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Emily Gerace

The College at Brockport, egera2@brockport.edu

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The association between owning domestic dogs as pets and the productivity
amongst college students

Emily Gerace

The College at Brockport

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Research Methods in Healthcare

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Background

Pets have been known to be a great support system for their owners, which could have potential benefits to one's mental and physical wellbeing. There have been numerous studies completed that evaluate the benefit of therapy animals and pets in our day-to-day lives, specifically dogs. We have learned much about the way they help us cope and even how they can impact our stress levels and overall health. In recent years, there has been increasingly more research conducted to specifically determine what kind of impact animals have on those enrolled in higher education, which is known to be a significantly stressful time for many. What I aim to explore is just how much of a benefit these animals, specifically domestic dogs, can provide to college-age students and how those benefits correlate to their overall productivity and grades. Though there isn't much research that exists yet in relation to those factors, there is plenty out there that provides a starting point and inside look into what a brief interaction can do for immediate health.

Stress is a big part of everyday human life and stressors can come from a variety of different sources. There is a great deal of research that shows benefits to an individual's level of stress when exposed to an interaction with a dog. Specifically, the use of trained therapy dogs has been used countless times in the majority of research that pertains to human-animal relations. As stress has been known to be linked to cardiovascular issues in humans, Krause-Parello and Kolassa (2016) aimed to show in "Pet Therapy: Enhancing Social and Cardiovascular Wellness in Community Dwelling Older Adults" that interactions with these trained animals are associated with a significant decrease in systolic blood pressure (Krause-Parello & Kolassa, 2016). Through the use of a cross-over design, participants between the ages of 60-102 acted as both case and control by receiving a visit from a therapy dog and receiving a visit from just a friendly person, a week apart, in random order depending on the subject. Both blood pressure and heart rate were measured throughout the experiment, and both were shown to decrease more after the interactions with the therapy dog versus the visit with a human (Krause-Parello & Kolassa, 2016).

In addition to older adults, one group in particular that is especially affected by stress is college students. Between new experiences, quizzes, exams, and projects, a great amount of stress can occur. "A Randomized Cross-over Exploratory Study of the Effect of Visiting Therapy Dogs on College Student Stress Before Final Exams" shows through a randomized crossover design that college students could experience benefits of interactions with therapy dogs (Barker, Barker, McCain, & Schubert, 2016). Final exams can create immense amounts of stress in college students; so many colleges spend a lot of time and resources trying to find efficient ways to reduce that stress. Barker et al. (2016) found that by petting, talking to, and playing with a dog 15 minutes prior to an exam did significantly decrease perceived stress in college students (Barker et al., 2016).

Stress has also been tested in college-age students while in the presence of a trained dog, as observed by Galvão, Zaine, and Domeniconi (2016). In their experimental study, "Influence of Dog Presence on Aversive Stimulation" (2016), they compared the latency period of college students exposed to a mild, low-

frequency sound that was perceived as aversive. There were 3 groups compared; the trained dog group, a group that was allowed to flip through a book of paintings, and the control group who were just instructed to listen to the noise as long as possible without anything else in the room with them (Galvão et al., 2016). Through a Pearson correlation test, most students described the experience with the dog as positive, whereas they described the scenario with the book as more negative, even though both were discovered to allow students to keep their headphones on longer than in the control (Galvão et al. 2016). Galvão et al. (2016) concluded that the presence of a dog acts a strong distractor to stressors and that they have a positive effect on tolerance.

Though many studies have proven the benefit of therapy dogs on humans, especially college students, what we know little about is how much benefit a novel dog would have on the same group. Novel dogs are dogs that are unfamiliar to the subject and typically don't have any formal training like therapy dogs do (McDonald, McDonald, & Roberts, 2017). Therefore, they aren't purposely trained to know how to react to human emotions, and instead just react off of instinct. Both studies by Polheber and Matchock (2014) and McDonald et al. (2017) found this gap of knowledge in their research. Similar to Krause-Parello and Kalassa's study (2016), Polheber and Matchock (2014) took a look at a dog's impact on college-age students' apparent stress related to increased cardiovascular activity in the study "The Presence of a Dog Attenuates Cortisol and Heart Rate in the Trier Social Stress Test Compared to Human Friends." The results were observed in a stressful situation to measure cardiovascular effects and stress levels in an experience that was believed to be a common scenario. Mock interviews and mental math were the tests administered in this study, except they used a novel dog and instead of a specially trained dog. (Polheber & Matchock, 2014) Like Barker et al.'s study (2016), saliva was tested. But unlike that study, they chose to measure cortisol levels in saliva intermittently throughout the study and not sNGF and sAA, which were not impacted at all after an interaction with a dog (Barker et al., 2016). These cortisol levels were attenuated by this interaction as compared to a control group with no support, and another group with support of a close human friend. The results of those in the dog intervention were proved to have lower cortisol levels than those who were not in the presence of the therapy dog, which was higher after the induced stress test (Polheber & Matchock, 2014).

In the study, "Effects of Novel Dog Exposure on College Students' Stress Prior to Examination", McDonald et al. aimed to show a very similar result to this. They observed students' blood pressure levels before and after the experiment in two different groups, 15 minutes prior to a midterm exam. Group 1 was allowed to do any quiet activity of their choosing and group 2 was instructed to interact, play with, talk to, and pet a novel dog (McDonald et al., 2017). McDonald et al. (2017) found this study showed that the intervention group had significantly lower blood pressure levels as opposed to the control group after finishing the experiment. In fact, the control group's levels actually increased even though they were instructed to do any quiet activity that they wanted. Conclusively, exposure to any good-natured dog, trained or untrained, has the potential to reduce blood pressure levels,

which ultimately have an effect on reduced stress in college students (McDonald et al., 2017).

Many of these studies observe the relationship between dogs and humans, but animals do not necessarily even need to be present in order to prompt a reduction in stress. Torres, Arnold, and Shutt show that through just images of young dogs and cats, college students experience a reduced level of stress just by looking at the pictures (Torres, Arnold, & Shutt, 2016). This study proposed that there is a learned anxiety associated with math and that people who are more susceptible to this math-anxiety are less likely to pursue a career in a STEM field and will avoid math in their adult lives (Torres et al., 2016). To reduce math-anxiety, they wanted to see if there was an association between the exposure of students to pictures of animals and lower self-reported stress and higher performance (Torres et al., 2016). Through experiments and questionnaires, they set out to compare stress levels and performance in a sample of 114 students majoring in Liberal Arts and Engineering (Torres et al., 2016). The experiment tested three groups. One group had pictures of desks in the margin, another had pictures of cats and dogs, and the last group just had blocks of color in the margin. McDonald, McDonald, & Roberts (2017) concluded that students perceived the questions of those which animals were displayed in the margin to be less difficult than other questions. Therefore, the pet stimuli ultimately reduce self-reported stress, although it was not as affective as the blocks of color (Torres et al., 2016). Ultimately, the use of dogs, specifically untrained or even just as pictures, could be an affordable tool for colleges and universities to implement in order to decrease anxiety and stress related to exams and quizzes in students (McDonald et al., 2017).

A major question that has been asked often is, "What benefit do animals actually have on a person's well-being?" There have been many people that have set out to discover the answer. Of course, we know that they provide companionship to us as owners, and can even be utilized in helping those with distress cope emotionally and those with disabilities perform tasks. But does it go beyond that? In the study "Pets and Happiness: Examining the Association between Pet Ownership and Wellbeing", Bao and Schreer (2016) aim to explore overall life satisfaction, positive emotions, and negative emotions through two questions and two hypotheses. The first question was whether or not owning a pet has a direct correlation with the happiness of the owner; the second question addressed whether there was a difference in happiness when comparing cat owners to dog owners (Bao & Schreer, 2016). What they found through numerous questionnaires completed by 263 individuals, ranging from ages 19-68, was that there were no significant differences in measured happiness between those with pets and those without (Bao & Schreer, 2016). The same analyses were used for people who self-identified as "dog people" or "cat people" and the results showed that there were no differences in overall life satisfaction or positive emotions, but that "cat people" displayed significantly higher negative emotions than "dog people" (Bao & Schreer, 2016). In addition to overall life satisfaction, "Dogs in the Workplace: A Review of the Benefits and Potential Challenges", a review conducted by Foreman, Glenn, Meade, and Wirth (2017) showed that the presence of dogs in a work environment can lead to generally higher job satisfaction and lower turnover rates in companies

that allow their presence. The majority of humans spend a great deal of time at work, so the ability to improve feelings of stress and happiness at work could be beneficial to their overall well-being (Foreman, Glenn, Meade, & Wirth, 2017). Another way pets can contribute to overall well-being is by providing motivation and a reason for physical activity. In a literature review conducted by Westgarth and Christian (2014), they explored, condensed, and reviewed existing knowledge on the impact of having a dog on owners by enticing them to walk more often than non-pet owners (Westgarth & Christian, 2014). They discovered that through mostly observational cross-sectional questionnaires and qualitative interviews that there was evidence that dog ownership could be associated with higher levels of physical activity in humans (Westgarth & Christian, 2014). As obesity is a significant problem in the United States, it is recommended that people exercise a minimum number of minutes per week, and those that owned pets were shown more likely to achieve those recommendations in a week than non-pet owners (Westgarth & Christian, 2014). Because many feel an obligation to walk their dog in order to provide a better quality of life for their pet, Westgarth and Christian (2014) found that many studies showed that sense of obligation as a great motivator. The effect of walking a dog not only has potentials to improve physical health but mental health as well.

One of the main reasons identified that animals are able to have an effect on well-being and happiness is because they provide a sense of support. As humans, socialization is critical to our well-being and we all naturally have an innate sense to want to socialize (Westgarth & Christian, 2014). As discussed previously, owners feel an obligation to their pets to provide exercise for a better quality of life (Westgarth & Christian, 2014). This review (Westgarth & Christian, 2014) also pointed out that humans that walk their dogs more frequently are also more likely to develop an attachment and stronger relationship to that animal. Eckerd, Barnett, and Jett-Dias (2016) talk about the sense of attachment to a pet in their study "Grief following pet and human loss: Closeness is key." They found that when pets pass away, an owner could experience a significant amount of grief, just as if they would when a human dies. This is due to the sense of attachment (Eckerd, Barnett, & Jett-Dias, 2016). Although the grief is not as significant in most humans when losing a loved one vs. losing a pet, they did find that the majority of college students in their study show similar amounts of grief in both situations because most college students have only lost family members that are not in their immediate family by that age (Eckerd et al., 2016). They link this grief to the sense of closeness that one experiences with their pet due to them acting "as a secure base and a safe haven" for their owners (Eckerd et al., 2016).

As shown in Peolheber and Matchock's study (2014), the stress levels of college students were reduced more when exposed to a dog versus before a stressful situation versus the effect that spending time with their own familiar friend (a friend they have previously known) was shown to have. Their reasoning for this was that dogs provide a non-judgmental support system for humans, whereas other humans do have the ability to perceive and judge their own friends (Peolheber & Matchock, 2014). In fact, Foreman et al. (2017) similarly concluded in their review on dogs in the workplace that "pets may serve as a source of social support, perhaps more effectively than a spouse or close friends." Bao and Schreer

(2016) explain that the basic need for relatedness amongst humans presents them with the desire to feel close and connect with others and that pets have the potential to fulfill that desire. This provides increased companionship and comfort. They also present the idea of anthropomorphism, which is when humans perceive and treat their pets as if they are also human. (Bao & Schreer, 2016) We see that quite often in the relationship between pets and their owners. Often times, pets are also considered to be “part of the family” (Eckerd et al., 2016).

These pets not only provide the social support directly to their owner, but also expose them to higher chances of interaction with strangers (Westgarth & Christian, 2014). Walking dogs through the neighborhood or bringing them to a dog park presents the owner with the opportunity to interact with someone they do not previously know over a common topic: their pets (Westgarth & Christian, 2014). This can also present the feeling of a better sense of community amongst neighborhoods. (Westgarth & Christian, 2014) For many people who do not have the chance to meet new people that frequently, this could be a way for humans to socialize and interact with one another (Westgarth & Christian, 2014). Foreman et al. (2017) concluded from their review that strangers are ultimately more likely to engage with one another when a dog is present. It is unclear whether this would actually have any effect in the workplace because workers typically already are acquainted with their coworkers, but there is a link to the possibility of more social interactions with improved mood (Foreman et al., 2017).

Although there is much research showing the benefits animals can have on owners and college students, the disadvantages must not be overlooked. One of the most obvious negative consequences of owning an animal or being in a shared environment is the possibility to develop allergies (Foreman et al., 2017). Due to dander in the air, Foreman (2017) explains that there is a possibility that owners and those around the pet can experience mild to severe symptoms such as swelling, itchiness, breathing problems, rashes and more. Limiting these potential allergens can prove to be a difficult task (Foreman et al., 2017). Another issue associated with keeping a domestic pet is, of course, the possibility of this pet biting the owner or someone else (Foreman et al., 2017). When walking a dog, an owner needs to be particularly careful about coming into contact with other people and other animals (Westgarth & Christian, 2014). Knowing the temperament of the dog and considering obedience classes are crucial to know how your dog will react with others and are the best ways to prevent these situations from occurring (Foreman et al., 2017). Injuries from bites can range from “light bruising to serious laceration, tears and crushing injuries” and can be serious enough to even require prompt medical attention according to Foreman et al. (2017) It is also important to be aware of fears and phobias of animals in others. Additionally, not all cultures feel the same way about domestic pets such as dogs. It is critical to know and understand that just because the owner may love their pet and see them as a positive influence in their life, not everyone will share that same perception (Foreman et al., 2017).

Lastly, and potentially the biggest disadvantage of having a pet, is the opportunity for these animals to cause distraction from work, school, or other important functions and tasks. According to Torres et al. (2016), their study found that even just pictures of animals could act as a distraction when answering

questions on a math exam. Similarly, Foreman et al. (2017) saw this as a potential in her review as well. Due to the nature of increased socialization, these animals may actually cause a distraction from work tasks or potentially increase unsolicited social attention (Foreman et al., 2017). Both of these studies suggest that as the novelty of the dog wears off, the occurrence of distraction could decrease, but more research is needed to show whether or not this is true (Foreman et al., 2017; Torres et al., 2016). Finally, another way that an animal could pose a distraction to the owner is through the grief of losing it after the pet dies. As a college student, that could be an extremely emotional event that could cause a distraction from schoolwork and activities. Many bereaved pet owners experience symptoms of “crying, feeling depressed, experiencing a sense of loneliness, feeling guilt, numbness, or disbelief” (Eckerd et al., 2016). Eckerd et al. (2016) also explain that they may feel as though a part of them is missing and “experience intense emotional psychological, physical and spiritual symptoms.” With such a great combination of feelings, one may be pulled away from their priorities when added stress and grief are piled on top of already stressful situations such as college.

With all research comes many limitations. Perhaps one of the biggest limitations to most of these studies is that great portions of the subjects were already shown to either have an interest in or general like for dogs. Many studies used a Pet Attitude Scale to determine if the subjects either had a phobia or dislike of dogs prior to beginning the study (Polheber & Matchock, 2014). If a subject is already proven to be fond of a dog, there is a better chance that the study will be more successful. Unfortunately, this decreases the generalizability of the study since it is only applicable to the part of the population who either isn't afraid of or doesn't dislike dogs. Reviews of animal-human relationship studies have also found that typically these studies only account for mainly dogs, sometimes cats, and rarely other pets and what kind of effect they have on humans (Bao & Schreer, 2016). Therefore, we only really have an idea of what benefits dogs can have on well-being and stress.

Another limitation is the lack of opportunity to use blinding in any of these studies. Interaction with an animal is a very obvious intervention, so it is nearly impossible for subjects to not know when they are in the presence of an animal (Barker et al., 2016). Additionally, there is a great chance that many of these studies did not consider or report numerous possible confounding variables. For instance, Polheber and Matchock (2014) acknowledged in their study that they did not account for measuring the hormone oxytocin, which may have had the possibility to influence their results. They explained that this hormone is produced in a human when their pet gazes at them, and the rise of this hormone could reduce the amount of measured cortisol (Polheber & Matchock, 2014). When dealing with studies that involve animals and people, ethics should be a great consideration for too, which could potentially limit the capabilities of the study. It is important to keep in mind what is a fair environment for the dog, and is what they are being subjected to fair as well. Ethics also need to be considered when testing human subjects too. If you are testing a stressful situation or aversive stimuli, you need to make sure it is humane and not harmful or damaging to the person (Torres, Arnold, & Shutt, 2016). For example, Galvão et al. (2016) had to be very mindful of the severity of the noise

they were using to create the aversion. Too loud of a decibel or too severe of a noise could have inflicted harm on the subjects (Galvão et al., 2016).

One of the best ways to conduct new research is to determine what does not yet exist. The strength of finding these gaps in knowledge provide us with the opportunity to explore new ideas or take already existing research and build off of what has already been found. A gap in research found through this literature review is what I hope to find out and that is the association between college students owning pets and their productivity throughout the semester. We already know that there is an association with reduced stress and cardiovascular distress, but what we do not know is does this reduced stress have any association with how much work college students that own pets accomplish, whether those tasks get done on time, and whether they are more active in their school community. These ideas could be taken one step further by determining what kind of grades college students get when they own a pet. Could they be higher due to the mental physical and social health benefits, or could they actually be lower due to distractions and added responsibilities? Building off of this, studies could be conducted to determine why students choose to own pets and why others don't. Or, what is the financial cost for college students of owning pets and is it a feasible option for stress reduction? In general, there aren't many, if any, studies that show the benefits of dogs over time on generally any human, so it would be very beneficial to utilize more longitudinal designs to see just what are the lasting impacts that dogs have on humans (Foreman et al., 2017).

Pets are an integral part of a human's life. The ability to feel support and closeness to them provides many benefits to us, especially in stressful times. They have the ability to promote socialization, reduce anxiety, and keep our hearts healthy, which is especially useful during a very stressful, chaotic time in one's life, such as college. However, these benefits do not come without disadvantages. Pets also have the ability to cause distractions, allergies, and even potential harm to us as owners. Further research could display just how much of an effect owning a pet has on a college student in relation to their productivity and academic success.

Method

Research Question

Do college students who own domestic dogs as pets experience higher levels of academic productivity?

Objective

Looking at the effect of all pets is too vague for longitudinal research at this time, so this study focused only on the effect of domestic dogs, because most existing research has studied these interactions primarily using dogs. The primary objective of this study was to determine whether or not college students who own domestic dogs as pets are more likely to experience increased levels of productivity

when compared with students who do not own domestic pets in regards to grades, perceived stress, and participation in extra-curricular activities.

Participants

Participants were recruited from local Rochester area colleges including The College at Brockport, Rochester Institute of Technology, University of Rochester, St. John Fisher College, and Monroe Community College to increase generalizability. Informational fliers and posters were posted on campuses advertising and asking for volunteers for the study. The students who responded were emailed about participation. Inclusion criteria involved those who already owned a domestic dog and those who did not own a domestic dog, and who have no previously diagnosed emotional conditions or learning disorders. The students with a dog had to score in the 50th percentile on the Pet Attitude Scale to qualify for inclusion. Students who owned pets other than a domestic dog were excluded from the study as well. Of the interested volunteers, students were randomly chosen to participate and were put into two separate groups based on ownership status: those who own a domestic dog and those who do not. The sample consisted of 180 participants. (150 plus 30 subjects to account for any who leave college, drop out of the study, or are unable to complete follow up). A total of 130 subjects completed the study, 68 of whom were at different stages of owning a dog as a domestic pet (Group A) as well as 82 students who do not own any domestic pets (Group B), based on the percentages of groups in Barker et al.'s study (2016). They consisted of males and females, various ethnicities, various academic majors and included an age range from 17 years old to 25 years old (college Freshman and up). Each participant was required to read and return a signed consent form explaining that they understood the study and fully wished to participate. Every subject under the age of 18 was required to provide a signed consent form from a parent or guardian as well as their personal assent form. Each participant received 1 extra college credit upon completion of participation in the study, 2 full semesters.

Design

A prospective cohort study was conducted over the course of two semesters equal to one full academic year. This quantitative, longitudinal study allowed observation over the course of time with periodic measurements and check-ins with each student, once a month during active school months (August-December and January-May), for a total of 10 check-ins. The benefit to using cohort design is the ability to determine causal basis of an association, which was the goal of this study.

Procedure

All questionnaires were administered through email and returned via email. Prior to beginning the study, all students were asked to complete a Pet Attitude Scale to determine their like or dislike towards animals. They were also asked to take an initial demographic questionnaire that gathered information on their age,

race, gender, dog ownership status, and academic major. As the study began and continued, once a month, students were asked to complete the same questionnaire in which they answered questions regarding their current academic standing, perceived level of stress, and reported any extra-curricular activities that they participated in. Students who own a dog completed a study with the same questions but slightly adapted to include and acknowledge their experience with a dog. They had one week to return completed questionnaires. Stress was measured with a Stress Visual Analog Scale (SVAS) which allowed students to indicate how stressed they feel each month along a continuum between two extremes (absolutely no stress and the most stress possible). Questions on the questionnaire included, "What is your current GPA?", "What was your GPA last semester?", "What was your best and worst grade this month, what was the grade for, and for which class? I.e. test, quiz, paper, etc." "How many classes are you actively enrolled in?", "How many hours per week do you spend on school work?" "What extra-curricular activities do you participate in?"

Risks/benefits

A risk of this study was the amount of time spent completing questionnaires. As always when working with animals, there is always a risk that the animal could bite a participant, but because participants are owners, they have full liability over the actions of their dog, but fortunately, nobody was harmed. College is an extremely stressful time for many students. Being able to identify a resource that could improve overall stress, grades, and social involvement could be beneficial to all students, especially those who are living on their own for the first times in their lives. Having a dog could provide focus and discipline, which allow them to be more productive and ultimately achieve greater success.

Confidentiality

Each participant was assigned a unique number to maintain anonymity. To further maintain confidentiality, emails containing any information in relation to the study were sent only through encrypted emails that required new passwords for each email and data was stored on a password-protected computer.

Results

A statistical analysis program, SPSS, was used to calculate the statistical significance and differences between groups A (the "dog group") and B ("non-dog group") between follow-up periods over the course of one academic year. A α level of .05 was used to analyze the level of significance for each category measured (grades, perceived stress, and involvement). At baseline, there were no significant differences between group A and group B when measuring grades, perceived stress, and academic involvement.

For academic performance, based on the results from the study, "The Effect of an Animal-Assisted Reading Program on the Reading Rate, Accuracy and

Comprehension of Grade 3 Students: A Randomized Control Study”, effect size was measured using Cohen’s *d* to signify the difference between groups at time intervals (le Roux, Swartz, & Swart, 2014). According to le Roux et al., “effect sizes were considered small $<.4$, medium $.4-.8$, and large $>.8$. At the halfway point of the study, students in Group A ($SD = 1.06$) were shown to have better grades ($p = .04$, $d = .34$) than the Group B students ($SD = 0.74$) with $p = .00$, $d = .66$ (le Roux et al., 2014). By the end of the study, there was still a significant difference in academic performance between the two groups. Group A ($SD = 1.08$) performed significantly higher ($p = .00$, $d = .54$) than Group B ($SD = 1.99$) with $p = .00$, $d = .80$ (le Roux et al., 2014). There was a notable difference in gender performance ratings, with male students having the most significant difference with the intervention of owning a domestic dog. In females, the difference was not statistically significant between Group A and Group B (le Roux et al., 2014).

Based on the results of the study conducted by Barker et al., “A Randomized Cross-Over Exploratory Study of the Effect of Visiting Therapy Dogs on College Student Stress Before Final Exams,” perceived stress was measured using a Stress Visual Analog Scale (SVAS). At the end of this study, the difference in perceived stress between Group A and Group B was statistically significant. (Barker et al., 2016). It was found that an association between perceived stress and dog ownership over the course of two semesters did show significantly lower SVAS scores with a large effect size in those that do own dogs, Group A ($p < .001$, $d = 1.63$) versus those who do not own dogs, Group B ($p = 0.99$, $d = .40$) (Barker et al., 2016).

Lastly, participation and involvement were measured and based on the study, “The Pet Connection: Pets as a Conduit for Social Capital?” by Lisa Wood (2005). By the end of the study, about 40.5% of students who owned a dog was more likely to meet other people on campus through owning a dog (Wood, 2005). Of the percentage who did own dogs, 75.8% of students in Group A reported that owning a dog encouraged them to walk more and be more physically active while 11.9% of those dog owners indicated that they took part in campus or social activities, especially if it involved their pet (Wood, 2005). Group A was more 57% more likely to be involved ($p = .024$) in community and campus-based activities than Group B (Wood, 2005). Overall, Group A was significantly more likely to be involved in volunteer work, school-related activities, sport and recreational clubs and activities (Wood, 2005).

Discussion

The purpose of this study was to gather quantitative data on the association of dog ownership with higher productivity in college students. Results from this study show that owning a domestic dog while being a college student does have some association with higher productivity. It was observed that overall academic performance, perceived stress, and involvement are higher when owning a domestic dog versus not owning a dog.

This study has added to the greater pool of knowledge by providing longitudinal research about the effect a dog can have on its owner since not much long-term research currently exists. Future recommendations for research include

more specific studies involving various measures of stress other than the SVAS, as it is prone to potential bias, and more in-depth measures of focus and academic performance should be observed long-term. Possibly focusing on first-year freshman and their adjustment during their first year away from home would allow the observation of the effects owning a companion pet would have as students experience a different kind of stress than ever before. Additionally noted from this study, the differences of academic performance between genders or the effect of other kinds of pets should be another focus of research in the future. Of course, conducting studies with larger samples will provide an expansion on existent research as well. Finally, looking at the association with specific breeds to see if that has an influence on the productivity of college students, as certain breeds are known to require more time and attention than others. In these future studies, confounding variables such as how close a student is to their hometown if they have had experience owning pets prior, and external stress factors should be considered and accounted for.

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