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Should Dogs Have a Seat in the Classroom? The Effects of Canine Assisted Education on College Student Mental Health

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Should Dogs Have a Seat in the Classroom? The Effects of Canine Assisted Education on College Student Mental Health

Abstract

Students continue to face an increase in mental health concerns related to their role of being college students, including increased academic expectations; organizational and time management demands; and, often, a transition to an independent living situation. Mental health symptoms, such as stress and anxiety, have negatively affected students' academic performance more than any other factors in college students' lives, and nontraditional inexpensive interventions that can reach a large number of students, such as animal assisted intervention, continue to be explored. Thus, the researchers in this study investigated the effects of canine assisted education (CAE) on students' stress and anxiety, distractibility, and participation in the natural environment of a college classroom. A quantitative quasi-experimental, one-group pre-test/post-test design was implemented in which participants completed a pre-test survey, experienced 5 weeks of CAE, and then completed a post-test survey. Wilcoxon signed-rank analysis revealed a significant effect for stress and anxiety ($p = .033$) and participation ($p = .009$). Findings add to the body of literature attesting to the efficacy of CAE in support student well-being and optimizing learning conditions for students.

Comments

The authors declare that they have no competing financial, professional, or personal interest that might have influenced the performance or presentation of the work described in this manuscript.

Keywords

animal assisted intervention, college students, mental health, anxiety, stress, distraction, participation

Cover Page Footnote

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Credentials Display

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Mental health is defined by the World Health Organization as “a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community” (2020, para 2). The term mental health has become a buzzword across university and college campuses nationwide as increasing numbers of students are being met with social-emotional challenges affecting academic performance and student roles both inside and outside of the classroom. Historically, student stressors include time management, academic expectations, and new social roles (Kitzrow, 2003). Many of the aforementioned historical stressors still remain in effect for current college students and are confounded by additional stressors. Some of these stressors (Ebert et al., 2019), like financial stressors, such as student debt and employment concerns (Brown, 2018), and overwhelming stimuli from technology, such as smart phones, social media, and cyber-bullying, include less individualized support from student services (Brown, 2018). In addition, although many causes for stress have been listed, researchers have stated the reasons for increased negative mental health symptoms vary significantly across demographic and social factors and still need to be studied (Hunt & Eisenberg, 2010).

Although the causes are still being researched, the drastic increase in mental health symptoms is well documented. According to the American College Health Association’s (ACHA, 2019) National College Health Assessment (NCHA), students reported being formally diagnosed with anxiety (24.3%), ADHD (6.7%), depression (20.0%), and panic attacks (11.9%), highlighting the need for increasing mental health services on college campuses as the percentages rise. The majority of mental health interventions on college campuses focus on 1:1 and group counseling services. Although the need for services has increased, there has not been an increase in funding or staff (Mowbray et al., 2006). Furthermore, there has been a perceived stigma associated with receiving counseling, particularly in health professional students, which may make counseling services less desirable to this student population and leave many health professional students with unmet needs (Gaddis et al., 2018).

Animal assisted interventions (AAIs) are increasingly researched and present a viable option as animals have been found to promote both mental and physical health benefits at a lower cost (Binfet & Passmore, 2016; Binfet & Stuik, 2018; Kamioka et al., 2014). AAIs purposefully include animals in health, education, or human services to achieve therapeutic gains in humans (International Association of Human-Animal Interaction Organizations, 2018). Current AAI research has focused on the effects of single event exposures and their impact on well-being, stress, and anxiety among college students (Barker et al., 2016; Binfet, 2017; Grajfoner et al., 2017; Pendry & Vandagriff, 2019). Although college campuses are experiencing increasing needs for mental health interventions, significant gaps exist in studying recurring AAI effects as well as exploring the role of AAIs in college classrooms.

Mental Health Effects on Occupational Performance of Students in Higher Education

The connection between mental health and academic performance in college-aged students has gained more attention in recent decades with university and college personnel seeking new ways to offer mental health services to students on campus. In an effort to provide a more effective intervention for student health needs, the ACHA created the NCHA to determine areas in which students’ well-being are impacted the most (ACHA, 2019). The ACHA defined barriers to academic performance as students receiving lower grades on exams or in courses, dropping a course, receiving an incomplete in a course, or experiencing a significant interference in thesis or dissertation work (ACHA, 2019). In 2019, students reporting to the NCHA cited that the factors impeding their academic performance the most included stress (36.5%), anxiety (29.5%), sleep difficulties (24.3%), and depression (21.6%), which have been

increasing over the past few years and reached all-time highs in 2019. Stress, anxiety, sleep difficulties, and depression were selected from a list of over 30 factors, including work responsibilities, health problems, relationship difficulties, internet usage, injury, and drug and alcohol use. Despite the increasing number of students reporting concerns with mental health, the wait time for a first counseling appointment averaged 17.7 days in 2018, suggesting the inability of counseling centers to meet students' needs (Association for University and College Counseling Center Directors, 2018). One study explored barriers to accessing mental health services, noting that only 24.6% of students reported they “would definitely” seek help if they experienced an emotional problem, with cost (24.1%) and time/scheduling (22.6%) being highlighted as specific factors decreasing students' willingness to seek therapy (Ebert et al., 2019, p. 5). In a study by Yorgason, Lineville, and Zitzman (2008), 18% of students reported that cost was a limiting factor to their use of mental health services. This study also discovered that 30% of students were unaware of available mental health services on campus, with students citing “not enough time” and “lack of knowledge” as the top two limiting factors to access (p. 177). Attitudinal barriers, such as wanting to handle the problem independently, feelings of embarrassment, and lack of knowledge surrounding services, propound the need to use alternative therapy interventions. AAI has the potential to ameliorate the barriers through providing low-cost interventions and allowing greater ease of access to services while decreasing the need for student disclosure, thereby eliminating attitudinal barriers and increasing social participation.

Previous research studies have explored the use of cost-effective interventions to help combat pre-test and posttest anxiety in college students. One such study examined anxiety levels in students who participated in a 20-min coloring activity and 20 min of peer engagement after an examination (Burton & Baxter, 2019). This study found that both groups dropped in anxiety levels, but the group participating in a coloring leisure activity demonstrated significantly greater reduction in anxiety over the peer group (Burton & Baxter, 2019). The majority of the studies reviewed demonstrated findings in sample events, often during a pretest or posttest period. There are few studies available that examine long-term stress and anxiety reducers through recurring sessions or that explore treatment interventions outside of coloring or mindfulness practices.

Traditional treatment services include individual 1:1 counseling as well as group interventions, but the costs associated with staffing mental health professionals and providing services are prohibitive for the needs of large college campuses. As numbers of students reporting mental health concerns multiply, college campuses should consider looking toward AAI as a low-cost intervention model. Adams et al. (2017) discussed the benefits of AAI for college counselors with limited budgets, stating the current attitude of “do more with less” is possible through AAI as it can provide significant benefits with minimal resource investment (p. 317). The costs for having a dog tested and registered as a therapy dog from a reputable organization ranges from \$10 to \$100 for the first year with renewal costs of approximately \$30 to \$70 for subsequent years (Therapy Dogs International, 2020). College campuses may find it more cost effective to establish volunteer therapy dog programs that create regular programming for students rather than to hire additional mental health professionals at a salary wage.

Person-Environment-Occupation Model and AAI

Theory can be used to describe, explain, and predict behavior and relationships between people, objects, and the environment. The person-environment-occupation (PEO) model is a theoretical framework that supports the exploration of the effect of AAI on the college student population. This model provides the framework to allow researchers to investigate the fit between personal and environmental

factors and their influence on individuals' occupational performance in their role as students. Contextually, the person is described as college students who are typically the developmental age of 18 to 22 years. These individuals experience a transitional period where they may be leaving stable physical and social environments for the first time. This transition includes moving into a dormitory or apartment surrounded by unfamiliar, same aged peers, in addition to leaving established social relationships, including pets. Often, students are met with new demands and may experience additional stressors, such as work-life balance between employment and academic duties, juggling new social relationships with the addition of navigating unfamiliar social pressures and schemes, and participating in roles and activities outside of their collegiate identities. The primary role of a college-aged individual is student, in which academic performance and maintaining their academic studies is their main occupation. The student role involves expected academic demands, including participation in classroom activities and maintaining attention throughout class (i.e., decreased distractibility). In addition, the struggle of maintaining demands from academic and non-academic roles frequently leads to perceived anxiety and stress as students attempt to juggle occupational performance, which is the transaction between themselves as the individual, their new physical and social environment in a college or university setting, and their occupations surrounding academics and roles in leisure (Law et al., 1996).

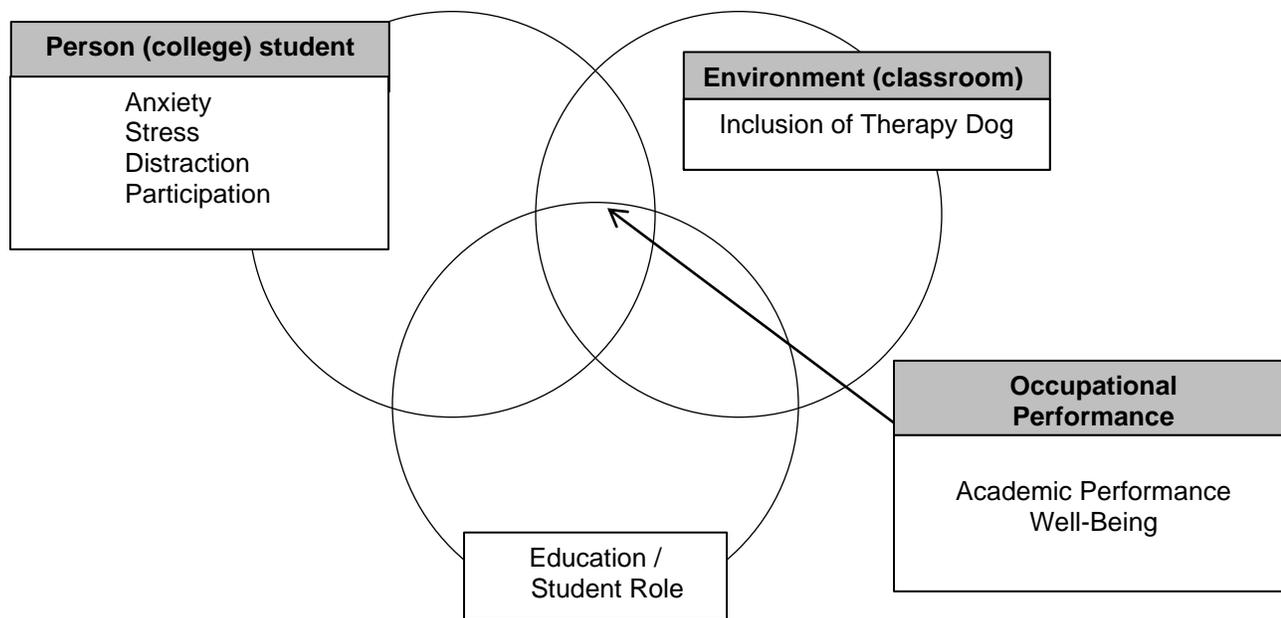
The significant environmental and occupational shifts experienced by college students often lead to incongruence of the person, environment, and occupation domains of a student resulting in occupational performance declines. These occupational performance declines may include decreased well-being resulting from high anxiety and stress, low levels of fulfillment in the individual's role as a college student, or poor grades. This study investigates the potential to decrease negative personal factors such as anxiety, stress, and distraction to maximize positive personal factors, such as participation through the introduction of a therapy dog into the college students' (person) natural environment (classroom; see Figure 1). This study also considers whether modifications to a college classroom environment, such as the introduction of a therapy dog, demonstrate the potential to impact a student's overall occupational performance and reduce the negative impacts students often experience through transitions into unfamiliar environments and occupations (see Figure 1). AAIs have an emerging role in assisting students in meeting academic demands and decreasing perceived anxiety and stress as they attempt to maintain each aspect of the PEO performance as a college student.

The expansion of disciplines using animals in practice in therapeutic and recreational settings resulted in the need to define and categorize types of animal interventions into more specific categories (Binfet & Hartwig, 2020). AAI is an umbrella term that includes several categories of animal interventions with the requirement of being goal-oriented, structured, and leading to individuals demonstrating therapeutic gains (International Association for Human-Animal Interaction Organizations, 2018). AAIs include animal assisted activities, animal assisted education, and animal assisted therapy. Binfet and Hartwig (2020) acknowledge the variability in animal assisted terminology and stress the importance of streamlining language in order to advance understanding and work in the field. Identifying the species used in animal intervention studies is an important factor in reducing terminology variability in the field. The researchers in this study chose an animal intervention that is categorized as animal assisted education and can be further defined as canine assisted education (CAE). CAE occurs in a school or classroom setting and is carried out by teachers or professors with the goal of incorporating canines with students to reach academic goals (Binfet & Hartwig, 2020). Investigators aimed to explore how student factors related

to in-class learning (anxiety, stress, distractibility, and participation) were impacted by the presence of a therapy dog, thus they chose to implement CAE for this study.

Figure 1

Conceptual Theoretical Model Applying PEO to Canine Assisted Education in this Study



Canine Assisted Education (CAE)

Note. Adapted from Law et al., 1996

Therapy Dog Impact on Anxiety and Stress, Distractibility, and Participation

Research related to therapy dog intervention demonstrates a reduction in anxiety and stress among college students through intervention in the classroom and through campus wide single events (Binfet, 2017). In the college setting, therapy dogs are most commonly used in counseling centers and through campus outreach events (Barker et al., 2016; Binfet, 2017). Most studies have focused specifically on using therapy dog intervention during midterm and final exams. Barker and colleagues (2016) identified the need for studying the effect of therapy dogs' presence on stress during the completion of final exams. In another study, Pendry, Kuzara, and Gee (2019) supported the idea of dogs in the classroom to decrease stress in the moment, which allowed students to focus on materials being presented. There have been short-term positive effects demonstrated with the use of therapy dogs; however, little research has been conducted on studying the effects of recurring therapy dog intervention. The current study intends to investigate the recurring presence of a therapy dog in a classroom environment through CAE.

Individuals have experienced physical and mental benefits in regard to emotional development and social well-being as a result of exposure to animals. Researchers have documented decreased blood pressure, indicating individuals experienced decreases in stress as a result of exposure to therapy dogs (Jarolmen & Patel, 2018; McDonald et al., 2017). Jarolmen and Patel (2018) examined anxiety through blood pressure measurements before and after a 15-min interaction with a therapy dog on the day of a

college exam. They found statistical significance, suggesting that exposure to therapy dogs had positive effects on reducing perceived anxiety of college students on exam days. Frequently, research surrounding the use of therapy dogs in college settings involves direct stimulation and interaction with therapy dogs, but few studied the effect of the mere presence of a therapy dog. Similarly, most research on this subject entailed single events or short exposure to animals. Binfet (2017) studied recurring sessions and found perceived stress and homesickness among college students decreased immediately after therapy dog exposure; however, the effects were not found to be sustained 2 weeks later. This suggests the need for future studies to explore recurring sessions and long-term effects of therapy dogs on college students to determine the efficacy of this intervention in battling mental health concerns.

Anxiety and stress are areas frequently highlighted and studied among AAI research. Pendry et al. (2019) studied the effect of therapy dogs on undergraduate students' satisfaction with their program and participation levels in a classroom setting. This study compared the students' responses to evidenced-based stress management lecture content, guided therapy dog interventions, and a combination of the two. Pendry et al. stated that therapy dogs had a positive impact on students presented with a combination of both coursework and interaction with therapy dogs, reporting that 14.9% of students felt more motivated to attend and participate when exposed to therapy dogs during the course versus stress management coursework alone. Jalongo and McDevitt (2015) found that staff were viewed as more approachable while therapy dogs were present, suggesting that students may feel more connected to and comfortable with their professor in the classroom, which may make them more inclined to participate during lectures with the presence of a therapy dog. The potential impact of a canine's presence on students' distractibility is an area of concern that therapy dogs pose. Pendry et al. found only 2.9% of students reported dogs to be distracting to materials presented in the stress management course. The current research available on therapy dogs on college campuses primarily focuses on single event exposures and their effects on anxiety and stress with little research exploring the additional effects of an animal on distractibility and participation. Because of the limitations presented in previous research, this study explored the recurring effects of CAE in a college classroom setting on student anxiety and stress, distractibility, and participation over the course of 5 weeks. The results of this study will inform AAI research on effectiveness of a recurring CAE and inform higher education personnel of a low-cost intervention having potential to positively impact in-class learning for college students.

Method

Study Design

A quasi-experimental, one-group pre-test/post-test design was used to explore the recurring effects of CAE on student anxiety and stress, distractibility, and participation over the course of 5 weeks.

Participants

A non-probability convenience sample of occupational therapy (OT) students enrolled in the Introduction to Occupational Science course was used for this study. One therapy dog, Stella, registered with Therapy Dogs International (ID# 144787), participated in the study. Stella is a 3-year-old female Leonberger with 2 years of therapy dog experience. She has had experience engaging in therapy dog work in a variety of settings, including hospitals, skilled nursing facilities, and three college campuses. The Principal Investigator (PI)/instructor for the Introduction to Occupational Science course is Stella's handler. The study consisted of one group, an experimental group. The Northeast College's Institutional Review Board for protection of human subjects approved this study (approval #1016-03). Students were screened for exclusion criteria, including having an allergy or fear of dogs, prior to the study. The student

participants were provided the option to disclose any possible concerns with the therapy dog's presence publicly or privately with the PI and/or graduate research assistants. All students identified as being free of allergies and stated that they did not have a fear of dogs prior to the study. The study took place in a classroom located in the Center for Health Science's building on a campus in the Northeast. There were 27 students and one professor in a large rectangular classroom, including two sets of four rows of four tables approximately 8 feet by 3 feet allowing for up to four students to sit at each table and a center aisle in the middle. Spaces were provided between tables to allow access for Stella to walk through the classroom.

Instrumentation

The College Student Engagement Survey was developed and used to measure students' levels of perceived anxiety and stress, participation, and distractibility. Although there are measures that capture stress and anxiety independently, they vary in the amount of time between delivery and purpose of assessment. For example, the popular Perceived Stress scale (PSS) capturing stress over the past month, and State-Trait Anxiety Inventory intended to assess anxiety in the moment as well as anxiety "proneness." In addition, there were no instruments that included participation and distractibility measures for the college student population. Furthermore, the investigators wanted to implement a concise measure to maximize student response rates as there have been reports of increasing survey fatigue among college students (Porter et al., 2004). After initial questions were developed, three PhD educated instructors working in higher education reviewed the survey and provided feedback. The feedback was carefully reviewed and implemented prior to submitting the survey to the Institutional Review Board. The 32-question survey included nine demographic questions followed by two questions related to students' personal class performance and learning style. In addition, the survey included 13 questions on *distractibility* that used a Likert scale, including 11 questions with five rankings (1 = *strongly disagree* to 5 = *strongly agree*) and two questions with four rankings (1 = *never* to 4 = *always*). The survey contained five questions regarding participation and was written in a Likert format with five rankings (1 = *strongly agree* to 5 = *strongly disagree*), as well as 12 questions on anxiety and stress, including 10 Likert type questions with five rankings per question (1 = *never* to 5 = *very often*). A continuous sliding scale format was used for the remaining two questions in this category that allowed the student to adjust a point on the scale from 1 = *no anxiety* to 10 = *maximum level of anxiety*, and 1 = *no stress* to 10 = *maximum level of stress*. The College Student Engagement Survey was used as both a pre-test and post-test instrument for this study. The participants completed the College Student Engagement Survey pre-test immediately before their first intervention and immediately after their last intervention.

Procedures

In order to eliminate the possibility of coercion, the PI/instructor of the course was not present during informed consent and data collection procedures. Trained graduate student research assistants actively completed informed consent with each participant prior to participation in the study, which allowed the students to ask questions. After informed consent was completed, the students were provided the option to include or exclude their survey data in the final results to further decrease the possibility of coercion. The participants voluntarily completed the pre-test survey via Qualtrics™ online at the beginning of their regularly scheduled class at the start of the 5-week period from November 1st to December 8th (Qualtrics, 2020). Any student that did not have access to a laptop or electronic device to access the survey had one provided to them.

After completion of the pre-test survey, the therapy dog, Stella, was introduced into the classroom. Stella attended each of the two scheduled 75-min classes on Tuesday and Thursday for 5 weeks from November 1st to December 8th. In order to allow the students, a majority of whom were freshman, to have a typical classroom experience for the first half of the semester, the CAE was implemented in Week 11 through Week 15 of a 15-week semester. The 11th week was approximately 3 weeks after midterm and was not considered a particularly stressful time of the semester. During the intervention, normal classroom instruction proceeded as scheduled, consisting of lectures by the professor, guest lecturers, student presentations, small group discussions, and quizzes. Stella navigated through the classroom and students throughout each class period as desired. At the end of the 5-week period, the students completed the College Student Engagement Survey for a second time to generate post-test data without the PI/instructor present. All students who completed the pre-test and post-test consented to their survey results being included in the final data analysis.

Data Analysis

In the one-group pre—test/post-test design, the independent variable in the study was time. The dependent variables in the study were anxiety and stress, distractibility, and participation. Quantitative data from the surveys was analyzed using the Statistical Package for the Social Sciences (SPSS) software (Version 24.0). Responses to the College Student Engagement Survey were assigned numeric values and entered in SPSS. The research questions and data guided the analyses. In this study, a nonparametric, Wilcoxon signed-rank test was chosen. This test is equivalent to a dependent *t*-test; however, it does not assume normality in the distribution of the data. Furthermore, it can be used to compare two sets of scores that come from the same group of participants (Laerd Statistics, 2018). The investigators reviewed the data and excluded one participant's data because of incompleteness. The investigators reviewed the study to ensure all assumptions were met, including the data was ordinal, the independent variable consisted of two matched pairs, and the distribution of the differences between the matched pairs were symmetrical in shape. Finally, the investigators used an alpha level of $p < .05$ as a cutoff for significance. The numeric data was then further analyzed to determine conclusions as related to the study's research questions.

Results

Data collected during the implementation of the study were analyzed to assess the effectiveness of the intervention. First, demographic data will be presented, followed by the results of the analyses of the specific research questions.

Demographics

The study's population consisted of 26 college student participants. Specific demographics are provided in Table 1. The students in this study were OT students that were accepted into the OT program during the admissions process to college. This Northeast University offers a unique combined Bachelor of Science/Master of Science 5-year program that allows direct admissions to the graduate program with no separate application process.

Table 1
Demographic Information of College Student Participants

Variable/Category		Participants
		26 (100%)
Gender	Male	2 (7.7%)
	Female	24 (92.3%)
Age	18 years	24 (92.3%)
	19 years	2 (7.7%)
Ethnicity	Asian	2 (7.7%)
	White	24 (92.3%)
Education level	Freshmen	24 (92.3%)
	Sophomore	2 (7.7%)
Family-owned dog (off-campus)	Yes	22 (84.6%)
	No	4 (15.4%)

Anxiety and Stress, Distractibility, and Participation

Using the Wilcoxon signed-rank test in this study, the investigators intended to determine if there are statistically significant findings between CAE on college students' anxiety and stress, distractibility, and participation of one group's pre-test and post-test scores (Laerd Statistics, 2018). The researchers hypothesized participants would demonstrate a significant decrease in anxiety and stress on the post-test survey compared to the pre-test survey. This hypothesis was accepted ($p = 0.033^*$; see Table 2). Next, the researchers hypothesized college student participants would not demonstrate increased distractibility on the post-test survey compared to the pre-test survey, as this might indicate students were distracted by the therapy dog's presence in the classroom. This hypothesis was not accepted ($p = 0.295$). Although the participants did not show statistically significant decreases in distractibility, the hypothesis aimed to determine if increases in distractibility existed, and the analysis showed the distractibility mean decreased from 36.92 to 35.73 with sums decreasing from 960 to 929. Finally, the researchers hypothesized college student participants would demonstrate a significant increase in reported participation in class activities on the post-test survey compared to the pre-test survey. This hypothesis was accepted ($p = 0.009^*$). These results divulge further insight into the profound impacts of recurring CAE on college students.

Table 2
Wilcoxon Singed-Rank Test Analysis: Z Scores and P Values

Outcome	Z	p value
Anxiety & Stress	-2.131	.009*
Participation	-2.596	.033*
Distractibility	-1.047	.295

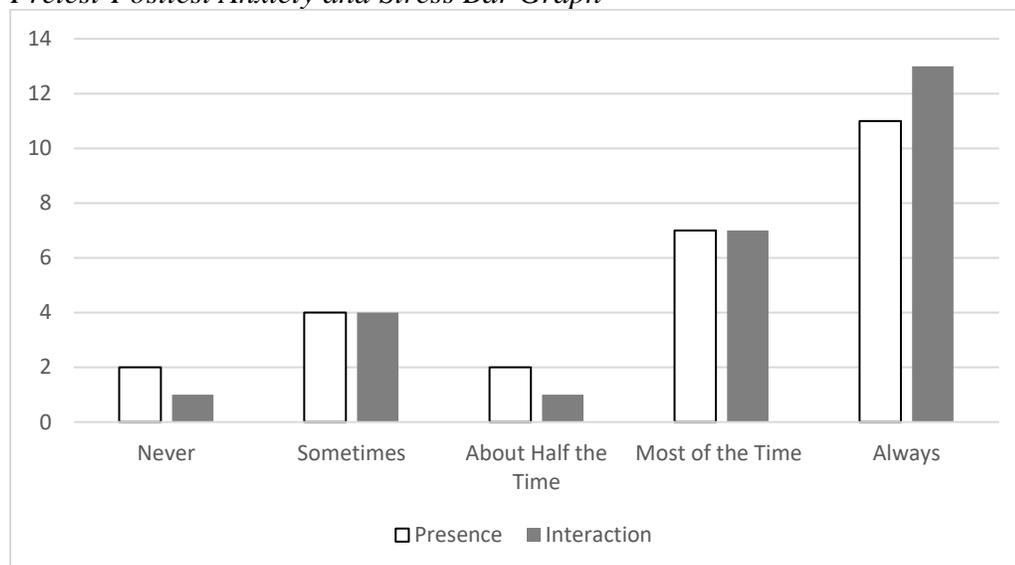
* $p \leq .05$

This study demonstrates recurring CAE, over a 5-week period, in college students' natural environment, a college classroom, has a positive impact on students' anxiety and stress. Most notably, 69% of the student participants noted a decrease in perceived anxiety and stress with 42% of the participants reporting the presence of a dog to *always* decrease anxiety and stress and 27% of the students noting a decrease in anxiety and stress *most of the time*. Furthermore, 78% of the students reported

interaction with the dog to reduce anxiety and stress with a greater reduction noted with direct interaction (see Figure 2). This can be defined as interactions such as physically touching the dog via petting, sitting with the dog, or 1:1 engagement through play.

Figure 2

Pretest-Posttest Anxiety and Stress Bar Graph



Note. Participants' pretest and posttest responses regarding the perceptions of the effect of the presence and/or interaction with a therapy dog.

Discussion

The objective of this research project was to explore the impact of the presence of a therapy dog (CAE) on college students in their natural environment, a college classroom. The research design specifically analyzed dependent variables, including anxiety and stress, distractibility, and participation levels of entry-level college students. The significant differences noted between the pre-test and post-test scores suggested a therapy dog in the classroom positively impacted student participation and anxiety and stress while not having an effect on students' level of distraction, which presents a positive outlook on the potential of including therapy dog programming at colleges and universities to increase students' mental health and overall learning experience.

Anxiety and Stress

The study reveals a significant relationship between the presence of a therapy dog in the classroom and college student anxiety and stress. The findings in this study were similar to those in the literature in demonstrating a reduction in anxiety and stress. The majority of researchers who have measured anxiety and stress in the college setting have done so at one-time events through counseling centers and outreach events before or after final exams (Barker et al., 2016; Binfet, 2017; Blender & Ryan, 2009; Jalongo & McDevitt, 2015; Jarolmen & Patel, 2018; Pendry & Vandagriff, 2019). The results of this study indicate the benefit recurring therapy dog interventions through CAE may have on college students' stress and anxiety.

The far reaching, positive effects on anxiety and stress across the majority of the classroom indicate a means to support the overwhelmed college counseling centers. Positive impacts, starting in the classroom, have the potential to decrease student need for 1:1 counseling. This in turn can decrease the extended wait times (Association for University and College Counseling Center Directors, 2018) for

services and provide increased opportunities for services for those who need it most in the counseling centers. In addition, with 69% (18 of 26) of the students reporting the presence of the therapy dog to decrease their perceived anxiety and stress, CAE demonstrates the ability to assist meeting the social-emotional and scheduling needs of the high number of students who feel they do not have time to seek out counseling opportunities (Ebert et al., 2019, p. 5; Yorgason et al., 2008) or even attend therapy dog events outside of their scheduled class times. These results support access to mental health benefits for students who are embarrassed or resistant to initiate counseling services themselves by bringing possible relief to the comfort of their classroom (Yorgason et al., 2008). Lastly, this also provides a financially conscious option for colleges and students' alike who are concerned with the cost of direct mental health services (Ebert et al., 2019, p. 5; Yorgason et al., 2008).

Distraction

This study is among the first to analyze the potential impact of distractibility from a therapy dog in a learning environment. Although results did not show statistically significant changes in the area of distractibility, this may suggest the limited impact of the dog's presence, positive or negative, on student engagement and focus on presented class materials. However, this finding may be viewed as beneficial, as results did indicate a decrease in distraction levels, although not at a statistically significant level. The lack of significance with distractibility may also indicate that the therapy dog's inclusion promoted decreased anxiety and stress and increased participation without taking away from the coursework and learning opportunities in the class. These results mirror those by Pendry et al. (2019). In addition, as students become more familiar with one another throughout the 5-week period, it would be expected that distractibility would increase. Therefore, despite possible increased comfort with classmates, the professor, and the therapy dog over the 5-week period, there were not significant changes to distractibility.

Participation

Although most researchers measured the effect of therapy dogs on students through counseling centers and outreach events (Barker et al., 2016; Binfet, 2017; Grajfoner et al., 2017), Pendry et al. (2019) also studied therapy dogs in a classroom environment with a focus on understanding the effects on students' academic outcomes, which is a gap in the literature. Results from Pendry et al.'s study revealed that students who engaged with therapy dogs alone or in educational content with the presence of a therapy dog, had significantly higher scores and perceived usefulness compared to students that engaged with educational content alone. These results align with the results of the current study with students reporting significantly increased participation levels in class activities during CAE. Therefore, the outcomes of this research indicate the presence of a dog in the classroom may benefit the college student population by decreasing anxiety and stress and increasing student participation in the classroom while not increasing distractibility. These effects are likely to result in improved overall academic outcomes and achievement.

Theoretical Implications

The findings of this study are supported by the PEO model by demonstrating the positive implications of the presence of a therapy dog in the college classroom and the potential benefits to the PEO role of a college student. College students function in a multitude of roles, environments, and occupations, which are influenced heavily by fluctuations in external and internal factors. This study indicates that the inclusion of a therapy dog in a college classroom has the potential to provide positive benefits to the internal factors of a student, including their response to stress, anxiety, and distractibility. The influence of internal factors may bring change to a student's external factors, such as their participation in the classroom, which may further impact their perception of their sense of self and

performance as a student. The positive adjustments the inclusion of a therapy dog in the classroom was found to have on the students' personal factors, then has the potential to carry over to students' additional roles, environments, and/or occupations. For example, decreased anxiety and stress that may have resulted from the dog's presence may also improve the congruence of the three domains and ultimately the occupational performance in the student's job outside of the classroom. The more harmonious the balance between the PEO of an individual, the greater the potential to reduce negative impacts on a student's mental health on a college campus. When analyzing mental health on college campuses through the lens of the PEO model, this study demonstrates a significant yet cost-effective means of potentially positively influencing a student's response to stress and anxiety through the modification of the environment to include the presence of a therapy dog.

Implications for OT

In the profession of OT, the findings from this study have the potential to impact the careers and performance of future occupational therapists through impacting OT students' themselves first. Occupational therapists have a unique role in treating the whole person. Therefore, OT academic programs have a vital duty to apply the same framework to their education programs. In order to effectively treat the whole person, occupational therapists are highly trained in collaboration with the client's multi-disciplinary team. A scoping review has identified that most OT services provided in post-secondary education exist primarily in student populations who demonstrate mental health needs (Keptner & McCarthy, 2020). Important themes that emerged from the review include focusing on skills required for success, importance of using the campus environment, and campus collaboration (Keptner & McCarthy, 2020). Our current study aligns with themes from the scoping review as it discusses the impact of mental health and stress on educational performance and demonstrates the value of potential campus collaborations with counseling services with the introduction of therapy dogs in classrooms. The current study also demonstrates use of the campus environment by implementing CAE in the classroom.

The current study provides a positive and proactive option for occupational therapists and/or higher education personnel to offer support not only to the students' academic achievements, but also for their personal development and mental health as well. OT programs, as well as other specialized health profession programs, are intensive, often involving practical educational and clinical experiences both during the typical student semesters as well as during the summers (National Board for Certification in Occupational Therapy [NBCOT], 2018). This indicates a significant time and financial commitment. In addition, with college students frequently indicating high stress and anxiety (ACHA, 2019), the high rigor of OT programs make OT students no exception. This current research study outlines an option to provide OT students an opportunity for mental health support without additional time or financial commitments. This model supports the requests by Keptner and McCarthy (2020) for increased attention to preventative mental health measures by occupational therapists. The improved well-being and mental health of students in the profession has the potential to positively impact their success in the programs, which as a result may promote a profound impact on students' competence, confidence, and clinical skills as they enter the OT profession as clinicians. This idea may be expanded on in future research endeavors to show how these benefits may cross varying practice settings in which anxiety and stress are common symptoms experienced by clients and therapists alike. Finally, from the perspective of a professor, the inclusion of a therapy dog has the potential to lead to feeling more rewarded in their profession through increased student participation and engagement.

Study Limitations and Implications for Future Research

The largest limitations to this study were a small sample size and the lack of a control group. Unfortunately, another section of the Introduction to Occupational Science course was not available to conduct the intervention. Future studies should consider using courses with multiple sections to allow for different conditions, including treatment and control, to take place. Inclusion of a control group would significantly reduce threats to internal validity. In addition, increasing sample size and population demographics would reduce threats to external validity. In future studies researchers should consider implementing a similar therapy dog intervention in courses with multiple sections and larger class sizes in order to increase the number of participants. Also, the inclusion of students in the entry-level OT program may have limited gender and demographics of study population. Similar to the current study's findings, the 2017 NBCOT Practice Analysis found 80.1% of registered occupational therapists reported identifying as white and 91.8% reported identifying as female, indicating the OT field to have a narrow participant focus (NBCOT, 2018). Future research should explore classes of different majors to reach a broad range of student participants, particularly in specialized programs such as health professional programs. As class size used in this study was fairly small, the students may have had more interaction and impact from the therapy dog than a large class format. Thus, future research should study the optimal ratio of class size to therapy dog or ratio of number of participants to therapy dog.

The use of a self-created assessment was an additional limitation. Although there is a limited number of college-aged distraction and participation measures, more rigorous options should be explored. Similarly, both a physiological and self-rated measure for perceived anxiety and stress should be explored to differentiate both the body and mind's response to therapy dog intervention. In addition, the time constraints of an academic semester was a limitation on the study as the PI needed to ensure it was possible to implement the study in one academic semester because of schedule changes and drop-out that could occur the following semester. Future studies should continue to investigate avenues for making therapy dog programming accessible to more students, including graduate and professional students of various majors.

When discussing future research, another avenue that could be explored is to compare therapy dog programming across majors and schools within the college campus to determine if the type of classroom setting has implications as well. Comparing student reactions to inclusion of therapy dogs in college classrooms may vary between analytical students and creative arts students. This study was limited to one major area of study in a college setting that houses 90 different majors for undergraduate students to pursue. Exploring the impact of therapy dogs in a college classroom with other majors may lead to further research involving the benefits of CAE.

Conclusion

The findings of this study have implications for understanding the effects of therapy dogs on participants' academic role as a college student through presenting statistically significant results in anxiety, stress, and participation as well as demonstrating therapy dogs are not perceived as a distractor in the classroom. The study's results aligned with those of researchers that explored similar variables in this population and added to the body of research demonstrating positive effects with a recurring CAE. Future studies should focus on using rigorous instruments as well as reaching a larger body of students, including those in graduate and professional fields. The PEO model is an appropriate framework to further explore the fit between the person (college student), environment (college classroom), and occupation (education). The results of this study demonstrate significant potential for the inclusion of a low-cost intervention of CAE on college campuses to reduce growing mental health concerns in this population.

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