 3, the students who were in the room with the rabbit, but did not have any structured interaction ($m = -5.25$, $sd\ 2.493$), an independent samples t-test showed a nonsignificant statistical difference ($p = .196$). Although both groups who were exposed to the live rabbit were the only two groups who demonstrated an increase in arousal score, the independent samples t-test showed those student who were allowed to pet the rabbit ($m = 1.38$, $sd\ 4.207$) had no significant statistical difference ($p = .955$) to those students who were simply exposed to the rabbit ($m = 1.25$, $sd\ 4.528$).

A stuffed rabbit was used to discern if there was a difference for students who petted a soft, live rabbit versus those who petted a soft, stuffed rabbit. An independent samples t-test failed to show a statistically significant difference between the stress score change for students with the live rabbit ($m = -7.50$, $sd\ 3.964$) than the stress change for students with the stuffed rabbit ($m = -6.00$, $sd = 5.237$) $t(14) = .650$, $p = .529$. Likewise the arousal score change for the students with the live rabbit ($m = 1.38$, $sd\ 4.207$) and the arousal score change for students with the stuffed rabbit ($m = .00$, $sd = 2.726$) found no significant statistical difference $t(14) = .776$, $p = .451$.

Paired Samples T-test Comparing Stress and Arousal Post-test and Follow-up Scores. A paired samples t-test was run to analyze the difference in the stress post-test score and the stress follow-up score (24 hours later), as well as a t-test comparing the

arousal post-test score and the arousal follow-up score. Results are shown in Tables 15 and 16.

Table 15. Statistics of All Student Stress and Arousal Post-test and Follow-up Scores

| Paired Samples Statistics | | | | | |
|----------------------------------|-------------------|-------------|----------|-----------------------|------------------------|
| | | Mean | N | Std. Deviation | Std. Error Mean |
| Pair 1 | StressPost | 2.39 | 28 | 2.529 | .478 |
| | StressFollow-up | 7.86 | 28 | 5.090 | .962 |
| Pair 2 | ArousalPost | 4.57 | 28 | 3.436 | .649 |
| | Arousal Follow-up | 4.68 | 28 | 3.278 | .619 |

Table 16. T-test of Student Stress and Arousal Post-test Scores and Follow-up

| Paired Samples Statistics | | | | | | |
|----------------------------------|-------------------------------|---|--------------|----------|-----------|------------------------|
| | | Paired Differences | | t | df | Sig. (2-tailed) |
| | | 95% Confidence Interval of the Difference | | | | |
| | | Lower | Upper | | | |
| Pair 1 | StressPost-StressFollow-up | -7.828 | -3.101 | -4.744 | 27 | .000 |
| Pair 2 | ArousalPost-Arousal Follow-up | -1.691 | 1.405 | -.145 | 27 | .885 |

The respondents’ mean post-test stress score was 2.39. A day after their research experience, the students’ mean stress score was 7.86, an increase of 5.47. Therefore, the students’ reported an increase in stress a day after their experience $t(27) = 4.744$, $p = .000$. The respondents’ arousal mean post-test score was 4.57. In their follow-up score, the students’ mean arousal score was 4.68. This difference is a .11 increase, indicating only a slight rise in arousal a day after the research experience $t(27) = .145$, $p = .885$.

Paired T-Test Post and Follow-up Scores for Stress and Arousal by Group.

Paired t-tests analyzed the combined mean of participants’ post and follow-up scores for both stress and arousal by group experience. None of the group’s t-tests suggested a relationship between the arousal post-test and follow-up scores. Only two of the four stress post and follow-up t-tests showed a statistical significance. Both Group 1 (the

control group) and Group 2 (the therapy rabbit group) had a statistically significantly higher stress follow-up score the following day. Table 17 and 18 show the results for these two groups.

Table 17. Statistics of Student Stress Post-test and Follow-up Scores for Groups 1 & 2

| Paired Samples Statistics | | | | | |
|----------------------------------|------------------|-------------|----------|-----------------------|------------------------|
| | | Mean | N | Std. Deviation | Std. Error Mean |
| Group 1 | StressPost | 2.25 | 8 | 1.982 | .701 |
| | StressFollow-up | 10.38 | 8 | 4.470 | 1.580 |
| Group 2 | StressPost | 1.86 | 7 | 1.345 | .759 |
| | Stress Follow-up | 9.00 | 7 | 5.033 | 1.902 |

Table 18. T-test of Student Stress Post-test and Follow-up Scores for Groups 1 & 2

| Paired Samples Statistics | | | | | | |
|----------------------------------|----------------------------|---|--------------|----------|-----------|------------------------|
| | | Paired Differences | | t | df | Sig. (2-tailed) |
| | | 95% Confidence Interval of the Difference | | | | |
| | | Lower | Upper | | | |
| Group 1 | StressPost-StressFollow-up | -12.398 | -3.852 | -4.496 | 7 | .003 |
| Group 2 | StressPost-StressFollow-up | -11.259 | -3.027 | -4.246 | 6 | .005 |

The hypothesis for the inclusion of this follow-up test was to determine if there was a residual buffering affect for those who interacted with animals. The null hypothesis is that there is no relationship between an animal interaction and residual stress relief. These findings $t(7) = -4.496$, $p = .003$ suggest a relationship between Group 1 students' post-test scores ($m = 2.25$, $sd = 1.982$) and the follow-up scores ($m = 10.38$, $sd = 4.470$). The stress scores for Group 1 increased, meaning the students' stress levels increased the day following their relaxation experience. Likewise, Group 2 students post-test scores ($m = 1.86$, $sd = 1.345$) were significantly lower than the next day's follow-up scores ($m = 9.00$, $sd 5.033$). The increase in the mean the following day suggests a

statistically significant relationship $t(6) = -4.246, p = .005$. The findings of these studies support the null hypothesis.

Discussion

This study focused on determining if a relationship exists between college student's stress level and interaction with a therapy animal. Because of the previous research, this study posits that a college student's stress level would decrease after interacting with a therapy animal; particularly those who actually engaging in stroking the animal (Brodie & Biley, 1999; Crawford & Pomerinke, 2003; King, 2007; Stanley-Hermanns, M. & Miller, J. 2002). Some of the findings of this study support this assumption, as the students' stress level decreased by 7.5 points on an 18-point scale after the therapy rabbit interaction. However, all of the four groups demonstrated a statistically significant decrease in their stress level after their relaxation experience ($p = 000$). Although the decrease in stress level of the students who held the therapy rabbit was the largest of the four groups, analysis did not find a statistically significant decrease when compared to the other three groups.

The researcher is not aware of the correlation of arousal and interaction with animals measured in previous literature. However, Brodie and Biley suggest feeling connected to others offers stimulation (1999). This concept is also suggested by the Biophilia Hypothesis (McCulloch, 1984). The arousal scores prior to the experience found the student mean arousal level was 4.46 on an 11 point scale. After the experience, the mean arousal level was virtually unchanged at 4.59. However, as shown in Figure 8, there was an interesting pattern in how the arousal changed after the interaction. The group who stroked a stuffed animal had no change in their arousal level. The control

group decreased in arousal by a mean of -2.13. The researcher observed the students from this group were relaxed to the point of being sleepy after their experience. Whereas both groups who were exposed to the rabbit had an increase in arousal by a combined average mean score of 1.31 between the two groups, with those who directly interacted with the therapy rabbit at a mean score of 1.38, and those who were just exposed to the rabbit at a mean score of 1.25.

Further analysis did not find a statistically significant difference in the arousal levels of students who were in the control group versus those who were exposed to the animal ($p = .073$). However, researcher observed students were talkative and happy after their experience with the rabbit. Participants from the therapy rabbit groups tended to linger after their experience and wanted to engage the researcher in conversation about the rabbit and their own pets at home. While the data did not indicate a statistical advantage to the animal interaction, the students did seem to benefit from the social interaction and touch of the rabbit in their experience, as discussed by Friedmann (1980 & 1983), King (2007), and others. The rabbit also served as a catalyst for conversation, as identified by Hart (1995), Havener et al. (2001) and Hooker et al. (2002). These observations point to the need for different kinds of measures for future studies. Perhaps adding some qualitative data collection to capture these personal experiences would add some depth and clarity to a study of this type.

Measuring the stress and arousal levels approximately 24 hours after the research experience was an attempt to discover if spending time with an animal had any residual buffering effect against stress. Some colleges bring animals to visit for a day during finals week (Adamle et al., 2009; Gaterud, 2011; Kueser, 2013). If a student has a

chance to interact with an animal one day, will any benefit remain if the individual has finals the next day? While the study failed to support a beneficial buffering effect for any of the groups, the follow-up study did support that the experience of the control group (Group 1) and the therapy rabbit group (Group 2) did offer a stress reduction to the students the day of their experience as their stress level returned to a higher average stress level, similar to that measured in the pre-test.

The 2004 Charnetski et al. study, on which this research was based, found a significant correlation between increased immunity and petting a live dog. The result was consistent whether or not the student previously had a positive attitude toward pets. Using Templer's same Pet Attitude Scale, this study also found no correlation between a student's attitude toward animals and the change in student stress level ($r = .201$, $p = .269$) or the student arousal level ($r = .040$, $p = .828$). Students benefitted from the relaxation experience regardless of their opinion of animals. However, overall the students in this study held a very positive attitude towards animals, with a mean score of 101.5 out of a possible range of 18 to 126. This result supports the positive interest (96%) college students have in animals and AAI found in the Adame, Riley & Carlson study (2009).

Limitations of this Study. This study was a small convenience, non-probability sampling. As such, its results are not able to be generalized to the larger population. The 32 college student participants were from a Minnesotan private university, all female (100%), primarily between 18 – 20 years old (56%), with a high concentration of first year college students (34%). Research suggests these students are the highest risk category for college stress.

The overwhelming majority of students in this study fall in the highest risk category for college stress. They are studying at a private university in Minnesota. Minnesota students graduate with the third highest debt in the nation (Reed & Cochrane, 2012). It is likely that, as students at a private university, these participants are at the higher end of Minnesota student debt. As women, these students are at risk of higher levels of overall stress than their male counterparts (cited in Pedersen, 2012). As young, first year students, these participants are in the midst of transitions, facing an array of academic, financial and social challenges (Misra & Castillo, 2004). This is all happening at a point in time when the nation's college freshman are reporting the lowest emotional health since it was first measured in 1985 (Hurtado, 2010). However, contrary to these risks, the students who participated in this study reported a relatively low initial stress level, as shown in Figure 2: Student Stress Pre-test. These studies were held at the beginning of the Spring semester. Students were just returning from an approximately six-week J-term break, and were not embroiled in the stress that surrounds the commitments of midterms or finals. It is possible this study, if held around midterms or finals, might reveal higher stress levels in these same participants. Because of the low stress level in these students, perhaps there is some other support at this university which is reducing student stress. Conducting a research study at one or several different universities might reveal stress levels more closely mirroring the statistics cited, which may impact the results of a future study.

Implications for Social Work Research. While the results of this test did support the hypothesis that a therapy rabbit would decrease a college student stress level, the results were inconclusive as to the specific benefit of a therapy rabbit, as opposed to

another intervention. Perhaps if future research had a larger, more diverse sample, trends might become clearer. Because these students had a relatively low initial stress level, it would be important to research individuals who are experiencing more stress, perhaps replicating this experience during finals time. Another important aspect would be to measure if the stress reduction had an academic benefit. Can students who spent time with a therapy animal actually perform better academically than students who have not had that experience?

There is an association between academic achievement and engagement. Student retention research has shown that high levels of student engagement are positively associated with higher student satisfaction, retention and academic achievement (Kuh, Kinzie, Buckley, Bridges & Hayek, 2006). As noted earlier, interacting with the therapy rabbit seemed to elicit conversation and engagement among the student participants. Future research measuring participant engagement could be beneficial. Social workers in educational settings can incorporate therapy animals into their work with students, which will help nurture the relationship between the social worker and the student. AAI may also serve to increase student academic performance and level of satisfaction with their school experience, thereby helping the student to follow through on their education to completion.

The interesting trend of a therapy animal increasing a student's arousal level would lend itself to some further study. Arousal has a direct academic link. Literature suggests arousal can be elevated by high cognitive demand. In addition, elevated arousal has been shown to increase an individual's performance (Dienstbier, 1989; King, Burrows & Stanley, 1983). The results of this project suggest AAI during finals time

may be beneficial to students by increasing his or her arousal level prior to an important exam and thus increasing that individual's level of performance.

Since this experience was structured as a relaxation experience, it would be interesting to see how a student's arousal level would be affected by a normal interaction. Many colleges offer their students an interaction with animals during finals week, e.g. Harvard Law School, University of Minnesota, University of Connecticut Storrs, University of New Hampshire, University of Wisconsin Madison, and Yale Medical School (Adamle et al., 2009; Gaterud, 2011; Kueser, 2013). These occur in a common setting, such as the library or another large space where many people gather. A study that measured how the type of setting used for AAI impacts the benefit to student participants might be helpful. Is there a greater benefit to a large group of students sharing this experience, or does the group dynamic increase their stress? Perhaps the arousal trend would be more significant to individual's participating in AAI, if it was not being mitigated by a relaxation experience, as in this study.

Future studies in AAI should explore the potential correlation of type of therapy animals used in different settings. When offering AAI, are certain species of animals better suited for different environments? The Charnetski et al. study (2004) used a dog in their college student experiment. That study found a statistically significant correlation between students who petted the dog and an increase in immune system function. Rabbits are the fifth most popular pet in the United States (American Veterinary Medicine Association, 2012). There are approximately 1.4 million American households which have rabbits, as compared to 70 million dogs and 74.1 million cats. Perhaps college students might find a higher reduction in stress if the therapy animal offered mirrored that

of the companion animal in their own home. Or, maybe on-the-go college students find the outgoing exuberance of a dog more appealing. Whereas the quiet nature of a rabbit or purring cat may be more appealing in a care facility, hospital, or preschool setting.

Implications for Social Work Practice. Nevertheless, the results of this study clearly indicated the students benefitted from any of the stress-relieving interactions. The interaction with a therapy rabbit did decrease a student's stress level. Social workers who choose to incorporate a therapy animal into their practice, either partnering with a trained therapy animal handler or becoming one themselves, can offer their clients an additional way to reduce their stress level. Social workers who work in school settings should be specifically mindful of high stress times in their general population. Social workers at the college level can elicit the support of local therapy animal groups to visit during midterms or finals.

Currently most colleges invite groups of trained volunteer animal handlers to visit campus during high stress times (Adamle et al., 2009; Anderson, 2011; Gaterud, 2011; Kueser, 2013). This is a very cost-effective, relatively low-risk way to offer this type of intervention, which has been shown to be highly appealing to college students. While mindfulness techniques such as breathing, meditating, or taking a mental break have been shown to relieve student stress, offering AAI to student clients may be a way to entice students to take a beneficial, short break, which they might not otherwise allow themselves to do (Chang et al., 2004; Rosenzweig, Reibel, Greeson, Brainard & Hojat, 2003; Shapiro, Schwartz & Bonner, 1998; Williams, Kolar, Reger & Pearson, 2001).

The trend of colleges and other institutions seeking volunteer AAI services seems to be increasing. It is possible the need could outpace the supply of trained volunteers.

Some universities, like the University of Minnesota, are moving toward professional AAI services (Bailey, 2013). Not only would this secure the availability of these services, but AAI could be offered on an ongoing basis. As a relaxation-based technique, AAI might be better suited as a sustainable practice. The intervention could be modeled after mindfulness-based stress reduction (MBSR).

The typical MBSR intervention is comprised of eight weekly group sessions, each of which consists of an hour discussion on topics such as body awareness or focus on breath, 45 minutes of meditation practice, and 45 minutes of mindful movement, such as yoga. In addition, individuals incorporate 45 minutes of daily meditation on their own (Chang et al., 2004). College students who participated in MBSR have shown a reduction in stress, an increase in an individual's sense of control and reduced symptoms of depression (Astin, 1997; Chang et al., 2004). Dienstbier (1989) cautions against using only relaxation-based techniques. Therapists use relaxation-based therapies to help clients overcome stressful situations and decrease elevated arousal. However, without also incorporating coping mechanisms into their therapy, it is possible students will experience only short-term relief and not build the emotional toughness to tolerate similar future situations. A professional using AAI would have the necessary skills to help student reduce stress, while also assisting with coping skills.

Conclusion

College is a stressful time for students. As Laurel Rabschutz, PhD and Pet Partners Therapy Handler, states, "College students face many of the same issues as the elderly; living away from home, often leaving pets behind, and adjusting to an impersonal institution" (Kueser, 2013). Animals offer a positive influence in that they

increase socialization and alleviate loneliness through their openness, responsiveness, and ability to be present (Chandler, 2005; Fine, 2006; Miller, 2010; Saxton, 2009). In addition, as this study indicated, interacting with an animal has been shown to reduce anxiety, despair, depression, and stress (Becker, 2002; Blankley, 2003; King, 2007; Pichot & Coulter, 2006). The positive effect an animal has on a human, coupled with the overwhelmingly positive interest in which college students view animals, offers a natural association to address their increasing stress levels and the consequence of increasing health care costs that accompany it (Adamle, Riley & Carlson, 2009; Greenberg et al., 1999). The enthusiasm college students demonstrate toward animals may mitigate some of the excuses students express about not engaging in more traditional mental health methods, such as talk therapy, mindfulness techniques, or simply taking a break. There is no social stigma about spending time with a therapy animal. Most students express a positive interest in animals and may make time for this interaction. Incorporating registered therapy animals for this work is a low-risk, cost-effective way to assist students who are experiencing the growing pains that come with this age.

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Appendix A

The Effect of a Therapy Animal on College Student Stress Level

INFORMATION AND CONSENT FORM

Introduction:

You are invited to participate in a research study investigating the relationship between a therapy animal and college student stress level. This study is being conducted by Shelly Bjick, a graduate student at St. Catherine University under the supervision of Katharine Hill, a faculty member in the School of Social Work. You were selected as a possible participant in this research because you are a student at St. Catherine University and you elected to participate after seeing information about the study on campus. Please read this form before you agree to be in the study. Please do not sign the form until you come to your appointment and have the opportunity ask any questions you may have about this research study.

Background Information:

The purpose of this study is to discover if a correlation exists between interaction with a therapy animal and a reduction in college student stress level. Approximately 40 people are expected to participate in this research.

Procedures:

If you decide to participate, you will be asked to make an appointment. Prior to your appointment, this Information and Consent Form will be emailed to you. You should read and understand the form. When you come to your appointment, you should bring the printed form with you. Please ask the researcher any questions you may have about the research study. The researcher will answer any questions you may have and then clarify that you understand what you are agreeing to do. When your questions are answered and you decide you want to participate, you will be asked to sign the form. Should you forget your form; copies will be available for you at the time of your appointment.

Once you have given informed consent, you will login to your email account on the available computer to follow a link and complete a pre-questionnaire in Qualtrics Software, which includes several demographic questions, a Pet Attitude Scale, and a Stress Arousal Checklist. You will then be brought into the research room where you will remain for 18 minutes. During that time you will be asked to sit quietly, stroke a stuffed rabbit, view a rabbit in her habitat, or pet a live rabbit. If you pet the stuffed or live rabbit, you will be asked to use antibacterial gel on your hands prior to touching the animal. After the 18 minutes are over, you will be asked to login to your email account again and complete a post-questionnaire in Qualtrics Software, using the Stress Arousal Checklist.

An additional Stress Arousal Checklist will be emailed to you the following day.

It is estimate that you will spend approximately 30 minutes for this study.

Risks and Benefits of being in the study:

The study has minimal risks. First, you may be exposed to a live rabbit. If you have allergies to a rabbit or timothy hay – a type of dried timothy grass that's often used for animal feed, you may experience runny nose or hives. Second, animals are live creatures and their behavior is unpredictable. It is possible you may experience a nip or a scratch. This risk is unlikely as the rabbit is a therapy rabbit and has been screened for social behavior. In addition, the rabbit has been recently bathed and had nails trimmed. If you hold the rabbit, she will be wearing a harness, attached to a leash and sitting within a lapbed. The correct way of touching a rabbit will be demonstrated to you. If at any time you feel uncomfortable, you may terminate your participation by alerting the researcher that you wish to be finished.

The benefits to participation are possible reduction in your stress level. All four optional settings of this research should allow a reduction in your stress level. You may also experience a decrease in feelings of loneliness, a lower heart rate, and overall all calming effect.

Results of this study will be used in a conversation about whether an animal interaction event will be offered to students at St. Kates.

In the event that this research activity results in an injury, I will assist you with a band-aid, tissues, or a referral to medical assistance. Any medical care for research-related injuries should be paid by you or your insurance company. If you think you have suffered a research-related injury, please let me know right away.

Compensation:

If you participate, you will receive a \$5 gift card to your choice of one of two vendors.

Confidentiality:

Any information obtained in connection with this research study that can be identified with you will be disclosed only with your permission; your results will be kept confidential. In any written reports or publications, no one will be identified or identifiable and only group data will be presented. No one at St. Catherine University, other than the researcher and possibly advisor, will be aware of your individual results. I will keep the research results in a locked file cabinet in at my home and only I, and possibly my advisor Katharine Hill, will have access to the records while I work on this project. I will finish analyzing the data by May 2013. I will then destroy all original reports and identifying information that can be linked back to you.

Please note, while I am a graduate student, I am also a staff member at St. Catherine University for Access & Success for student parents. It is possible we may have contact after this research study as a result of my employment. Your participation in this study, or lack thereof, will in no way affect services you will receive from me or Access & Success.

Voluntary nature of the study:

Participation in this research study is voluntary. Your decision whether or not to participate will not affect your future relations with St. Catherine University in any way. If you decide to participate, you are free to stop at any time without affecting these relationships. If you withdraw prior to the conclusion of your portion of the study, you will no longer be considered for the drawing for the gift certificate.

Contacts and questions:

If you have any questions, please feel free to contact me, Shelly Bjick, at 651-690-8696 or mjbjick@stkate.edu. You may ask questions now, or if you have any additional questions later, the faculty advisor, Katharine Hill, at 651-962-5809 or katharine.hill@stthomas.edu, will be happy to answer them. If you have other questions or concerns regarding the study and would like to talk to someone other than the researcher, you may also contact Dr. John Schmitt, Chair of the St. Catherine University Institutional Review Board, at (651) 690-7739.

You may keep a copy of this form for your records.

Statement of Consent:

You are making a decision whether or not to participate. Your signature indicates that you have read this information and your questions have been answered. Even after signing this form, please know that you may withdraw from the study at any time.

I consent to participate in the study.

Signature of Participant Date

Signature of Researcher Date

Appendix B

Pre-test Questionnaire

Default Question Block

What year student are you?

- First Year
- Sophomore
- Junior
- Senior
- Graduate student

What is your gender?

- Male
- Female

What is your age?

- 18-20
- 21-25
- 26-35
- 36-45
- 46-55
- 56+

What is your race/ethnicity?

Please answer the following questions as honestly as you can, in terms of how you feel right now. There are no right or wrong answers. (Pet Attitude Scale by Donald Templer)

| | Strongly disagree | Moderately disagree | Slightly disagree | Unsure | Slightly agree | Moderately agree | Strongly agree | Strongly agree |
|---|-------------------|---------------------|-------------------|--------|----------------|------------------|----------------|----------------|
| I really like seeing pets enjoy their food. | | | | | | | | |
| My pet means more to me than any of my friends. | | | | | | | | |
| I would like a pet in my home. | | | | | | | | |
| Having pets is a waste of money. | | | | | | | | |
| Housepets add happiness to my life (or would if I had one). | | | | | | | | |
| I feel that pets should always be kept outside. | | | | | | | | |

Click to write the question text

| | Strongly disagree | Moderately disagree | Slightly disagree | Unsure | Slightly agree | Moderately agree | Strongly agree | Strongly agree |
|--|-------------------|---------------------|-------------------|--------|----------------|------------------|----------------|----------------|
| | | | | | | | | |

| | |
|---|--|
| I spend every day playing with my pet (or would if I had one). | |
| I have occasionally communicated with my pet and understood what it was trying to express. | |
| The world would be a better place if people would stop spending so much time caring for their pets and started caring for other human beings instead. | |
| I like to feed animals out of my hand. | |
| I love pets. | |
| Animals belong in the wild or in zoos, but not in the home. | |

| | Strongly disagree | Moderately disagree | Slightly disagree | Unsure | Slightly agree | Moderately agree | Strongly agree | Strongly agree |
|--|-------------------|---------------------|-------------------|--------|----------------|------------------|----------------|----------------|
| If you keep pets in the house, you can expect a lot of damage to the furniture. | | | | | | | | |
| I like housepets. | | | | | | | | |
| Pets are fun, but it's not worth the trouble of owning one. | | | | | | | | |
| I frequently talk to my pet. | | | | | | | | |
| I hate animals. | | | | | | | | |
| You should treat your housepets with as much respect as you would a human member of your family. | | | | | | | | |

The words shown below describe different feelings and moods. Please use this list to describe your feelings at this moment. First reactions are most reliable; therefore do not spend too long thinking about each word. Please be as honest and accurate as possible.

(Stress-Arousal Checklist by Colin Madray & Tom Cox)

| | Definitely describes my feelings | More or Less describes my feelings | Cannot decide whether or not it describes my feelings | Does not describe my feelings |
|--------------|----------------------------------|------------------------------------|---|-------------------------------|
| Tense | | | | |
| Relaxed | | | | |
| Resistful | | | | |
| Active | | | | |
| Apprehensive | | | | |
| Worried | | | | |
| Energetic | | | | |
| Drowsy | | | | |

STUDENT SURVEY

What is your gender?

Male

Female

What is your age?

18-20

21-25

26-35

36-45

46-55

56+

What is your race/ethnicity?

Please answer the following questions as honestly as you can, in terms of how you feel right now. There are no right or wrong answers.
(Pet Attitude Scale by Donald Templer)

| | Strongly disagree | Moderately disagree | Slightly disagree | Unsure | Slightly agree | Moderately agree | Strongly agree | Strongly agree |
|---|-------------------|---------------------|-------------------|--------|----------------|------------------|----------------|----------------|
| I really like seeing pets enjoy their food. | | | | | | | | |
| My pet means more to me than any of my friends. | | | | | | | | |
| I would like a pet in my home. | | | | | | | | |
| Having pets is a waste of money. | | | | | | | | |
| Housepets add happiness to my life (or would if I had one). | | | | | | | | |
| I feel that pets should always be kept outside. | | | | | | | | |

Click to write the question text

| | Strongly disagree | Moderately disagree | Slightly disagree | Unsure | Slightly agree | Moderately agree | Strongly agree | Strongly agree |
|--|-------------------|---------------------|-------------------|--------|----------------|------------------|----------------|----------------|
| | | | | | | | | |

Appendix C

Post-test / Follow-up Questionnaire

Default Question Block

The words shown below describe different feelings and moods. Please use this list to describe your feelings at this moment. First reactions are most reliable; therefore do not spend too long thinking about each word. Please be as honest and accurate as possible.

(Stress-Arousal Checklist by Colin Mackay & Tom Cox)

| | Definitely describes my feelings | More or Less describes my feelings | Cannot decide whether or not it describes my feelings | Does not describe my feelings |
|--------------|-------------------------------------|--|--|----------------------------------|
| Tense | | | | |
| Relaxed | | | | |
| Restful | | | | |
| Active | | | | |
| Apprehensive | | | | |
| Worried | | | | |
| Energetic | | | | |
| Drowsy | | | | |
| Bothered | | | | |
| Uneasy | | | | |
| Dejected | | | | |
| Nervous | | | | |
| Distressed | | | | |
| Vigorous | | | | |
| Peaceful | | | | |
| Tired | | | | |
| Idle | | | | |
| Uptight | | | | |
| Alert | | | | |
| Lively | | | | |
| Cheerful | | | | |
| Contented | | | | |
| Jittery | | | | |
| Sluggish | | | | |
| Pleasant | | | | |
| Sleepy | | | | |
| Comfortable | | | | |
| Calm | | | | |
| Stimulated | | | | |
| Activated | | | | |

Appendix D
Recruitment Materials

ATTACHMENT D 1

Text for Campus Newsletter, Electronic Campus Bulletin Board (Gateway), and Faculty to Class Invitation

Feeling Stressed? Research Subjects Needed!

Shelly Bjick, a student in the Master of Social Work program at St. Catherine University and the University of St. Thomas, is seeking volunteers for her graduate social work research study. You will be committing no more than 30 minutes of your time and will meet in the Coeur de Catherine, room TBD.

Participants need to be a current college student, age 18 or older, any degree level.

This study will measure college student stress level before and after exposure to relaxation source. Participants will receive a \$5 gift card to their choice of one of two local vendors

For more information or to register, contact Shelly at mjbjick@stkate.edu or 651-690-8696.

ATTACHMENT D2



Feeling Stressed? Research Subjects Needed!

If you have 30 minutes to share, you may find you are feeling less stressed.

Shelly Bjick, a student in the Master of Social Work program at St. Catherine University and the University of St. Thomas, is seeking volunteers for her graduate social work research study. You will be committing no more than 30 minutes of your time and will meet in the Coeur de Catherine, room TBD.

Participants need to be a current college student, age 18 or older, any degree level.

This study will measure college student stress level before and after exposure to relaxation source. Participants will receive a \$5 gift card to their choice of one of two local vendors.

For more information or to register, contact Shelly at mjbjick@stkate.edu or 651-690-8696.



ATTACHMENT D3

FACULTY INVITATION SCRIPT

Faculty will be emailed the flyer with text below (Flyer is attachment D2).

Feeling Stressed? Research Subjects Needed!

Shelly Bjick, a student in the Master of Social Work program at St. Catherine University and the University of St. Thomas, is seeking volunteers for her graduate social work research study. You will be committing no more than 30 minutes of your time and will meet in the Coeur de Catherine, room TBD.

Participants need to be a current college student, age 18 or older, any degree level.

This study will measure college student stress level before and after exposure to relaxation source. Participants will be entered to win one of four \$10 Caribou gift cards.

For more information or to register, contact Shelly at mjbjick@stkate.edu or 651-690-8696.

In addition, faculty will be given the following information:

“I am an MSW student at St. Catherine and St. Thomas School of Social Work. I am also staff in St. Kates’ Access & Success department. I am conducting a research project for my MSW degree and am looking for student participants. I am hoping to get approximately 40 participants. If you are comfortable, I would appreciate your sharing this information with your class. If you would prefer to have me personally attend your class to extend this invitation, I am happy to do so. Let me tell you briefly about the study.

- Research will be held on the campus of St. Catherine University. It will take approximately 30 minutes of your time.
- Participation in this research is completely voluntary – there will be no negative consequences should a student decide not to participate.
- Participants will be asked to:
 - set an appointment and read a consent form.
 - complete an online survey, which will be emailed to the participant’s St. Kates email account. The survey will collect basic demographic data, as well as questions about animals and individual stress levels.
 - spend 18 minutes in the research effort, which involves exposure to a potential stress relieving source.
 - complete a second online survey upon completing their participation.
 - complete a third online survey approximately 24 hours after participation.
- If a student is interested in participation or has questions, please contact Shelly Bjick at mjbjick@stkate.edu or 651-690-8696.

Participants will receive a \$5 gift card to their choice of one of two local vendors. If you have any class policy to encourage participation, such as extra credit points, please let me know, as well as if you would need anything from me notifying you of participation. This would need to be communicated with the student prior to their participation. Do you have any questions? If so, please contact me. I appreciate your consideration and support!”

ATTACHMENT D4

PERSONAL INVITATION SCRIPT

Students will be handed the flyer with text below (Flyer is attachment D2).

Feeling Stressed? Research Subjects Needed!

Shelly Bjick, a student in the Master of Social Work program at St. Catherine University and the University of St. Thomas, is seeking volunteers for her graduate social work research study. You will be committing no more than 30 minutes of your time and will meet in the Coeur de Catherine, room TBD.

Participants need to be a current college student, age 18 or older, any degree level.

This study will measure college student stress level before and after exposure to relaxation source. Participants will be entered to win one of four \$10 Caribou gift cards.

For more information or to register, contact Shelly at mjbjick@stkate.edu or 651-690-8696.

In addition, students will be given the following information:

- Research will be held on the campus of St. Catherine University. It will take approximately 30 minutes of your time.
- Participation in this research is completely voluntary – there will be no negative consequences should a student decide not to participate.
- Participants will be asked to:
 - set an appointment and read a consent form.
 - complete an online survey, which will be emailed to the participant's St. Kates email account. The survey will collect basic demographic data, as well as questions about animals and individual stress levels.
 - spend 18 minutes in the research effort, which involves exposure to a potential stress relieving source.
 - complete a second online survey upon completing their participation.
 - complete a third online survey approximately 24 hours after participation.
- If you are interested in participation or have questions, please contact Shelly Bjick at mjbjick@stkate.edu or 651-690-8696.