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IMPACT OF EMOTIONAL SUPPORT ANIMALS ON STUDENT STRESS

by

Alexandra Kennedy

A Senior Project in Partial Fulfillment of the Requirements of the Honors Program

ST. CATHERINE UNIVERSITY

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INTRODUCTION:
Stress is a growing problem in higher education. There are varieties of student stresses in particular involving studies, finances, exams, grades, and transition of moving to college (Robotham 2008). Stress is becoming normalized and somewhat expected if you are perceived as being a hard-worker (a trait often associated with success in our society). Therefore, people do not often realize that they need help when the stress becomes too overwhelming. A certain amount of stress is needed as motivation for certain difficult tasks. For example, musicians being judged on creativity during a performance showed higher stress levels as well as higher intrinsic motivation levels, when compared to the non-performing musicians (Eisenberg and Thompson 2011). The stress of the competition actually allowed them to score better with the judges. A problem arises, however, when the stress becomes overwhelming, and there is no clear differentiation between motivation and negative stress.

A variety of stress intervention therapies and techniques are becoming increasingly prevalent. Yoga and breathing exercises are just a few examples (Gopal et al. 2011). More recently, there has been attention drawn to the benefits resulting from interactions between humans and animals in reducing stress. My study measured how the presence of a certified emotional support rabbit during a stress-inducing task affected physiological and psychological symptoms of stress in college students.

**BACKGROUND:**

**What is stress?**

Stress in general is very complex and involves the entire body, not just a single system in particular. The definition of stress according to Merriam Webster is “a physical, chemical, or emotional factor that causes bodily or mental tension and may be a factor in disease causation,” (Stress 2014). Even from this simplified definition, it is obvious that stress is a multifaceted
experience of the human condition involving social factors, nutritional intake, temperature, and various other environmental aspects (James 1997).

Stress involves the interrelation of body systems. There are two primary responses activated by stress in the body – faster and slower responses (Breedlove and Watson 2013). The faster response involves the hypothalamus in the brain activating the sympathetic nervous system (Figure 1). The electrical signal then activates the adrenal medulla, which releases epinephrine and norepinephrine. These hormones are known to directly influence heart rate and blood pressure in the body’s fight or flight response. The slower stress response involves the hypothalamus stimulating the anterior pituitary in the brain (Figure 1). That activates the adrenal cortex to release cortisol, another stress hormone that takes more time to show higher levels in the body.

![Figure 1. Stress Activates Two Hormonal Systems. Description of faster and slower stress responses in the body (Breedlove and Watson 2013).](image-url)
Gopal et al. (2011) described the chain reaction in more depth with the specific hormones that are released throughout the process (Figure 2). When the brain interprets an experience as a stressor, the stressor will activate the hypothalamo-pituitary-adrenal axis (HPA), which then activates the sympathetic nervous system. This triggers Corticotropin-Releasing Factor (CRF) to be released, then Adrenocorticotropin Hormone (ACTH), which finally activates the adrenal glands. The adrenal glands release glucocorticoids such as cortisol (which can affect the immune system). In summary, the endocrine system can respond to stress, releasing varying amounts of hormones into the bloodstream, which circulate the body creating additional changes.

Figure 2. Detailed endocrine feedback system. Demonstration of specific hormones released when body is presented with a stressor (BGD Lecture 2014).

This interrelation can also be seen between the endocrine system and cardiovascular system. A study by Vrijkotte et al. (2000) describes effort/reward imbalances at work. The researchers found that if there were imbalances, meaning the reward they received was not
commensurate with their effort, it created high-stress situations and in turn higher systolic blood pressures and higher heart rates.

Other studies examined effects of academic stress on the autonomic and cardiovascular systems. Results from a study performed by Gopal et al. (2011) demonstrated that exam stress led to an increase in heart rate and systolic blood pressure for subjects receiving no stress intervention or treatment. This same study found that psychological reports of stress as well as respiratory rates increased during exams for the subjects without any intervention. Additional research looked at cardiovascular changes occurring in response to psychological changes (Feldman et al. 2004). Their control group had a non-stressful task (reading) and the experimental group had to prepare a speech (a stressful task). The stressed group showed higher cardiovascular levels (blood pressure and heart rate) as well as increased negative emotion.

Another system impacted by stress is the immune system. Gopal et al. (2011) described how certain aspects of the immune system were found to decline with exam stress. There was a significant decrease in serum interferon for the control group when compared to the group that participated in yoga daily as a stress-relief intervention. Serum interferon is a cytokine that helps amplify or boost immune/antiviral response (Delves 2011). This is important because the more stressed group showed a significant decrease in serum interferon, meaning that their immune system (or at least that small part of it) could be compromised – obviously a negative side-effect of stress. Additionally, this study demonstrated that upper respiratory tract infection frequency increased with higher levels of stress. Furthermore, wound healing time lengthened and viral reactivation intensified, overall representing a wide range of negative effects that stress may generate. Therefore, there is an evident interrelation of different body systems.

**Counteracting stress symptoms**
It is apparent that there are a variety of negative consequences of stress; however, there are a variety of factors being explored that can help counteract these adverse effects. A study found that for subjects who did continuous yoga practice, their heart rate during exams remained consistent with their non-stressed heart rate (Gopal et al. 2011). There was no significant increase in the heart rate like there was for the control (non-yoga) group. Learning breathing and stretching techniques in a calming environment with others can be helpful. There are also a variety of breathing techniques including Complete Natural Breathing, the Relaxing Sigh, and Purifying Breath that are examples of a few stress reduction procedures promoted by psychologists to help people dealing with overwhelming stress symptoms (Davis et al. 1988). Another form of intervention is described by a study showing how increased levels of social support are correlated with lower blood pressure (Walsh and Walsh 1987). An example is when church attendance and positive affect, otherwise known as positive attitude and outlook, were found to help lower blood pressure in participants. Having the support of other beings can have a significant impact.

This relates to a newer, and increasingly utilized form of therapy for stress, involving animals. It is sometimes referred to as animal-assisted therapy (AAT). This type of therapy involves animals working with patients to help them achieve their therapeutic goals (Barker and Dawson 1998). There are primarily three types of AATs that will be focused on including ESAs, or emotional support animals, volunteer visit animals, and service animals. ESAs are also known as psychological support animals, or emotional therapy animals. They typically begin as someone’s pet and once officially prescribed by a doctor, they may be brought into public settings in which they might not otherwise be welcome. These animals are primarily for personal use, so the animal-human relationship is between the animal and the owner. Volunteer
visit animals are usually certified through a specific volunteer program (such as Pet Partners), trained, and then brought into medical facilities. Usually the handler is the owner and brings the animal to meet other people. These animals are therefore used less for personal use, but instead to help a wider variety of individuals. The last category focused on is service animals. These animals are usually used for people with sensory or motor disabilities. The owner works one-on-one with the animal who is highly trained, usually by a specific organization. The research portion of my study was based on the use of an ESA, but a variety of AAT were explored overall.

This type of therapy is relatively new. A study by Nepps et al. (2014) describes that there were statistically significant decreases in variables such as pain, depression and anxiety with the therapies involving animals when compared to a hospital’s typical stress management program. Both of their stress management programs were group therapy sessions, but the primary difference was the presence or absence of an animal. They also observed that the animal-assisted therapy sessions had a higher attendance than any of the other kinds of therapies, and some patients had major breakthroughs while working with the owners and their animals. The fact that more people attended the AAT sessions is essential to know since for many people, actually attending psychological therapy is the most difficult part of the recuperating process. If animals present the motivation needed to get to the therapy, patients may be able to recover faster if they are able to begin sooner and attend consistently.

Emotional support animals (ESAs) are becoming increasingly common for the treatment of anxiety and depression. They are most frequently used in nursing homes and hospitals. As studies begin to demonstrate a growing amount of physical and psychological benefits that ESAs offer humans, they are being incorporated into even more places such as airplanes, work offices,
and even college dorms. There are obvious benefits that these animals provide, including an increase in socialization and interaction between human subjects when an ESA was present versus when it was absent (Draae 2001). This increase in socialization can help counteract physical stress symptoms such as elevated blood pressure, as Walsh and Walsh (1987) described, and emotional stress, an important area of study, especially for college students. Animals are thought to help decrease blood pressure when subjects pet them, or are solely in the presence of a familiar animal (Baun et al. 1984). Additionally, geriatric patients have found decreased depressive symptoms, lowered heart rate, lowered blood pressure, and an increased report of quality of life when participating in animal assisted therapies (Steed and Smith 2002).

The role of animals in AAT

AATs in general are very diverse and the animals involved have varying roles. The types of animals utilized can range from dogs, to horses, to monkeys, to rabbits. A variety of case studies documenting these varieties of roles are described below.

Case Studies from Personal Observations and Interviews

An example is George, an Olde English Bulldogge who visits the geriatric psychiatry area of United Hospital in St. Paul, MN with his owner on a weekly basis (Garrett, personal communication). Patients often come to sit in a common room and have the option of being introduced to George. The patients frequently interact with George physically by petting him, but also open up psychologically by sharing stories of their own animals. Overall, conversation about the patients’ health is avoided, and sometimes that is the beneficial break that many people need. Nurses and staff have reported back to George’s owner that many patients only speak or show true enthusiasm when George comes to visit.
Another example is an organization called NEADS - National Education for Assistance Dog Services. NEADS works to train dogs, typically Labrador Retrievers, at a very high level for both “functional” and “emotional” reasons (Moon, personal communication). Functional tasks include performing certain actions for someone such as picking up a dropped object or opening doors, whereas emotional tasks can involve offering support and therapy to counteract anxious, depressive, and social symptoms or problems. These dogs are, for example, helpful for first responders or families who may have experienced a trauma. NEADS also provides some dogs to psychotherapists to act somewhat as a catalyst for initiating dialogue and conversation.

Dogwood therapy is an example of a healthcare practice utilizing the help of animals. It is an occupational therapy private practice that involves significant work with AATs (animal-assisted therapies) and education surrounding the welfare of these animals (Winkle, personal communication). They typically work with multiple breeds of dogs including Labradors and Golden Retrievers, and everyone there (staff, therapists, and patients alike) seems to enjoy the presence of the dogs. They help patients with a variety of activities in OT frameworks, including counteracting anxiety during a specific task.

Additionally, AATs offer a fantastic form of psychological motivation for many patients. A family friend’s young son, TJ, spends a great deal of time in the hospital. The Child Life Department at the hospital he receives treatments from creates a list of patients eligible to have dogs come to visit them (Wilson, personal communication). Even on the days that he was still in the ICU, the dogs would come in, and although TJ was groggy he would react positively to seeing the dogs there (Figure 3). Once he was able to get up and moving again, the physical therapists and occupational therapists working with him would use the dogs as a form of motivation. Often, TJ was in a lot of pain, especially after an amputation that he had, and
performing the exercises that the therapists wanted him to do was only feasible with the idea of interacting with the dogs. He would not do the exercises just because his parents asked him to, but with the promise of walking the dog, he had the psychological will to try it out.

Figure 3. TJ with a visiting animal (Wilson, personal communication)

From the perspective of TJ’s mother, the emotional relief she felt seeing TJ’s interaction with the dog was another benefit. So often, the extreme situations encountered in the ICU, especially with young children is incredibly difficult both physically, and definitely emotionally as well. Seeing the pain that her son has to encounter so frequently is not “normal” as she phrased it. Yet, to see him interact in a “normal” way, loving these dogs that came to visit, is an enormous comfort.

Another example is EAGALA or Equine Assisted Growth and Learning Association (Eagala 2010). This is an organization that offers psychotherapy with horses as a treatment for people. Their website describes why they chose horses to help with these therapies, including how large and powerful these animals are, as well as how similar to humans their personalities can be. These characteristics as well as the horses being very intuitive can help the people seeking psychotherapy with confidence building or communication.
A last example is a program at the University of Minnesota called PAWS or Pet Away Worries and Stress. They bring in primarily dogs, but also other animals such as a therapy chicken for faculty/staff and students to come pet and interact with (Gfrerer, personal communication). They have an enormously positive response on both of their campuses each week. The teams, which include the owners and the dogs, have shifts so that the dogs do not get overwhelmed. According to one handler that I spoke with, this program is more of a holistic approach to health since animals and nature in general have been beneficial to people throughout history. In her opinion, to reconnect to the animals is natural and healthy and therefore can have fantastic effects for peoples’ mental health (Gfrerer, personal communication).

Why study students?

There is great motivation for studying the interaction of ESAs with a population of college students since there are very few studies on ESAs and college students, and more on ESAs and populations such as geriatric patients (Steed and Smith 2002). The previously mentioned studies and case studies show clear benefits for patients and clients who work with AATs. Since stress for college students continues to increase, it is a problem that definitely needs to be further investigated if there is hope to counteract the negative symptoms that frequently result (Henriques 2014). If ESAs can offer a helpful treatment for college students, then this is an important area to research. Once there is evidence to support the claim that ESAs can help, it could lead to policy changes on campuses, allowing more of these animals to be utilized, and therefore more people benefiting from these animals’ presence.

On St. Catherine University’s campus specifically, there is a unique process for getting an ESA approved to live with a student on campus (King, personal communication). First, the individual needs a diagnosis from a healthcare professional. This is a medical reason for why the
student needs this animal, for example if they have anxiety or depression. Next, the individual needs to provide documentation from their health provider describing why they think the ESA would be helpful. The health providers that qualify typically include the individual’s own psychologist who has worked with them in the past and knows what therapies have or have not worked. Then, the student needs to have a discussion with Disability Services on campus about whether or not having the ESA would also be in the best interest of the animal. Finally, there are some procedural forms to complete from Residence Life, and ultimately Residence Life and Disability Services combine to approve the ESA living with the student on campus.

At St. Kate’s, a rabbit was one of the first ESAs permitted to be in the residence halls. The rabbit’s owner has had the rabbit its entire life, and throughout their time together, she has benefited greatly from his presence. Her stress levels have decreased dramatically. Additionally, she is more patient in stressful situations. Also, her grades have increased significantly since she has been with her ESA. Fortunately, this rabbit ESA was approved to be included in this study.

The study measured college students’ physiological and psychological responses to stress with the ESA rabbit both present and absent. It was hypothesized that in the presence of an Emotional Support Animal (a rabbit), the subjects, when presented with a mild stressor, will exhibit fewer and less intense physiological and psychological indicators of stress than when the rabbit is not present.

**METHODS:**

This study aimed to measure the effects that an Emotional Support Animal (a Mini Rex Rabbit, *Oryctolagus cuniculus*) had on college student stress. Since there were human subjects and an animal involved, an application was submitted to the Institutional Review Board of St.
Catherine University and was approved before testing began. There were thirty subjects, all of whom were women between the ages of 18-25. Prospective subjects who were allergic to rabbits were excluded. Anyone taking blood pressure or anxiety medications were also excluded since these were some of the variables being tested in the study.

For each subject, there were two sessions on different days. For half of the subjects, the rabbit was present on the first day and not on the second. For the other half of the subjects, the opposite occurred. The trials took place in Mendel Hall room 12 on the St. Catherine University campus.

Subjects were tested in the order that they signed up. Upon arrival to Trial 1, they read and signed the consent form after asking any questions and being made aware of the risks and benefits of participation. Then they were given a Visual Analog Scale and marked on a line ranging from “Not stressed at all” to “Extremely stressed” how they felt at that particular moment. Then, their initial blood pressure was taken. To record their heart rate and heart rate variability throughout the trial, electrodes were placed on their right wrist and left ankle. The electrodes were connected to BioPac MP36 through a heart rate lead (Figure 4). BioPac MP36 is a device that transmits and converts the information from the electrode leads into a visual display on the computer to later be analyzed.

Two other electrodes were then placed on each subject’s right index finger and middle finger and were connected to BioPac through an EDA (electrodermal activity) lead (Figure 4). Electrodes on the fingertips measure EDA by the conductance traveling across the skin. EDA is related to the sympathetic nervous system, which is activated during the body’s fight/flight response (Kremer and Mullins 2012). High EDA readings often indicate increased stress.
A video camera was then started to record the subjects during the trial, and the BioPac recording was started. The video camera was a tool used to induce stress in the subjects. Then, an approximately seven minute recording of ten double-digit math problems including multiplication and subtraction began. The lists were randomized as to who got version 1 or version 2 of various problems first. Subjects were instructed to answer each problem out loud to the best of their ability. If the rabbit was present in that trial, they were also instructed to pet or interact with the rabbit as much as possible throughout the trial. After the recording was over, the heart rate, heart rate variability, and EDA recording was turned off and their blood pressure was recorded for a second time. They were also asked to fill out the Visual Analog Scale a second time. Trial 2 was the same for each person, except for the presence or absence of the rabbit and there were also alternate sets of math problems that were randomized per trial. Lastly, subjects received a gift card after the second trial as a way to thank them for participating. The overall goal was to find out if the rabbit’s presence affected the person’s physiological and psychological stress symptoms.

**RESULTS:**
Overall there were five variables that were recorded and analyzed including blood pressure (BP), heart rate (HR), heart rate variability (HRV), electrodermal activity (EDA), and visual analog scale (VAS) data.

Average blood pressure was calculated by determining the average mean arterial pressure for each trial type. Results regarding blood pressure show no statistically significant difference between treatment type and mean arterial pressure (MAP) when it was just the second readings averaged from each trial (Figure 5, \( t = -0.9, p>0.05 \)). There is a slight trend in support of the hypothesis in terms of the MAP being lower in the presence of the ESA, although the difference was not statistically significant.

![Average second readings of mean arterial pressure (mmHg) in relation to presence of ESA rabbit.](image)

**Figure 5. Average second readings of mean arterial pressure (mmHg) in relation to presence of ESA rabbit.** The blood pressure of twenty-seven subjects was recorded twice per trial – once at the beginning and once after the math problems were just completed. The columns in this graph represent the average second readings of mean arterial pressure among subjects in relation to the treatment type. Standard error bars represent ± 1 standard error. The average mean arterial pressures were not significantly different (t-test, \( p>0.05 \)).

Heart rate was calculated by averaging the beats per minute (BPM) for each trial type. The results for heart rate demonstrate no statistically significant difference in BPM between
treatment types (Figure 6, \( t = -0.09, p>0.05 \)). Average heart rate was about the same whether the ESA was present or absent.

Figure 6. Average heart rate (bpm) of subjects in relation to presence of an ESA rabbit. The heart rate of thirty subjects was continuously recorded throughout both trials using electrical leads connected to BioPac MP36. Artifact data was eliminated and the columns of this graph represent the average remaining heart rate data per treatment type. Standard error bars represent ± 1 standard error. The average heart rates were not significantly different (t-test, \( p>0.05 \)).

Heart rate variability (HRV) was analyzed next. HRV is the variance in time between heartbeats, and it demonstrates the relationship between the sympathetic and parasympathetic nervous systems in the body (Kawachi 1997). This was analyzed by looking at a ratio of the activity between the two systems. HRV is often measured in frequency, and for stressful situations, people generally see an increase in sympathetic activity associated with more low frequency HRV. As sympathetic activity increases, the parasympathetic activity decreases which is associated with less high frequency HRV (Kawachi 1997; Berntson and Cacioppo 2004). The opposite occurs if someone is more relaxed, meaning their parasympathetic activity is increased. This would be associated with more high frequency HRV, and less low frequency HRV.
HRV was calculated through BioPac itself. It lists a sympathetic:parasympathetic ratio, which was then averaged per treatment type. There was no statistically significant difference between the treatment type and this ratio (Figure 7, t=-0.81, p>0.05). There is a slight trend of the ratio being higher while the ESA is present, indicating a larger sympathetic reaction to the ESA.

![Graph showing Heart rate variability sympathetic:parasympathetic ratio in relation to presence of an ESA rabbit.](image)

**Figure 7. Heart rate variability sympathetic:parasympathetic ratio in relation to presence of an ESA rabbit.** The heart rate variability of thirty subjects was continuously recorded throughout both trials using electrical leads connected to BioPac MP36. Artifact data was eliminated and the columns of this graph represent average sympathetic:parasympathetic ratios of activity in the body per treatment type. Standard error bars represent ± 1 standard error. The average HRV ratios were not significantly different (t-test, p>0.05).

EDA was then calculated by taking the integral under the EDA curve of data recorded in BioPac. The integrals were averaged for each treatment type. There was no statistically significant difference between treatment type and EDA (Figure 8, t=-1.04, p>0.05). The overall trend however, was in support of the hypothesis since EDA was slightly higher when the ESA was absent; however, this again was not a statistically significant difference.
Figure 8. Change in EDA (microsiemens) of subjects in relation to presence of an ESA rabbit. The EDA of thirty subjects was continuously recorded throughout both trials using electrical leads connected to BioPac MP36. The columns of this graph represent the average change in EDA in microsiemens per treatment type. Standard error bars represent ± 1 standard error. The averaged EDA changes were not significantly different (t-test, p>0.05).

Finally, the results for the visual analog scale (VAS) were analyzed. They were first calculated by measuring the distance between the two points that each subject marked on the scale. This became the numerator, whereas the total length of the line was the denominator. The difference was recorded as negative if the marked stress went down from the initial recording, or was positive if the opposite occurred. The results for the change in the visual analog scale demonstrate a significant difference between treatment types (Figure 9, $t = 2.71$, p<0.01). The presence of the ESA during the math task led to a decrease in self-reported stress, whereas completing the math problems in the absence of the ESA led to a small, but notable increase in self-reported stress.
Figure 9. Average change in self-reported stress in response to presence of an ESA rabbit.
Thirty subjects were given a visual analog scale ranked from “not stressed at all” to “extremely stressed” at the beginning and end of each trial. They marked their perceived stress levels on the scale and after both trials were completed, the distance between the two marks for each trial was measured. This distance was calculated as a percent of the entire length of the line and averaged per treatment. Each column in the graph represents the average change in the visual analog scale per treatment type. Standard error bars represent ± 1 standard error. The changes were statistically significant between treatment types (t-test, p<0.01).

DISCUSSION:

Significance of results

It was hypothesized that in the presence of an Emotional Support Animal (a rabbit), the subjects, when presented with a mild stressor, would exhibit fewer and less intense physiological and psychological indicators of stress than when the rabbit was not present.

In terms of blood pressure, my data showed a slight increase in blood pressure without the rabbit present (although this was not statistically significant). Other studies found similar results such as one study using yoga as a stress intervention treatment (Gopal et al. 2011). They found that subjects with no stress intervention demonstrated higher systolic blood pressure. Another study found higher blood pressure levels in subjects when they were stressed due to
effort-reward imbalances at work (Vrijkotte et al. 2000). Therefore, with more stress and no stress intervention, higher blood pressure is often observed. This was reflected in my findings, although again, they were not statistically significant.

For EDA, we found slight increases when the rabbit was absent. Van den Bosch I et al. (2013) performed a study looking at how repeated exposure to music influences EDA responses in accordance with emotional responses. They found that there was an overall increase in EDA, and in turn emotional response, and increase in happiness with the repetition of familiar music. Although the results in this study describe increases in EDA as a positive emotional response, depending on the task being performed in other situations, such as my study, the increase in EDA could be interpreted as an increase in stress. It remains difficult to determine how changes in the sympathetic nervous system relate to specific emotions (Monfort 2012).

For the VAS data, the presence of the ESA was associated with a significant decrease in self-reported stress, whereas the absence of the ESA led to a small, but notable increase in self reported stress. Gopal et al. (2011) found similar results in that there were more psychological reports of stress for those receiving no stress intervention. Feldman et al. (2004) performed a study with two groups – one stressed group that had to prepare a speech and one not stressed group who had to read a passage aloud. The stressed group showed increased negative emotion. Larroy (2002) also supported my findings. That study described the effectiveness of a VAS versus a numeric scale. The visual analog scales are more advantageous due to the continuous nature of the scale instead of having numeric intervals to choose from. The VAS data therefore are more precise representations of the perceived stress levels, making the statistically significant data from my study even more notable.
HRV results were the opposite of my expected hypothesis. I thought that there would be more parasympathetic activity (associated with the rest and digest system) with the rabbit present. The opposite results observed could be associated with excitement levels. It remains difficult to distinguish between an increased heart rate that is due to excitement versus anxiety (Monfort 2012). There is a study that demonstrates similar results describing people doing mental arithmetic having an increase in low frequency HRV due to their increase in activation of the sympathetic nervous system (Berntson and Cacioppo 2004).

Additional explanations for some of the data not being significant could include the fact that the rabbit being used for the study was an ESA and therefore meant to be most effective in lowering stress for primarily his owner and not a variety of people. Additional explanations for the data patterns include the ESA being an unfamiliar animal to most of the subjects, so potentially with repeated exposure to them, he could have a greater effect on their stress reduction. Also, subjects in this study were presumably animal-lovers already. Typically ESAs are used for patients who do enjoy animals, and many ESAs are owners’ pets to begin with so this was most likely not a limitation, but an important characteristic to note about the subject pool in general.

**Feedback from subjects**

Overall, these results signify the beneficial – in terms of stress reduction – results that an emotional support animal can have on an individual. Although not all of the results were significant or necessarily showed physiological stress reduction, this may be due to ESAs not being able to help everyone. As with any other kind of therapy, these animals may not help every person, but for the people that they can help, they can make an enormous difference. Subjects did report some helpful feedback at the end of the study. For example, one subject
described how for the trial without the rabbit, she felt more stressed because during the time interval between math problems, she was tense waiting for when the next problem would come. For the trial with the rabbit, she felt less stressed during these time intervals, because the rabbit presented a helpful distraction. Also some subjects reported less stress at the end of the trials in general due to knowing there were no more math problems coming, or because they knew the researcher already.

As this study, and various studies have shown previously, measuring stress is a difficult task. Physiological and psychological symptoms of stress may be manifested differently in different people. If ESAs can help students counteract even some of these symptoms, which the results from this study demonstrated, it is worth considering how ESAs can be incorporated more into college campuses.

**Future of ESAs on college campuses**

Overall, the role of animals in our society is changing. The Humane Society claims that, “Pet ownership in the U.S. has more than tripled from the 1970s, when approximately 67 million households had pets, to 2012, when there were 164 million owned pets,” (Pets by the numbers 2014). This shows an evident increase in the desire for animals, solely as pets. As the benefits of ESAs become better known and acknowledged, college campuses are also involving these animals more. For example, many campuses nationwide, including St. Kate’s, have dogs come in during finals week as a stress-relieving break for students (Figure 10).
These animals can have many beneficial effects on students, but at the same time, the well being of these animals, if they are going to be incorporated more on campuses, needs to also be addressed.

**Do animals have rights?**

To determine what is involved in the well being of animals, it is important to understand what rights animals have to begin with. Carl Cohen, a professor of Philosophy, is adamant that animals do not have rights. He believes that rights are claims between moral agents and since animals, in his opinion, lack free, moral judgment, they cannot be part of a moral community (Munson 2012). In turn, they would not have rights.

In my opinion, however, animals most definitely have rights and a moral community; it just may be a broader sense of morality when compared to (as an example) our ability to hold each other accountable for things. As the Stanford Encyclopedia of Philosophy denotes, many philosophers acknowledge the differences that exist not only among humans and animals, but between different groups of humans as well (Gruen 2012). They, however, do not believe that the differences are an adequate basis for not considering animals in a moral sense. As Marc Bekoff, a biologist, describes, “…the basic ingredients of morality [are] namely, cooperation,
empathy, fairness, justice, and trust.” (Bekoff 2007). He goes on to describe morality in terms of animals vs. humans broken down by different behaviors performed by each. He further explains that although the morality of other creatures may not appear the same as morality among humans, scientists are gaining more evidence that it is a “biological necessity for social living.”

The prevalence of this biological necessity is evident when studying the countless stories of animals helping each other, performing rituals, and more. It quickly becomes clear that they have a virtuous community revolving around respect and awareness of others. A recent scientific study examined mice in Plexiglass cages. There were two cages – one with chocolate and one with another rat. They placed a free rat into the pen, and the majority of the time, “…the rats opened both cages and shared in the chocolate chip feast,” (Jabr 2011). While the free rat could have eaten the chocolate on its own, it decided to free its fellow rat and share the goodies. This implies that the rats had an awareness of each other, and thought through their actions as well as helped others of their kind. This demonstrates at least a certain level of moral community and support for each other.

This level of morality and interpreted care for others translates to ESA-human relationships. Demonstrating morality means these animals therefore deserve rights. These rights ultimately contribute to the ethical treatment of ESAs.

**Ethical treatment of ESAs**

In contrast to other types of therapies and treatments that often involve a therapist working with a client to change the client’s behavior, an ESA-human relationship relies on two beings working closely together, sometimes with a therapist, long-term. These types of therapies should therefore involve not only behavioral changes for the client, but also training on how to
best care for their animal who is working with them. To make the relationship ethical, protection for both the client and the animal need to be addressed.

The fact that these animals are captive can sometimes be viewed as unethical treatment. As Cochrane argues, however, being autonomous by creating a certain life for oneself by choosing specific goals and revising these goals as one learns is not the kind of autonomy that animals possess (Gruen 2011). They “do not have an intrinsic interest in liberty, thus pain-free captivity is not objectionable,” (Gruen 2011). Intrinsic interest in liberty in this case would mean that they would be able to function on their own in the wild, and have a desire to do so. Most of these animals are born in captivity, and it would be more dangerous for them to live in the wild. Therefore, the captivity part of an ESA-human relationship is not necessarily unethical, but if the animals are not protected, and well cared for, that is when a problem arises.

Policies in any situation often are the first step towards protection. Currently, there is a lack of policies surrounding the welfare of animals used in ESA relationships. On many campuses, hospitals, and even in many laws, the policies, if they exist at all, often surround the protection of everything and everyone, except the animal. An example is on college campuses where ESAs are becoming increasingly common. “The Department of Housing and Urban Development (HUD) last April declared that public universities must comply with the Fair Housing Act which allows for emotional support animals,” (Halyard 2013). Although ESAs are being written into new policies put in place surrounding having them in dorms, apartments, or other types of housing, the policies revolve primarily around the repercussions for the owner if the animal destroys something in the home, or is a disturbance to neighbors. The policies do not generally go into detail about the needs of the animal or the best way to approach caring for the
animal in that housing setting. The policies generally ask for proof of vaccination for the animal and proof of psychological need from the owner.

An example of an ESA policy for college campuses can be found on Brigham Young University’s website. The policy specifically addresses when the ESA can be removed, what happens if they damage something, what areas are off limits, and all documentation and logistics surrounding permitting the animals into on-campus housing (Family Housing Policies 2012). Obviously, these are essential details to protect people on campus, as well as the university’s property. Some may think that the policies should not address the treatment of the animals anyways, but if they are going to be living with humans in close proximity and if they are so important as to have significant emotional impacts on their human counterparts, there should most definitely be something in the policies concerning their well being and protection.

The treatment of ESAs can also be unethical due to humans not training them when they are incorporating them into human society. Service and therapy animals typically receive extensive training, and the fact that ESAs may not receive any may be putting them at a disadvantage. An example is when some people use their ESA for the anxiety they experience while flying. Legally, an airline has to permit the animal to fly with their owner if they are a certified ESA, unless the animal is a danger to fellow passengers, because they cannot discriminate against someone with a psychological disability (Witz 2013). Flying with ESAs is controversial, though, because if the animal is not trained to be desensitized to the hectic environment, loud noises of plane engines, and the crowded chaos of the airport, they may experience anxiety themselves and bite someone, or go to the bathroom on the plane. There could be a great amount of negative consequences for the animal if they bite someone or damage something, and potentially legal repercussions for the owner as well, contributing to the already
anxiety-ridden situation of flying. Service animals, on the other hand, are usually trained for situations like these and are taught to be very docile and calm. This makes them less of a nuisance to passengers and makes them much less of a risk to anyone, including themselves, by getting into something they are not supposed to be in.

Ensuring that these animals are comfortable while being utilized for treatments is essential. A recent study looked into the physiological responses of dogs used in animal assisted therapies by testing the animals’ cortisol levels (Haubenhofer and Kirchengast 2006). The researchers found that overall, cortisol levels were higher during the days the dogs were used in treatments and were higher when there were more sessions. This demonstrates some form of arousal in the animals, but it remains unclear whether this is due to positive or negative emotions. The dogs may be happy and excited to be with people, but they could also be emotionally stressed. Clearly, if animals are being used in AAT of any form, more research needs to be done on the benefits and risks for the animals as well as for their human counterparts. As long as owners are aware of their animals, and understand when their animals have had enough and need a break, I think the animal-human relationship in AATs can work well.

Fortunately, many places such as medical practices are beginning to acknowledge these animal welfare issues. For example, Dogwood Therapy in New Mexico is working closely with their clients who require or want an ESA as part of their treatment to ensure the safety and health of the animal during their treatments (Winkle, personal communication). They are working with the occupational therapists (OTs) in the practice to ensure that they understand how to help treat the people as well as the animals and to effectively teach the patients how to also care for their animal. An OT working at Dogwood Therapy explained that the OTs working there are needing to know as much about animals as they do about OT (Winkle, personal communication).
Therefore, it may be best if the animals utilized in ESA-human relationships are animals that humans already have significant knowledge about. This would help to ensure protection for everyone involved in the ESA-human relationship and the best care possible for the animal.

**Changing roles of ESAs**

As time progresses, ESAs and AATs in general will most likely become numerous and more obvious as an increasing amount of people bring their animals with them. According to George’s (the bulldog who visits United Hospital every week) owner, he sees the role of these therapy animals growing in accordance with an increase in regulation (Garrett, personal communication). It has taken a great amount of effort to find people who are able to examine the dogs for the Pet Partners program and organize the program itself. He hopes that as the program expands, the quality of the dogs and owners will not decline. As he phrased it, “It takes a lot of convincing to open up an area to animal assisted therapy but probably only one accident to close it,” (Garrett, personal communication). As previously mentioned, an increase in policies and regulations can hopefully help protect the animals, their owners, and patients as well.

TJ’s family mentioned that over the past eight years spent in and out of hospitals, the amount of dogs at the hospitals that they have seen has grown dramatically (Wilson, personal communication). This past summer, he had a dog come almost daily to visit him. After TJ had his amputation, a handler who had a dog with an amputated limb came in to see TJ and spend time together. It was a beneficial program for him. Hopefully the trend of more dogs visiting patients in the hospital will continue.

According to a representative of the NEADS program, science is helping to support the increase in ESAs as well. As the representative there explained, research has identified hormones such as oxytocin that are released when the animals are working with their humans,
providing more physiological evidence of the benefits ESAs can have (Moon, personal communication). This will most likely continue as research in this area progresses.

Also, an OT from Dogwood Therapy described how there is more of a focus on animal welfare issues (Winkle, personal communication). This is essential for maintaining the safety and well being of the ESAs and the people they interact with as well. The animals have to be enjoying the work, have free access to water, not work for too long, and there have to be policies in place surrounding the ethical uses of these animals in a medical practice setting.

Additionally, the more science and research being done surrounding the benefits of AATs will most likely lead to an increase in the usage of AATs. Policies are simultaneously beginning to change, such as at St. Kate’s where part of the process of getting an ESA on campus is discussing whether it is simultaneously a good choice for the animal as well (King, personal communication). Even small changes such a growing number of campuses bringing in animals during finals week as a stress relief is helping to spread awareness of the benefits these animals can offer students.

**ESSENTIAL TAKE-AWAYS:**

Animal assisted therapies offer a variety of benefits for people (including students) as demonstrated by the visual analog scale data as well as results from various other studies. It, however, remains difficult to read emotions purely with physiology whether it is analyzing the physiological changes in humans or the animals helping them. Hopefully more research in this area will continue to ensure the well being of everyone (humans and animals) involved in AATs. We definitely need to be taking into account animal welfare issues, and policies are an important step in the right direction.
Overall, this project was a fantastic learning opportunity. I began by exploring a variety of biology and psychology ideas, but ultimately decided on my topic of emotional support animals helping students. This combined all of my interests including knowledge that I accumulated through the pursuit of my degree, as well as provided the opportunity to learn so much more about these areas.

Planning the project was probably the most difficult part of the entire experience since I performed a research study in addition to the background research and interviews that I included in my paper. This was an incredible opportunity, however. Many undergraduates at other universities do not get the chance to perform scientific research, or if they do, it often involves being the assistant for a professor, not truly working alongside them as a collaborator. This project allowed me to pursue a project that I designed alongside my committee members, and I was able to learn about the entire research process in a university setting. This involved the initial planning of what to do, determining what materials were needed, submitting applications for funding and institutional review, performing the experiment, and finally analyzing the collected data.

Additionally, the project was beneficial in terms of being able to make connections with a variety of people in animal assisted therapy (AAT) fields. This included Occupational Therapy and other health fields incorporating AATs. This is what I ultimately hope to pursue after graduation, so being able to network and ask questions about how therapists can effectively utilize animal assisted therapies in OT was advantageous.
The main problem that arose during the project was definitely time management. Although the project only counted as four credits, I found myself wanting to put more time and effort into what I was doing because I was so interested in it. Unfortunately, I did not have enough time to do as much as I hoped to accomplish. At the same time, I think I did successfully examine my topic in a variety of formats. Aside from the research that I did, I contacted and interviewed a variety of people from across the country as well as on campus, and had the opportunity to look into the ethical side of the topic as well. It was definitely multidisciplinary which I think is important. It allowed for a more complete analysis of animal assisted therapies being used in a variety of settings.

A somewhat minor problem that we came across was determining how to analyze and truly understand the results of my heart rate variability data. The data and research out there about this physiological variable is complex and not particularly clear in the findings. Working together with my adviser however, we were able to sort through this research and determine how to analyze the data in a clear way.

The only avenues that we rejected in the project were primarily due to logistical reasons. Some of my initial ideas for the project involved studying mirror neurons, which primarily have been studied in animal brains which I was not aware of at first. This would not have been feasible since we do not have access to many animals in our labs. Additionally, I would not want to harm any animals, even for research, so this did not seem like a good fit for my topic.

Once determining my project idea of ESAs on college campuses, deciding which variables to look at was also difficult. Cortisol is a hormone that is sometimes associated with stress, but I decided not to look at this variable specifically. Aside from the cortisol measuring kit being somewhat expensive, to see a real change in cortisol required more time per trial than I
had initially allotted. I think that it would have been complicated to keep the subjects and rabbit ESA interacting for long enough to get accurate cortisol change measurements, so I decided to pursue other physiological indicators of stress.

Lastly, I had a variety of other studies that I wanted to look into, but did not have time to. I was very grateful for the St. Kate’s community’s response to my research study, and many people, after hearing what I was doing for the project, sent me information and additional studies to look into. Some of these studies focused on different hormones being released in humans when animals were present, while others revolved around nontraditional ways to counteract stress and described how we can utilize stress to our benefit. The only reason I decided not to look further into these studies was due strictly to time; I did not have the ability to thoroughly read and understand them enough to relate them to my findings or study.

In a future study, I would definitely like to look further into these research studies that I did not have time to explore. Additionally, I would like to look more into touch therapies between humans such as hand massage. This could relate to contact with animals as well and add a new dimension to understanding AATs. There are other types of AATs I did not get to explore either, such as hippotherapy or equine therapy which are other intriguing fields for helping with both psychological and physical disabilities. Furthermore, additional interviews with more people currently working in AAT fields could be beneficial in determining where the future of these types of therapies will go.

Overall, the most exciting part of this research was seeing the support and enthusiastic reactions of people when they heard about the project. The people currently working in the field that I spoke to were incredibly interested in the fact that scientific research was being done on these therapies. After working in the field for some time, they observed and continue to observe
daily, the benefits that AATs offer their clients. Many of these individuals, however, expressed concern over the fact that they knew of hardly any hard scientific evidence to support their claims of the benefits these animals provide to the clients. Working on research addressing the importance of these animals, was simultaneously very exciting for me.

I certainly hope that a lot of research does continue in this field. Potentially in my future pursuits of an Occupational Therapy degree, I will have the opportunity to continue this research and be able to incorporate AATs into my career and work with patients. I specifically hope to work with individuals with prosthetics who could utilize AATs as a form of motivation and support for adjusting to a new way of life. This project, in my opinion, definitely prepared me well for life after college in terms of allowing me the chance to explore a topic that is important to me and allow me to explore what I want to pursue after my undergraduate education is complete. It also gave me the chance to work independently while still having the support and direction of faculty members to help make the project an overall success.
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