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University of Northern Colorado

Greeley, Colorado

THE INFLUENCE OF PERSONALITY ON THE EFFECTS OF NATURE EXPOSURE
AMONG COLLEGE STUDENTS

A Thesis Submitted in
Partial Fulfillment for Graduation
with Honors Distinction and the Degree of Bachelor of Arts

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05/07/2022

THE INFLUENCE OF PERSONALITY ON THE EFFECTS OF NATURE EXPOSURE
AMONG COLLEGE STUDENTS

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Abstract

College students' emotional, mental, and physical health have seen a steady decline over the last decade. Research suggests that exposure to nature such as interacting with wildlife, hearing nature sounds, or programs where individuals are directly involved in their experience with nature, allow for the individual to experience lower levels of stress, raise moods, and can help aid in the treatment of some of the most common mental illnesses such as Major Depressive Disorder and Post Traumatic Stress Disorder. However, there is little research that examine other variables such as personality that may influence the outcome of the nature exposure effect. This study aims to provide more information and insight into how the nature exposure effect is modulated among different personality types. This study examines how personality influences the outcomes of the nature exposure effect among college aged people through the use of the Big Five Inventory and the Perceived Stress Scale. This study did not find any significant differences among personality through the nature exposure effect ($p > .05$) but did find that those with low nature exposure scores had significantly higher perceived stress ($p = .045$). More research is required to fully understand how personality influences the effects of nature exposure.

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Introduction

The relationship between humans and nature has been observed since man's beginning. In a society where technology is constantly advancing, the job markets becoming increasingly more competitive, and the heavy emphasis our culture has on education, all have lead to college students reporting a downward trend on their mental and physical health (Stolzenberg et al., 2020). However, there is little research examining the potential influence of other variables on the outcomes of nature exposure. The purpose of this study is to provide insight and more understanding as to how personality influences the effects of nature exposure among college students.

Research Questions

The guiding research question is: How does personality influence the effects of nature exposure on college students? Other questions within this study are: To what degree does each personality type relate to nature exposure? Is there a difference between personalities? Do different personalities elicit different responses? Are those responses weaker or stronger?

Personal Importance of the Study

For as long as I can remember, I have had the desire to make a lasting, positive impact within my community. What better way to contribute and make a positive lasting impact than contributing the ever expanding body of knowledge? We have all heard the saying, "Knowledge is power." But knowledge is much more than that. Knowledge not only is a means for power, but knowledge is also a means to help people better their lives. I am what you could say, an outdoorsman. I fish, I hunt, and I spend a lot of my time adventuring in our great outdoors. Unfortunately, Covid-19 immerged late 2019 and has changed the daily lives we were able to experience. I was fortunate enough to have the opportunity to spend my time during the

lockdowns at a 200 acre ranch. I could not help but think of the differences individuals may experience in their mental health specifically due to the lockdowns. How does someone who is locked down in a studio apartment experience mental health compared to those who are locked down on a ranch? These questions would ultimately guide me to my research question.

Significance of the Study

There is enough research to justifiably conclude that nature exposure has beneficial effects. These effects can be incorporated into a nature-based program used for therapy as well as educational settings. However, there is little to no research examining the influence of other variable on the effects of nature exposure. Other variables include, race, socio-economic status, geographical location, and personality. This study aims to provide more of an understanding to how personality influences the effects of nature exposure among college students. The results will allow us to have more insight into the effects of nature exposure, the variables that influence it, and can be translated into a school or therapy setting where nature-based programs may be better tailored towards serving an individual's personality. Furthermore, individuals seeking therapy may be better prepared in their approach given our understanding of personality's influence on nature exposure.

Review of Literature

Humans have been involved in nature since man's beginning. In our society today, it seems as if we are traveling ever further from our ancestral origins. We have massive cities, large agricultural fields, and an ever expanding population. Does this gap between the lives of our ancestors and the modern human create for a problem? Are humans designed to live and interact with nature? Although there is research showing the positive benefits from nature exposure, there

is little research examining how different variables influence its effect. More specifically, how does personality influence the effect of nature exposure?

The Effect of Nature Exposure

The biophilia hypothesis is essentially the belief that humans possess an innate desire and tendency to seek out, explore, interact, and experience nature and other forms of life. It was made popular by a book titled “Biophilia.” It was written by Edward O. Wilson in 1984. At the time, very little research had been done to prove the statement but it opened an invitation for discussion. As of today, it is still just a hypothesis. However, there is a lot of evidence that might lead some to reconsider their thinking. Since 1984, many studies have been conducted testing the effects and examining a relationship between man and nature. A study was conducted by coupling social media and artificial intelligence using 31,534 social media photographs across 185 countries. It was concluded that nature was more likely to appear in photographs taken during a memorable, fun, and sometimes life changing celebrations. One significant aspect of this study was that it also found a proportion of photographs with nature taken during those fun-memorable activities is associated with national life satisfaction scores (Chia-Chen et al., 2020). This study allows us to have a basic understanding of how individuals across the world are benefiting from nature experiences and that those experiences may contribute to an individual’s overall well-being and life satisfactory.

Major Depressive Disorder also known as MDD, is one of the most common types of mental illness individuals may face. According to the Anxiety and Depression Association of America, MDD affects more than 16.1 million Americans (“Facts & Statistics: ADAA”, n.d). If we take that number and divide it by the US population from 2019, that means that roughly 5% of Americans are struggling with Major Depressive Disorder. Does nature exposure help one of

the most common mental illnesses? The short answer is yes. These researchers tested the effect of nature walks on individuals who had MDD. Participants were evaluated before each walk. They went on two walks. One in a nature setting and one in an urban setting. They found significant cognitive increases in memory span and increases in participants' moods (Berman, et al., 2012). These individuals struggling with MDD were helped by their exposure to nature. If nature exposure can help people struggling with MDD, then those findings can be transferred into a therapy like setting or program designed to help people cope with the stresses of life and work their way through their MDD. Therapists may be able to simply recommend that their patient go on a walk in a nature setting.

Nature exposure is not exclusively beneficial to adults. Nature exposure can be beneficial to children as well. Researchers in this study wanted to see whether or not nature could be used as a buffer to reduce the effects of life stress and stressful life circumstances (Wells & Evans, 2003). Researchers gathered data from 337 rural children in grades from 3rd through 5th. Data was recorded through Parent's reported data on their child's psychological distress, as well as a report from the child. Results concluded that the impact of life stresses were lower among children who had higher levels of nearby nature compared those children who had less levels of nearby nature (Wells & Evans, 2003). This data is significant because it helps answer some of our research questions. These findings show that there is a correlation between the amount of nearby nature and stress levels among children.

Age and mental health are not the only factors that may influence the effects of nature exposure. Geographical location, socioeconomic status, and amount of exposure to nature are factors that may contribute to the effects of nature exposure. Mihaela Schneider answers these questions. She compiled data from a multitude of dimensions including income, amount of

exposure to nature, amount of access to outdoor spaces, and compared how those factors' role influences the effects of nature exposure on the individual. The results suggest that participants with higher exposure to nature, regardless of urban living conditions or socioeconomic status, experience greater well-being, across multiple dimensions, than those who reported lower exposure to nature (Schneider, 2019). The results from this study suggest that the effect of nature exposure is widely beneficial, regardless of other variables such as socio-economic status. It would be appropriate to assume that nature exposure is beneficial to everyone regardless of their personality as well, however, unless studied, cannot be determined.

Nature Sounds and Nature in a Virtual Setting

The effects of nature exposure are not limited exclusively to the wild or in a natural setting. Nature exposure still has benefits among people when they are not actively involved in the outdoors. Alvarsson, Wiens, & Nilsson tested whether or not nature sounds elicit the same or similar effects as one would experience if they went out into nature (2010). In this first experiment, researchers tested to see if nature ambient sounds reduced stress levels. 40 subjects were exposed to sounds from nature as well as different levels of noise and several different kinds of noise, after a stressful mental arithmetic task. Skin conductance level was used to index sympathetic activation. After testing receiving the results, the study found that nature sounds were the most effective in reducing stress levels after taking the stressful mental arithmetic task (Alvarsson et al., 2010). This study provides us with the understanding that the effects of nature exposure are not limited exclusively to nature settings but can still be accessed through nature-like settings such as recordings of nature sounds.

The weaning off of a medical ventilation device can be quite challenging for many individuals. Nature exposure has been found to help. A random clinical trial was conducted to

test whether or not nature sound therapy would be an effective treatment in reducing the stressful impact from the process of weaning off a mechanical ventilation device. 120 coronary artery bypass graft patients, who ranged from the ages of 45 through 65 years, and all who were undergoing weaning from mechanical ventilation were randomly assigned to two groups. One group listened to nature based sounds through the use of headphones. Meanwhile the control group listened to no sound through the use of headphones. Hemodynamic variables, which include anxiety levels and agitation were assessed using the Faces Anxiety Scale and Richmond Agitation Sedation Scale. After conducting the experiment, data indicated that the intervention group who listened to nature based sounds, had significantly lower anxiety and agitation levels when compared to that of the group that did not. In regards to the hemodynamic variables, anxiety levels and agitation, significant differences were found between the anxiety and agitation scores in the two groups (Aghaie et al., 2014). The results indicate that nature based sounds illicit a similar effect among patients who are in a medical setting and effectively reduces stress levels.

Virtual reality is a rather new concept among our society. The technology has only recently been available to the general public over the course of the last several years. And the technology is only advancing. Virtual reality, although man made, can be used to illicit the effects from nature exposure. In this study, researchers had participants experience nature like settings within virtual reality. Three groups of participants were selected to take part in the study. The first group would experience a nature like setting in virtual reality with nature sounds. The next group would also experience a nature like setting within virtual reality but with out nature sounds. And the third group would act as the control group without either. Cardiovascular data and saliva cortisol were collected. After conducting this study, researchers found that the group who experienced a nature like setting and nature based sounds had activation of their

parasympathetic system, this suggests that an enhanced stress recovery may occur in when experiencing such surroundings. The group that experienced a nature like setting in virtual reality but with no nature sounds, as well as the control group did not display any particular autonomic activation or deactivation (Annerstedt et al., 2013). This might suggest how different mechanisms are at play, but also suggests the need for incorporation of real nature such as recorded sounds. Furthermore, the results highlight a potential link between nature, nature sounds, and stress recovery as well as provide further evidence of the biophilia hypothesis and provide us with the insight that the nature exposure effect can still be evident within an unnatural or man-made setting but requires the use of real nature for the full effects.

Nature Exposure Therapy and Programs

Nature exposure programs have begun being implemented in different ways across the nation. These programs have been designed to target a specific group of people. We will start by examining a nature program designed for school aged children. With mental health problems on the rise, researchers wanted to test the influence of engaging with nature and how that has an effect on mental health among children ages 8-11. Two groups of children would be used as the sample. One group of children were to be involved in a nature exposure program for one whole academic year. The other group would not participate in the nature program. Results indicated that children who participated in the nature program had significant improvements among their mood and well being (Harvey et al., 2020). A baseline measurement was taken before the children were to become involved in the program to measure how involved in nature children were already. Children who had originally reported a low connectedness level to nature later reported higher feelings of connectedness to nature after the program (Harvey et al., 2020). If school aged children benefited from this program, perhaps more schools or corporations should

be looking at creating a form of nature exposure program. This method may provide an alternative approach to therapy as the cost of a nature exposure program is relatively low.

Post Traumatic Stress Disorder is among the most common mental illnesses veterans face. PTSD can be caused by exposure to any traumatic life event. Researchers here tested the outcomes from exposing 8 Danish veterans to a 10 week nature-based therapy program. Interviews were conducted and analyzed throughout the study. Results from the study indicated that the veterans involved achieved tools that would be helpful to them during stressful situations. Furthermore, veterans learned to be more attentive to their surroundings, including reports of taking in the smells, weather conditions, and other wildlife (Poulsen et al., 2016). When in the therapy garden, veterans reported that it was a comfortable place to be in (Poulsen et al., 2016). One of the most important findings from this study indicated that veterans'' experienced an improvement of symptoms occurring from PTSD. This would suggest the important role of nature exposure in reducing stress, but also the reduction of symptoms emerging from stress disorders.

Nature exposure programs have proven to be beneficial for both students and veteran's alike (Harvey, et al., 2020; Poulsen, et al., 2016). However, US Cadets face both worlds. Stress, discomfort, and many other challenges make up the normal experience of the US military college experience. Cadets face the challenges of university as well as the challenges that service members face. A mixed method study explored the possibility of a nature exposure program. Within the program, researchers gathered 12 cadet women who participated in a 3 day backpacking trip. Backpacking is becoming an increasingly popular way for people to experience nature as it requires almost full immersion. Backpacking is where the individual carries everything they need including their tent, sleeping system, food, and water as well as

other supplies all in their backpack. The results indicated that those who participated in the backpacking event had a moderate positive effect on their happiness levels compared to little or no effect among those who did not go backpacking (Ilagan et al., 2020). Furthermore, the pretest and post test happiness score for the group involved in the backpacking event showed significant increases (Ilagan et al., 2020). The authors further propose wilderness-based intervention as a means to bolster the cadet's coping and resilience (Ilagan et al., 2020). Nature based intervention programs may be a means to bolster coping and resilience among students, patients, and veterans. This could provide a simple low-cost initiative that could be effective in reducing stress and bettering overall wellbeing. Thus, raising the quality of life.

Does personality predict well being? Stress levels?

Although there are many arguable factors that define who a person is, personality is one of the most compelling. Evidence suggests that personality can and does predict outcomes in regard to well-being and health outcomes (Strickhouser et al., 2017; Hakulinen et al., 2015). One of the most common ways in defining personality is through the Big Five model. The Big Five model separates and categorizes personality into 5 domains; neuroticism, extraversion, conscientiousness, agreeableness, and openness to experience (John & Srivastava, 1999). Researchers tested whether or not a relationship existed between each personality domain and health outcomes. Big Five personality traits were measured using metasynthesis. 36 meta-analyses which collectively provided 150 meta-analytic effects from over 500,000 participants were compiled and used. Results indicate that Big Five traits were moderately associated with overall health, however, effects were larger among agreeableness, conscientiousness, and neuroticism than extraversion or openness to experience. Furthermore, health-personality relations were stronger among mental health outcomes compared to physical health outcomes

(Strickhouser et al., 2017). This study provides evidence that different types of personality produce varying degrees of health outcomes. Another study examined this further. Testing whether or not the varying degree of personality domain influenced the effects of stressful life events on older adults health (Mitchell et al., 2020). Previous research would suggest that those who are higher in the neuroticism domain would experience more negative health outcomes and specifically more depressive symptoms (Hakulinen et al., 2015). However, more recent research suggests that stressful life events are harmful to health regardless of personality (Mitchell et al., 2020). If personality can predict mental health outcomes, and nature exposure has a positive effect on mental health, then how does personality influence the effects of nature exposure? Or would the effects of nature exposure allow for stress perception levels to be reduced across all domains of personality?

Stress Among College Students; Nature Exposure as a Solution

College is one step for many Americans who are pursuing the American dream. However, increased competition, an influx of technology, and social media have all played a part in affecting the lives of college students (Stolzenberg et al., 2020). Both incoming freshmen men and women's physical and emotional health have been on a consistent decline since 2015. In 2015, 66.0% of men and 46.3% of women reported their physical health as above average, while in 2019, 60.8% of men and 43.5% of women reported such. Additionally, in 2015, 59.0% of men and 43.7% of women reported their emotional health as above average, while in 2019, 50.4% of men and 34.0% of women reported such (Stolzenberg et al., 2020, 9). With the decline of health among college students, as well as the amount of stress college students face, students are facing an ever increasing challenge. Since nature exposure has been documented to provide benefits such as reduced stress, higher mood levels, cognitive function, PTSD, and MDD regardless of

their race, urban or rural setting, and socioeconomic status. Programs may be designed to help specific age groups and each age group experienced positive benefits from their nature exposure programs stress relief, coping skills, and higher levels of well-being and mood, studying the effects of nature exposure among college students may provide us with possible solutions to this problem. Furthermore, there is little to no research examining how the effects of nature exposure might be different among individuals with different personalities. This study aims to fill that gap. By having the knowledge and understanding as to how personality may influence the effects of nature exposure, therapists, counselors, and other organizations may provide better nature-based programs that can be tailored to the personality of the individual at low-cost rates.

Methodology

In order to test the research question, “how does personality influence the effects of nature exposure among college students?”, each variable must be defined in order to test this question. For this study, a survey was used examining three different categories. The three categories are personality, nature exposure, and perceived stress. Each of these categories is defined through a comprehensive questionnaire. For the first category, personality is defined using the Big-Five trait taxonomy (John & Srivastava, 1999). The 44-item inventory defines personality based on whichever of the five personality types the participant scores highest in. After completing the first category, participants are asked questions regarding their nature exposure experience. In this study, nature exposure is defined as “any activity or interaction that involves the use of or relationship with nature including experiences with other non-human lifeforms”. Participants were asked how many days they were involved in nature based activities as well as how many days the participants felt as though they were involved in nature. The reason participants were asked whether they felt involved in nature was to establish whether or

not increased perception of being involved in nature had any significance. The first question regarding the amount of days involved in nature activities can be regarded as NE1. The second question regarding whether or not participants felt as though they were involved in nature can be regarded as NE2. The third category of this questionnaire defines perceived stress. For this category, the Perceived Stress Scale 10-item inventory (Cohen, 1994) was used to determine perceived stress levels among the participants. The 73-item questionnaire was distributed through a link to Qualtrics. In order to access the link students enrolled in PSY 120 had to sign up through SONA. 20 total participants were gathered and their identity remained anonymous. Four males identifying as a male with the median age being 18 were gathered as participants. The remaining 16 participants were females identifying as female. The median age among the females is 19 with the youngest being 18 and the oldest being 22.

Hypothesis

H1: Participants with higher levels of nature exposure will experience lower levels of perceived stress.

Rationale: Nature exposure has shown to increase moods, cognitive function, and lower stress levels (Berman, et al, 2012; Schneider, 2019; Wells & Evans, 2003).

Demographics

Before participants will be asked to fill out the questionnaire, questions must be asked to eliminate outliers. In order to test the research question, the survey must first sort out who the participant is and if they qualify into the sample population. This study looked for participants who were of college age and were enrolled in college-level studies. This study gathered data about demographics through these following questions:

Q: What is your sex?

Q: What is your gender?

Q: What is your age?

Q: Are you a student enrolled in college courses?

A: Undergrad, Graduate, No

Big-Five Inventory

The Big Five Inventory (BFI; John et al., 1991) is a self-report inventory designed to measure the Big Five dimensions of personality; Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. These domains are meant to help categorize personality based off of these broad terms. Each domain can be broken down further into traits. Traits that are common among Extraversion are talkative, energetic, and assertive. Agreeableness has common traits such as sympathy, kindness, and affection. Those who fall in the Conscientiousness domain possess traits such as organization, thorough, and planful. Participants who fall into the Neuroticism domain are more emotional, sensitive, and can be moody, tense, or anxious. Lastly, those who fall into the Openness to Experience domain tend to have wide interests, are imaginative, and insightful (Srivastava, 2021). For this study, we will use the 44-item inventory that measures an individual on the Big Five dimensions of personality (John et al., 1991; John & Srivastava, 1999). This inventory uses 44 questions with the answer to each being scored on a 1-5 basis. 1 being strongly disagree. 5 being strongly agree. The Big Five Inventory has 8 items for Extraversion. 9 items for the agreeableness dimension. 9 items for the conscientiousness dimension. 8 items for the neuroticism dimension. And 10 items for the openness to experience dimension. The Big Five Index is then scored by using the dimension

with the highest score. For example, those with a higher score in Neuroticism will be defined as having a Neurotic personality. Several examples of items are as follows: Is talkative? Tends to find fault with others? Does a thorough job? This inventory will enable us to establish a definitive personality within the Big Five Inventory which will then be used to compare responses from the data received by the remaining portions of the questionnaire. Including a comparing of the relationship between stress and personality.

Nature Exposure (Self report)

Nature exposure will be defined as the following: Any activity or interaction that involves the use of or relationship with nature including experiences with other non-human lifeforms. Specifically, we seek to understand how many days participants were involved in nature based activities. As well as how many days participants felt as though they were involved in nature. A third question was asked regarding the social aspect of the activity to see if participants were more likely to be involved in the nature based activities with others or by themselves.

NE1: Over the last year, about how many days have you participated in a nature-based activity?

NE2: Within the last year, about how many days would you say you were actively involved in nature?

Perceived Stress Scale

The Perceived Stress Scale (PSS; Cohen et al, 1983) is one of the most highly used and recognized stress perception inventories. For this study, the Perceived Stress Scale-10 will be used. The PSS-10 is a 10 question inventory where researchers can measure the degree to which individuals' perceive a situation to be stressful. Stress has been correlated to predict other health

outcomes such as, failure to quit smoking, greater vulnerability to stressful life events, and more colds (Cohen & Williamson, 1988). We will use the PSS-10 to determine stress levels among participants.

Timeline

The survey link to Qualtrics remained live from the dates of January 26th, 2022 and closed on February 27th, 2022. This was 2 weeks into the start of the Spring/2022 semester at the University of Northern Colorado. These dates are important as incoming PSY 120 students were assigned to take SONA surveys. Those wishing to get a head start in the class would be most likely to complete surveys during this time period.

Results

Gender	N	Median Age	NE1 Mean	NE2 Mean	PSS Mean
Male	4	18	77.25	75.5	22
Female	16	19	67.0625	51	21.1875

Gender

The link to the survey was live for four and a half weeks. During this period, we gathered 20 participants. Four males identifying as a male with the median age being 18 were gathered as participants. The remaining 16 participants were females identifying as female. The median age

among the females is 19 with the youngest being 18 and the oldest being 22. No significant gender differences were found (all p s > .75).

Personality

No significant differences exist between personality type and nature exposure outcomes. The highest appearing personality types were also run through t-tests. Personality yielded non-significant differences. Neurotic vs openness $p > .07$. Neurotic vs agreeableness $p > .08$. Those with a neurotic index did not have significant differences in nature exposure outcomes than those with an openness to experience index. And those with a neurotic index did not have significant differences than those with an agreeableness index.

Perceived Stress

When scoring the perceived stress scale, individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress. Scores ranging from 0-13 would be considered low stress. Scores ranging from 14-26 would be considered moderate stress. Scores ranging from 27-40 would be considered high perceived stress. One-way ANOVA showed significant differences between low, moderate, and high stress groups: $F(2,19) = 45.93$, $p < .00001$. Tukey pairwise comparisons are as follows: Low vs moderate $p = .0001$, Low vs high $p < .00001$, Moderate vs high $p = .0004$. These results indicate that each of the stress groups are significantly different and accurately describe differences in stress. See figure 1.

Nature Exposure and Perceived Stress

Results from Pearson's r showed significant relationships between perceived stress and NE1: PSS and NE1. $r = -.45$, $p = .03917$. See figure 2. Thus, the correlation exists between higher levels of nature exposure and lower levels of perceived stress. This finding further

exemplifies previous research findings that nature exposure may be correlated with reduced stress levels. Pearson's r did not show significance with NE2 and perceived stress outcomes: PSS and NE2 $r = -.17, p > .45$. Pearson's r did find a significant relationship between NE1 and NE2: NE1 and NE2 $r = .85, p < .00001$. See figure 3. Thus, showing that these questions are basically identical and are asking the same thing. One-way ANOVA was used to find significant differences between stress outcomes and NE1: NE1 (2,19) = 3.56, $p = .051$. Almost showing significance, these results show that differences in nature exposure levels exist and correlate with significant outcomes based on whether the participant had high or low levels of nature exposure. Tukey Pairwise comparisons are as follows: Low vs moderate $p = .445$, Low vs high $p = .03$, Moderate vs high $p = .278$. See figure 4. This indicates that there is significant difference between low nature exposure groups and high nature exposure groups in perceived stress outcomes. One-way ANOVA was used to find significant differences between stress outcomes and NE2: NE2 (2,19) = 1.34, $p = .288$. No significant differences were found. Tukey pairwise comparisons are as follows: Low vs moderate $p = .965$, Low vs high $p = .288$, Moderate vs high $p = .411$. These findings indicate that NE2 does not have any significant differences in terms of perceived stress outcomes. A median split between NE1 scores at 40 resulted in 11 participants in the low NE1 group and 9 participants in the high NE1 group. Three t-tests were performed. Results are as follows: The low NE1 group had significantly lower NE1 scores than the high NE1 group ($p = .0006$). See figure 5. This establishes that the low NE1 group had significantly lower amounts of nature exposure than those in the high NE1 group. The low NE1 group had significantly lower NE2 scores than the high NE1 group ($p = .02$). See figure 6. This indicates that NE1 and NE2 are essentially the same question and that those in the low NE1 group have significantly lower amounts of nature exposure and experienced less nature exposure as a result.

The low NE1 group had significantly lower PSS scores than the high NE1 group ($p = .045$). See figure 7. This finding fits with previous research and shows a positive relationship existing between nature exposure and reduced perceived stress scores. This result proves that the hypothesis of this study was correct. More exposure to nature is correlated with reduced levels of perceived stress. A median split of NE2 scores at 31 resulted in 12 participants in the low NE2 group and 9 participants in the high NE2 group. Three t-tests were performed and the results are as follows: The low NE2 group had significantly lower NE1 scores than the high NE2 group ($p = .0021$). See figure 8. The low NE2 group had significantly lower NE2 scores than the high NE2 group ($p = .012$). See figure 8. Both of these findings again show that these questions are potentially asking the same thing and that those with in the high NE1 group will also be in the high NE2 group, and those in the low NE1 group will be in the low NE2 group. The low NE2 group did not have significantly lower PSS scores than the high NE2 group ($p = .056$). This study's finding that those with lower amounts of nature exposure have higher amounts of perceived stress furthering previous research and showing that higher levels of nature exposure among college aged people is correlated with lower amounts of perceived stress.

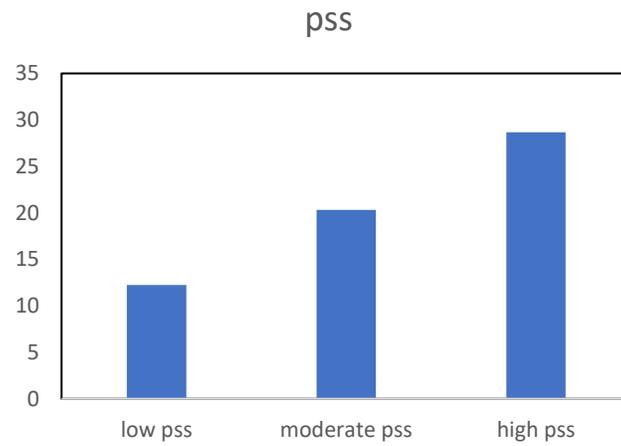
Figure 1

Figure 1 demonstrates significant differences between each of the perceived stress groups. This highlights that each of the different perceived stress groups accurately represent perceived stress levels among participants.

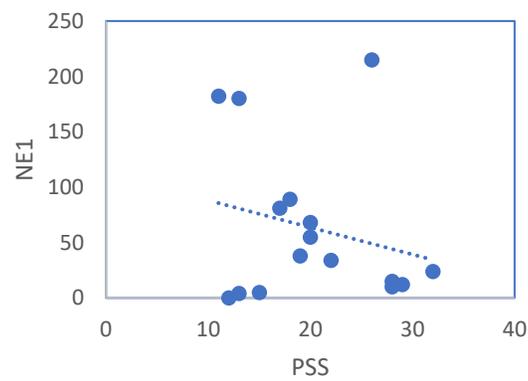
Figure 2

Figure 2 highlights that those with more amounts of nature exposure is correlated with having lower amounts of perceived stress.

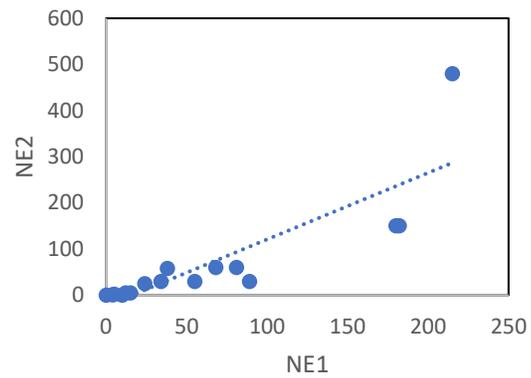
Figure 3

Figure 3 demonstrates that NE1 and NE2 are essentially asking the same question.

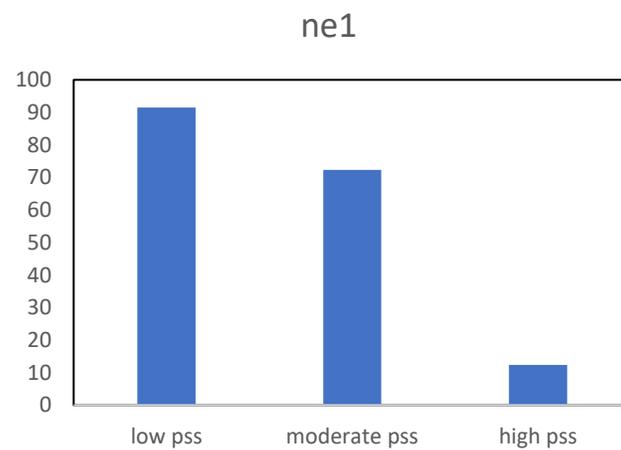
Figure 4

Figure 4 demonstrates that those with higher amounts of nature exposure activities have significantly lower perceived stress levels than those with low amounts of nature exposure.

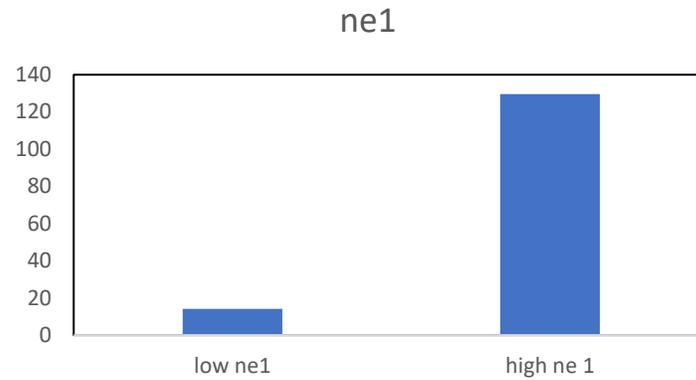
Figure 5

Figure 5 demonstrates that the low NE1 group had significantly lower amounts of nature exposure than those in the high NE1 group.

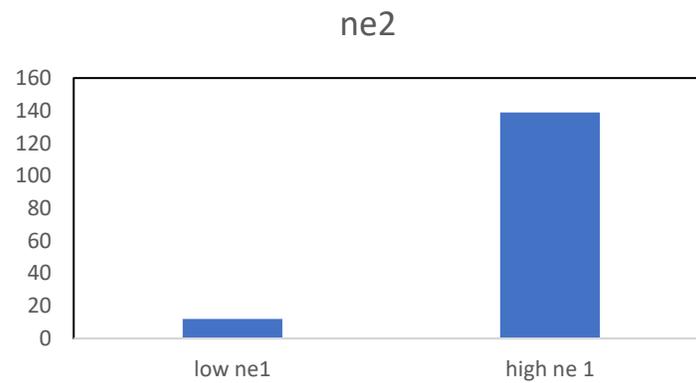
Figure 6

Figure 6 demonstrates that NE1 and NE2 are essentially the same question and that those in the low NE1 group have significantly lower amounts of nature exposure and experienced less nature exposure.

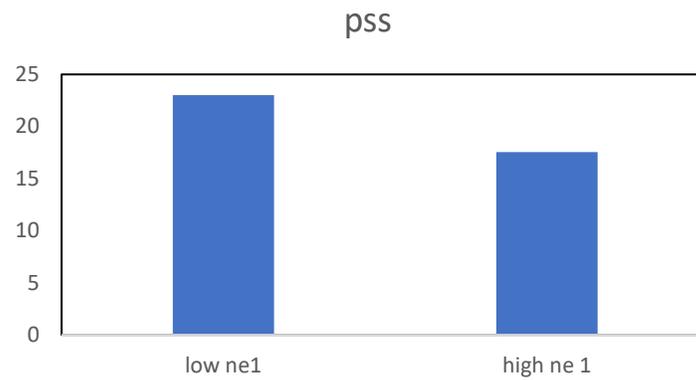
Figure 7

Figure 7 demonstrates the relationship between higher levels of nature exposure correlating with lower amounts of perceived stress.

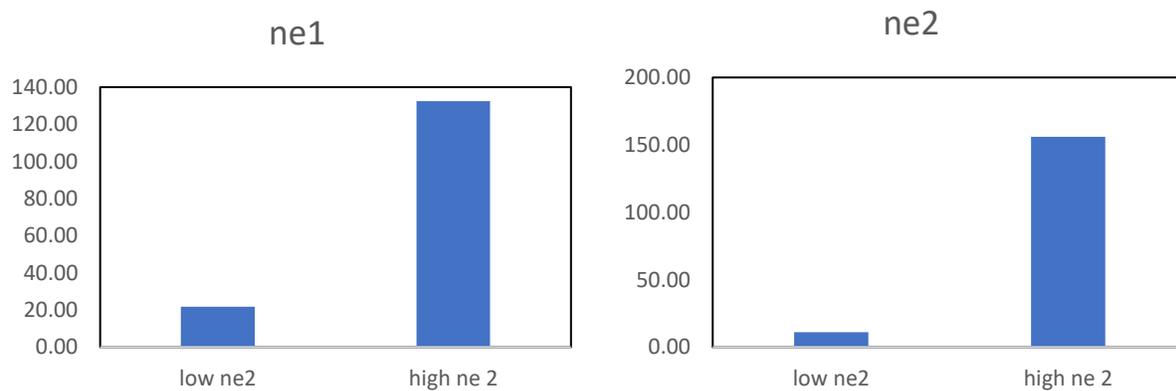
Figure 8

Figure 8 demonstrates that NE1 and NE2 are asking essentially the same thing and that those within the high NE1 group will also be in the high NE2 group, and those in the low NE1 group will be in the low NE2 group.

Discussion

The most significant findings of this study were that those who had experienced less than 40 days of nature exposure activities and were subsequently placed into the low nature exposure group had significantly higher perceived stress than those who had more than 40 days of nature exposure activities and were in the high nature exposure group. This finding fits with previous research and further proves the correlation existing between nature exposure and reduced stress levels (Aghie et al., 2014; Harvey et al., 2020). If this study were to be replicated it would be advisable to have the survey open for longer as to gather more participants. 20 total participants is too small of a sample size to accurately represent the population. In order to accurately represent the student population at the University of Northern Colorado more participants would be needed. Targeting the beginning of or the end of the semester is also advisable. During this period students are more likely to complete the survey requirements for their PSY 120 class as those who are hoping to get a head start in the class will likely complete their survey requirements at the beginning of the semester. The students who have yet to complete the requirements will be forced to complete it during the end of the semester if they want full credit for their course. Furthermore, by opening up the survey to those beyond just college students would help gather more accurate data about the general population and the influence of personality on nature exposure. Western states such as Colorado, Wyoming, Montana, Nevada, and California are known to have large percentages of public land. This includes BLM land, State Trust Land, and National Forests/Parks. Colorado alone has 8.3 million acres of public land (Bureau of Land Management, 2022). This provides for more opportunity to recreate in nature. Further research on access to public lands should also be considered. A larger sample size might further correlate with previous findings that more nature exposure results in reduced amounts of

stress and more accurately represent the population (Aghie et al., 2014; Harvey et al., 2020). The disruptions caused by the COVID-19 pandemic could possibly produce more stress. The environment the participants gathered from this study is also a rather stressful environment. College is not a place to find many luxurious activities and relaxation. It is a time of intense study. Thus, the findings could be skewed due to the type of participants. Further research is required to understand the relationship between nature exposure and perceived stress outcomes. Since the main goal of this study was to examine how personality modulates perceived outcomes and instead this study found that low amounts of nature exposure correlate with low perceived stress, thus going against previous research, this study cannot speak to whether or not differences exist between different personality types and nature exposure outcomes. It is possible, due to the small sample size and timeframe of this study that the results are skewed and do not accurately represent the population at the University of Northern Colorado.

Conclusion

Previous studies show the existence of a positive correlation between stress reduction and nature exposure (Aghie et al., 2014; Harvey et al., 2020). This study has similar findings. Those with low amounts of nature exposure had significantly higher perceived stress ($p = .045$). More research is required to understand how personality modulates the effects of nature exposure among college students as this study did not find any significant differences.

References

- Aghaie, B., Rejeh, N., Heravi-Karimooi, M., Ebadi, A., Moradian, S. T., Vaismoradi, M., & Jasper, M. (2014). Effect of nature-based sound therapy on agitation and anxiety in coronary artery bypass graft patients during the weaning of mechanical ventilation: A 29 randomized clinical trial. *International Journal of Nursing Studies*, *51*(4), 526-538. <https://doi.org/10.1016/j.ijnurstu.2013.08.003>
- Alvarsson, J. J., Wiens, S., & Nilsson, M. E. (2010). Stress recovery during exposure to nature sound and environmental noise. *International Journal of Environmental Research and Public Health*, *7*(3), 1036–1046. <http://dx.doi.org/10.3390/ijerph7031036>
- Annerstedt, M., Jonsson, P., Wallergard, M., Johansson, G., Karlson, B., Grahn, P., Hansen, Å. M., & Währborg, P. (2013). Inducing physiological stress recovery with sounds of nature in a virtual reality forest — results from a pilot study. *Physiology & Behavior*, *118*, 240-250. <https://doi.org/10.1016/j.physbeh.2013.05.023>
- Berman, M. G., Kross, E., Krpan, K. M., Askren, M. K., Burson, A., Deldin, P. J., ... Jonides, J. (2012). Interacting with nature improves cognition and affect for individuals with depression. *Journal of Affective Disorders*, *140*(3), 300–305. <https://doi.org/10.1016/j.jad.2012.03.012>
- Chia-chen, C., Cheng Gwyneth, J. Y., Nghiem Thi, P. L., Song, X. P., Oh Rachel, R. Y., Richards, D. R., & Roman, C. L. (2020). Social media, nature, and life satisfaction: Global evidence of the biophilia hypothesis. *Scientific Reports (Nature Publisher Group)*, *10*(1), Article 4125. doi: <http://dx.doi.org/10.1038/s41598-020-60902-w>

- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 385–396.
- Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan & S. Oskamp (Eds.), *The social psychology of health: Claremont Symposium on applied social psychology*. Newbury Park, CA: Sage
- Colorado: Bureau of Land Management. (2022.). Retrieved March 29, 2022, from <https://www.blm.gov/colorado>
- Facts & statistics: Anxiety and Depression Association of America, ADAA. (n.d.). Retrieved April 06, 2021, from <https://adaa.org/understanding-anxiety/facts-statistics#:~:text=MDD%20affects%20more%20than%2016.1,older%20in%20a%20given%20year.>
- Hakulinen, C., Elovainio, M., Pulkki-Raback, L., Virtanen, M., Kivimaki, M., & Jokela, M. (2015). Personality and depressive symptoms: Individual participant meta-analysis of 10 cohort studies. *Depression and Anxiety*, 32(7), 461–470. doi:10.1002/da.22376
- Harvey, D. J., Montgomery, L. N., Harvey, H., Hall, F., Gange, A. C., & Watling, D. (2020). Psychological benefits of a biodiversity-focussed outdoor learning program for primary school children. *Journal of Environmental Psychology*, 67, Article 101381. <https://doi.org/10.1016/j.jenvp.2019.101381>
- Ilagan, G., Ilagan, J., Jocius, R., Jefferson, R., Bennett-Mintz, J., McCormick, K., & Farrell, M. (2019). Happiness outcomes among cadet women backpackers. *Journal of Adventure*

Education and Outdoor Learning, 20(4), 285–297.

<https://doi.org/10.1080/14729679.2019.1660194>

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *Big Five Inventory (BFI)*. APA PsycTests. <https://doi.org/10.1037/t07550-000>

John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (Vol. 2, pp 102-138). New York: Guilford Press.

Mitchell, L., Zmora, R., Finlay, J., Jutkowitz, E., & Gaugler, J. (2020, June 01). Do big five personality traits moderate the effects of stressful life events on health trajectories? Evidence from the health and retirement study. Retrieved April 10, 2021, from <https://academic.oup.com/psychsocgerontology/article/76/1/44/5849472?login=true>

Poulsen, D. V., Stigsdotter, U. K., Djernis, D., & Sidenius, U. (2016). ‘Everything just seems much more right in nature’: How veterans with post-traumatic stress disorder experience nature-based activities in a forest therapy garden. *Health Psychology* *Open*. <https://doi.org/10.1177/2055102916637090>

Schneider, M. I. (2019). *Relationships between exposure to nature, well-being, and demographic variability* (Order No. 27543172). Available from ProQuest Dissertations & Theses Global. (2311655571). Retrieved from <https://www-proquest-com/dissertations-theses/relationships-between-exposure-nature-well-being/docview/2311655571/se-2?accountid=12832>

- Srivastava, S. (2021). *Measuring the Big Five Personality Factors*. Retrieved April 16th, 2021 from <http://psdlab.uoregon.edu/bigfive.html>.
- Stolzenberg, E. B., Aragon, M. C., Romo, E., Couch, V., McLennan, D., Eagan, M. K., & Kang, N. (2020). *The American Freshman: National Norms Fall 2019*. Los Angeles: Higher Education Research Institute, UCLA.
<https://www.heri.ucla.edu/monographs/TheAmericanFreshman2019-Expanded.pdf>
- Strickhouser, J. E., Zell, E., & Krizan, Z. (2017). Does personality predict health and well-being? A metasynthesis. *Health Psychology, 36*(8), 797-810. <https://doi.org/10.1037/hea0000475>
- Wells, N. M., & Evans, G. W. (2003). Nearby nature: A buffer of life stress among rural children. *Environment and Behavior, 35*(3), 311–330. <https://doi.org/10.1177/0013916503035003001>
- Wilson, E. O. (1984). *Biophilia*. Cambridge, MA: Harvard University Press.