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College Campus Restorativeness: Examining Relationships with Personality and Space Usage

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ABSTRACT

Current literature on restoration of directed attention focuses on outdoor environments, even though humans spend a significant amount of time indoors. This is especially true for college students, whose study activities commonly result in directed attention fatigue. The present research provides an important, foundational understanding of collective personality, its influence on restorativeness, and the impact of how spaces are used. These variables were examined for indoor environments on a university campus. Participants were 615 undergraduates who completed an online survey about how they use campus spaces, restorativeness of those spaces (Perceived Restorativeness Scale), and personality (IPIP-NEO-120). Key results indicated that when we examined personality combined, we found that agreeableness and neuroticism were significant predictors of restorativeness (R^2 = .15). When we examined personality holistically to predict restorativeness for study spaces, we found that agreeableness was the only significant predictor (R^2 = .03). For social spaces, agreeableness, neuroticism, and extraversion were significant predictors (R^2 = .15). For break spaces, agreeableness and neuroticism were significant predictors (R^2 = .10). Findings extend previous research efforts by contributing a holistic understanding of personality as a predictor of restorativeness, with agreeableness and neuroticism demonstrating consistent prediction. This relationship is additionally affected by how a space is used. With these insights, universities can design indoor spaces that are maximally restorative for all personality types.

KEY WORDS Restorativeness; Personality; College Students; Indoor Environments

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Successful completion of indoor tasks requires directed attention (DA), but utilizing DA also depletes the resources one needs to continue engaging in these tasks. Populations such as college students regularly utilize DA capacities and subsequently have those capacities diminished; however, certain types of environments can be considered *restorative,* meaning they aid the attention-replenishment process. Most research has examined restorative qualities of outdoor environments, and some have also looked at the influence of individual differences on restoration. Given the importance of DA for college students, the present study examined the ability of personality factors to predict restorativeness in indoor environments. Additionally, this study substantially adds to the existing literature by analyzing holistic personality and its relationship with restorativeness. This is important because personality traits continually coexist and interact with one another. Individual prediction is important for understanding standalone characteristics, but there is greater value in observing personality as it naturally occurs. The present study assessed personality's predictive abilities for restorativeness across a variety of university campus spaces, factoring in how spaces were primarily used by students. Understanding the relationships between personality, use of space, and restorativeness is critical for the well-being of students as well as for colleges that rely on the academic excellence of their student body for scholarly reputation and funding.

DIRECTED ATTENTION

Considering the high demands of modern society, DA has caught the eye of researchers in the past few decades. This variable is the basis for Attention Restoration Theory (ART), a framework developed by Stephen and Rachel Kaplan for understanding the process behind the depletion and recovery of mental resources (Hartig 2004). DA involves an intentional, effortful, and forceful act of focusing on a stimulus that is not naturally fascinating (Kaplan and Kaplan 1989). Involuntary attention, in comparison, allows a person to engage in effortless attention because the object or task at hand is naturally engrossing (Kaplan and Kaplan 1989). Studying and understanding DA is a relevant and important task because "often the modern human must exert effort to do the important while resisting distraction from the interesting" (Kaplan 1995:170).

As may be inferred from the definition, using DA can require a great deal of effort. First, it can be difficult to focus on something not innately interesting (Kaplan 1995). Second is the challenge of simultaneously resisting distractions (Kaplan and Kaplan 1989). Kaplan (1995) explained that this distraction resistance, called inhibition, is crucial to executing DA and can involve significant exertion if the competing stimulus is more intriguing than the task at hand. Because it does not come easily or automatically, the ability to exercise DA can be exhausted or difficult to sustain; this experience is called directed attention fatigue. As a mental resource, DA is renewable but limited, meaning one has a finite supply of DA available for use before it needs to be replenished (Kaplan 1995).

The reality of DA fatigue poses a threat to daily functioning, as DA is a critical component of many cognitive and behavioral tasks. It is specifically important for executive thought and self-control, perhaps because of a connection with working memory (Ohly et al. 2016). For example, the process of psychological selection, or determining the

appropriate information to solve a problem, requires the ability to focus on the problem while ignoring other, irrelevant, details (Kaplan 1995). This inhibition also empowers people to behave in ways contrary to their natural inclinations, which can be helpful for tasks such as making healthy decisions, acting in socially desirable ways, or restraining the expression of harmful emotions (Kaplan 1995).

The flip side is that fatigue of this resource may be associated with various negative consequences. DA fatigue can compromise effective functioning, relationship quality, and accurate perception of the world and can lead to impulsivity, risky/poor decisions, and mistakes (Kaplan 1995). Overall, Kaplan and Kaplan (1989:181) concluded, DA fatigue can lead to behavior that is "more aggressive, less tolerant, and less sensitive to socially important cues." More specifically, Felsten (2009) warned that college students, because of their life circumstances, may be especially susceptible to the disadvantages of DA fatigue, asserting that the intense mental effort and focus required for tasks such as studying, taking notes, and completing projects may "reduce the efficacy of their scholarly efforts and lead to lower academic achievement" (p. 3).

RESTORATIVE ENVIRONMENTS

Fortunately for modern society, and especially college students, DA fatigue need not be a permanent impairment, because DA is a renewable resource. Opportunities to use involuntary attention, rather than DA, can provide space for the DA capacities to recover (Kaplan 1995). This knowledge has led to increasing interest surrounding the topic of restorativeness, or the ability of an environment to contribute to the process of replenishing the brain's mental resources (Hartig 2004). This recovery happens via breaks from using DA in restorative environments (Hartig 2004), places specifically inclined to evoke involuntary attention (Kaplan 1995).

Kaplan (1995) described four major components of restorative environments: fascination, being away, extent, and compatibility. *Fascination* means that the environment has qualities that are interesting and naturally draw attention without concerted effort. *Being away* refers to the environment's capacity to allow a mental shift away from the fatiguing task. *Extent* signifies a cohesive and substantial environment that fills a large portion of mental space. Lastly, *compatibility* conveys that the environment is compatible with one's purposes there, or that "what one does comfortably and naturally is what is appropriate to the setting" (Kaplan 1995:173). A variety of restorativeness measures exist, and the literature utilizes several different ones, but the present study landed on the established and commonly used Perceived Restorativeness Scale (PRS; Hartig et al. 1997) because it relies on these four comprehensive environmental components as its basis.

Restoration Outdoors

When it comes to DA restoration, all environments are not created equal. Numerous studies have examined the restorative elements of outdoor environments, which seem to be particularly inclined to promote restoration and other valuable life outcomes. In their study of restorativeness in botanical gardens, Carrus et al. (2017) interviewed visitors at various

locations and found restorativeness to be significantly related to measures of subjective well-being, as well as physical and psychological benefits. The work of Payne, Loi, and Thorsteinsson (2020) corroborated these results, as it demonstrated significant relationships between restorativeness and well-being for people who spent at least 20 minutes in nature per week. Research also indicates that natural settings are more restorative than urban ones. Takayama, Morikawa, and Bielinis (2019) found that time spent in a forest was more restorative than time spent in an urban environment. Similarly, Felsten (2014) looked at perceived potential for attention restoration (PPAR) utilizing photos of urban and natural scenes. PPAR was higher for the moderately attractive natural scene than for the moderately attractive urban one.

Scopelliti, Carrus, and Bonaiuto (2019) were concerned, however, that the mounting evidence in favor of natural settings was due to bias in the studies. Specifically, they wondered if researchers were choosing natural environments with inherently more restorative properties than urban environments, confounding the results. To test their inquiry, Scopelliti and colleagues compared a natural setting and an urban setting, both of which had been previously rated as having high restorative characteristics. They still found, however, that participants rated the natural environment as more restorative, even though both settings had been confirmed as having equivalent restoration qualities. These researchers were not the only skeptics in the restorativeness research; Menardo et al. (2021) also wanted to explore the credibility of the claim that natural environments are more restorative than urban environments. To do so, they conducted a meta-analysis of literature on the restorativeness of outdoor spaces. The goal was to see if other variables, such as different methodologies and participant samples, were confounding the growing literature surrounding nature's restorativeness. What they found, however, was that nature has a special restorative power "regardless of the context of exposure . . . , the kind of natural environment being considered . . . , the measurement instrument being used, or the kinds of people making the judgments" (Menardo et al. 2021:429).

From this literature, it is clear that natural environments hold special restorative potential, especially over urban environments. Additionally, some studies suggest that outdoor settings may be more restorative than indoor ones. For example, Breitenbecher and Fuegen (2019) found that outdoor environments are more restorative than indoor settings, regardless of whether a person is resting or exercising. A recent study by Subiza-Pérez et al. (2021) also supported this claim. These researchers looked at restorative outcomes in urban indoor and outdoor favorite places, and the influence of various environmental and personal characteristics. Like Breitenbecher and Fuegen, they observed higher restoration for favorite places that were outdoors rather than indoors.

Restoration Indoors

Even though outdoor environments are consistently more restorative than indoor environments, it does not mean that indoor spaces should be disregarded. Subiza-Pérez et al. (2021:2) found that indoor settings had higher associations than outdoor ones with place attachment (an affective emotional bond with places) and identification (personal identity in relation to the place one is in), both of which were strong predictors of subjective

restoration. This suggests that although the outdoors may be particularly useful for restorative purposes, indoor environments may also have special contributions to offer, especially regarding emotional bonding with a space.

The majority of the restorativeness research has focused on outdoor spaces, creating a need for more indoor-focused research; however, a few relevant studies provide a starting point for understanding and exploration. The work of Annechini et al. (2020) indicates that museums are restorative spaces, specifically for children. This restorativeness may be linked to museums' ability to conjure fascination. Additionally, this study suggests that aesthetic qualities, person-environment relationships, social aspects, and restorative characteristics are all relevant to producing an overall experience in a space. Evensen et al. (2017) explored psychological perceptions and benefits of plants, specifically in indoor offices containing windows. The office with plants was reported as more pleasant than the office with inanimate objects or the office with no additional items, for both participants who sat in the offices and those who only viewed photographs of the offices. Additionally, the participants who viewed photographs of the offices also reported higher fascination with the one with plants.

Lastly, Felsten's research (2009) examined how different views of nature affected university students' perception of the potential for restoration in indoor settings. These nature views were either of murals or through windows. Overall, students perceived an indoor space as having higher restorative potential if the space included a view of nature than if it did not; the murals were also perceived as a bit more restorative than the windows. Additionally, window views with fewer man-made structures were more restorative than were window views with more, and murals that included water were more restorative than murals without water.

PERSONALITY AND RESTORATIVENESS

While research confirms that the characteristics of an environment are critical in determining restorativeness, a few studies in the past decade have begun to show an additional connection with personality. Most studies, including the current one, have chosen to examine personality using the five-factor model (FFM; Costa and McCrae 1992), as it is a common, supported, and standard conceptualization of personality. Some exceptions exist, but overall, the FFM dominates as the common framework for measuring personality. The five domains of this model include agreeableness, extraversion, openness, neuroticism (also referred to as emotional stability, its opposite), and conscientiousness.

Research suggests that personality can predict restorativeness, but there are mixed findings among the few studies on the topic. As mentioned previously, Felsten (2014) compared PPAR between urban and natural photos. He also investigated the role of personality in PPAR, using the Restorative Components Scale (RCS), finding that all the personality factors except conscientiousness were significant predictors of restorativeness. Of these, only neuroticism had a negative relationship. This is supported by the results of Meagher (2016), who studied the interaction between neuroticism and restorativeness in home environments. Like Felsten (2014), Meagher found that higher levels of neuroticism were related to lower perceptions of restorativeness.

Two studies utilized the Restorative Outcome Scale (ROS), a slightly different measure from the PRS used in the present study. Subiza-Pérez et al. (2021) emphasized that, whereas the PRS measures an "individual's appraisal of the restorative qualities of a given place" (p. 2), the ROS measures "achieved physiological and/or psychological recovery through contact with an environment" (p. 2). Using an expanded version of the ROS, they uncovered no relationship between any of the FFM traits and restoration; however, this may be due to their use of a shortened measure of the FFM and the fact that agreeableness and openness were removed from analyses because of poor internal consistency. Unlike that of Subiza-Pérez et al. (2021), a study by Johnsen (2013) on emotion regulation, restoration, and personality among visitors in the wilderness yielded a few relevant and significant findings. Johnsen conducted correlations between three dimensions of the ROS: extraversion, conscientiousness, and neuroticism. Conscientiousness was significantly related to relaxation and attention restoration, and none of the traits was related to clearing one's thoughts. This suggests that conscientiousness may hold a special relationship with restoration.

Finding clear trends in the personality-restorativeness literature proves a tricky task because limited studies exist and researchers vary in their approaches to the topic, making direct comparison difficult. Subiza-Pérez et al. (2021:3) echo this claim, commenting, "There is limited existing research on the association between personality traits and psychological restoration and what little exists is diverse in terms of selection of study settings, the methods and instruments used, and the obtained results." This is also evident by the variety of restoration measures, from the PRS (e.g., Meagher 2016) to the RCS (e.g., Felsten 2014) to the ROS (e.g., Johnsen 2013; Subiza-Pérez et al. 2021). Additionally, most of these studies did not examine all five of the personality facets (Johnsen 2013; Meagher 2016; Subiza-Pérez et al. 2021). Furthermore, their results showed minimal overlap and even occasional contradictions.

THE CURRENT STUDY

Personality Restorativeness

Overall, personality appears to have a relationship with restoration, but the specific influence of various traits is not yet clear, and studies focused exclusively on indoor environments are limited. These issues lead to the first aim of the present study: to confirm the relationships between personality and restorativeness indoors. More specifically, this research will delve into linear relationships between the FFM domains and restorativeness. Because the literature is minimal and does not display clear trends, the first set of hypotheses (H1) was based upon the results of Felsten (2014), as they are most in line with our research. We expected that agreeableness, extraversion, and openness would have significant positive relationships with restorativeness. Additionally, we expected that neuroticism would have a significant negative relationship with restorativeness as seen by Felsten (2014) and further supported by the indoor study of Meagher (2016). Even though Johnsen (2013) found a connection between conscientiousness and restorativeness, this

was more an exception than the norm, so we did not expect to see a significant relationship between conscientiousness and restorativeness.

Another aspect of personality literature that needs greater attention is taking a holistic approach with the examination of personality. While there is value in analyzing traits separately to identify their effects and relationships, research has neglected exploration of personality as it naturally occurs. Considering this reality, Dunlop (2015) pointed out the importance of considering personality as a whole: "characteristics are viewed as inseparable; understanding of any one characteristic demands consideration of the person as a whole" (p. 317). No trait exists in isolation from the others, because every individual falls somewhere on the spectrum for all characteristics. Despite this, most studies have examined the factors of personality separately (e.g., Felsten 2014; Johnsen 2013; Meagher 2016; Subiza-Pérez et al. 2021).

Because of this immense oversight, the second aim of our study was to explore the personality-restorativeness relationship when all the FFM domains are considered together. To date, there are no studies devoted explicitly to examining combined personality and restorativeness. For this reason, predictions were based upon the work of Lindborg and Friberg (2016), the only researchers of this topic to complete analyses looking at holistic personality. Lindborg and Friberg conducted univariate multiple regressions to examine the FFM traits (along with other variables) for their ability to predict soundscape quality across two samples. Although the focus of these researchers was primarily on sound perception, an environment's soundscape does play a role in its restorativeness (Payne and Guastavino 2018). Lindborg and Friberg's results may at least provide a starting place for restorativeness predictions. Considering these things for our second set of hypotheses (H2), we expected that extraversion, agreeableness, and conscientiousness would positively predict restorativeness and that neuroticism would negatively predict restorativeness. We did not expect any significant prediction for openness.

Restorativeness and Use of Space

While the restorativeness of a space can be influenced by personality, it is also meaningfully related to the situational context of a setting. Personality is typically conceptualized as general and stable traits, but it can also be studied in terms of more temporary and variable states. Some research has demonstrated a relationship between situational characteristics and personality states. Individuals experience and express different levels of personality states depending on the characteristics of a situation (Fleeson 2007) and even perceive their personality in different ways based on the social roles of a context (Dunlop 2015). It seems that the spaces people visit during their day have a significant influence on their subsequent personality states, and conversely, the FFM traits are related to how frequently people visit different types of spaces in their daily lives (Matz and Harari 2021). Surprisingly, Matz and Harari (2021) found that spaces appeared to have an even stronger effect on short-term personality expression than on stable, dispositional traits. These trends indicate that personality has a special and important relationship with both the environmental and situational factors of spaces.

When it comes to how these factors interact with restorativeness, the sparse research is far less revealing. Use of space may be important to restorative outcomes, but it is sorely understudied. A couple of sources hinted that the presence of others and one's social responsibilities may influence restorative outcomes in a space (Colley, Brown, and Montarzion 2017; Izenstark and Ebata 2016). Breitenbecher and Fuegen (2019) found that exercise is more restorative than sedentary activity, especially indoors. Ehret et al. (2020) also showed that the time awareness involved in an activity may influence its restorativeness. Aeschbach et al. (2022) reinforced this in their study of museum visit lengths. Although there were no significant differences in restorativeness between objective visit lengths, those who *perceived* their visit duration as either ideal or too short reported significantly higher restoration than did those who perceived their visit as too long. This suggests that the perceptions of time spent in a space, specifically an indoor space, may interact with restorative outcomes. Patching these minimal findings together, one can conclude that the way a space is used may demonstrate significant involvement in restorative outcomes; however, it has not been seriously and rigorously studied and warrants such attention.

Personality Restorativeness by Use of Space

Overall, research to this point has somewhat addressed use of space and personality relationships, as well as personality and restorativeness, but bringing all three of these variables together is an unprecedented endeavor. While this reality makes hypothesis formation and discussion of results difficult to complete in the context of the literature, it also means that the current study leads the way in approaching a new area of important discovery. Thus, the third aim of the current research is to unite these three variables by exploring the personality-restorativeness relationship in the context of space usage. For our study, various campus spaces were categorized by their common, primary use: studying, socializing, or getting a break. The goal was to examine if there were restorativeness differences between personality traits based on the three space uses. Because no extant studies have examined these variables together, previous literature does not offer relevant conclusions to inform hypotheses. For this reason, the third and fourth hypotheses are largely exploratory and are necessarily based on personality literature and logical reasonings.

The third group of hypotheses (H3) examined linear relationships between personality and restorativeness when use of space is considered. Based on the descriptions of Costa and McCrae (1992), we now outline the logic behind H3. First, more-agreeable personalities are more likely to "go with the flow" and not push back in any situation. For this reason, we expected that high agreeableness would correlate with restorative outcomes in all spaces. Conscientious individuals are more purposeful, determined, and reliable and focus on doing what they set out to achieve. Of the three space uses, studying seems to have the most meaning to conscientious individuals because of its strong association with accomplishment. We expected conscientious individuals to feel most restored in such a space. As for the domain of extraversion, people high in this trait are more sociable and talkative and prefer stimulation. Contrastingly, introverted individuals are more independent and can tend to be less sociable. These characteristics suggest that extraversion would be associated with restorativeness in

social spaces. Individuals high in openness are curious, imaginative, and drawn to novel ideas. The spaces of this study have established and consistent primary uses based largely on design, leaving little need for openness. We therefore did not expect openness to be significantly associated with restorativeness for any use. Lastly, highly neurotic people experience negative affect and psychological distress, are less calm, and have higher energy levels. In contrast, those higher in emotional stability experience greater positive affect and calmness. Keeping these qualities in mind, we expected that neuroticism would negatively predict restorativeness in any space, regardless of use.

Summarizing, and wording by space use, the H3 predictions follow: For study spaces, we expected significant relationships between the personality factors of agreeableness, conscientiousness, and neuroticism (as a negative predictor) and restorativeness. For socializing spaces, we expected significant relationships between agreeableness, extraversion, and neuroticism (as a negative predictor) and restorativeness. For break spaces, we predicted a positive relationship for agreeableness and a negative relationship for neuroticism, with restorativeness.

The prior H3 predictions and information set the stage for the final research aim: to examine the same relationships of H3, but with combined personality. We could find no literature examining relationships between the predictive ability of personality as a whole and restorativeness, broken down by use of space. H3 placed heavy emphasis on agreeableness and neuroticism as the strongest predictors of restorativeness across spaces, and it would make sense to anticipate similar associations when considering the FFM domains together; however, there was simply not enough literature to allow for making solid predictions. We therefore explored these relationships for each primary use of space to create a starting point for future research, as hypothesis 4 (H4).

METHOD

Participants

Participants consisted of 615 (390 full completes, 225 partial completes) full-time undergraduate students from a private midwestern university. The sample was predominantly White/Caucasian (86.7%) and female (66.2%). The sample represented all 112 majors (from 0.3% to 9.5%) and all years (freshman through senior; from 23.6% to 26.7%). All participants were at least 18 years of age and signed an informed consent prior to participation in the study. All participants were entered into a drawing to win one of 28 Amazon gift cards (one at $100, two at $50, and 25 at $20).

Measures

Johnson's IPIP-NEO-120. Johnson's IPIP-NEO-120 (IPIP; Johnson 2014) measures personality. It is based on the FFM of personality (Costa and McCrae 1992), measuring the five personality domains of neuroticism, extraversion, conscientiousness, agreeableness, and openness to experience. The IPIP consists of 120 items, with 24 items measuring each domain. Sample items include "I dislike myself," "I look at the bright side

of life," "I carry out my plans," "I take advantage of others," and "I have a vivid imagination." For participants to rate how much they agreed with each item on the 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), we added "I" to the beginning of each statement. Each domain comprises six facets, with each facet measured by four items. To score, the questions for each facet were averaged, then multiplied by four. Domains were scored by adding the six facet scores. Higher scores indicate higher levels of the trait. Johnson (2014) reported an alpha reliability coefficient of .80. We found alpha reliability coefficients ranging from .82 to .91 for each of the five domains.

Perceived Restorativeness Scale. We measured restorativeness with the Perceived Restorativeness Scale (PRS; Hartig et al. 1997). The 16 items of this scale measure the restorative quality of environments by asking participants about various perspectives of specific environments and rating how much they represent those characteristics on a scale from 1 (*not at all*) to 5 (*very much*). Sample items include "there is a great deal of distraction" and "it is an escape experience." Scoring includes calculating an average score for each facet (being away, fascination, extent/coherence, compatibility) and an overall average. A higher score indicates greater restorativeness. Hartig et al. (1997) reported subscale alpha reliability coefficients to be at least adequate at the .75 level. We calculated overall alpha reliability coefficients for each of 14 spaces where we used the PRS, finding values ranging from .84 to .94.

Ratings of Campus Spaces. We included 14 campus spaces, most known to students, so most of the sample would be able to assess the restorative qualities of those spaces, and to assess a broad variety of spaces to gain a greater understanding of campus spaces as a whole. These included Euler classroom (a typical campus classroom with seats, podium, projector, and windows), Euler atrium (a common workspace in an academic building, large and open), study rooms (at the campus library, each containing a table, chairs, and a whiteboard), Geek room (a library study room for groups or individuals that is set up with individual desks and windows), the first floor of the library (having bookshelves with books, offices, and tables for meeting and working), dorm lobby (dorm entry point with furniture), Stu up (the upstairs of the campus student center, containing tables where students frequently gather), the OIP (Office of International Programs, with social table seating), Stu couches (couches located in wide hallways at the campus student center), Jumping Bean (the coffee shop at the campus student center with close-by table seating), dorm rooms (typically accommodating two students), laundry rooms (located in lower levels of dorm buildings), Memorial Chapel (one of two campus chapels, and a standalone building), Meredith Chapel (the second campus chapel, located in its own space of a campus building). For each of these 14 spaces, participants completed the PRS. Additionally, students rated their familiarity (1 = *not at all familiar*; 5 = *extremely familiar*) with each space, as well as the frequency (1 = *never*; 5 = *very often*) at which they use each space for studying, socializing, and getting a break. Each of the use-of-space questions was framed as "Per week, how frequently do you use this space for . . . ?" These questions were derived from asking a sample of students ($N = 8$) what activities they primarily engage in within indoor campus spaces.

Procedure

The university's institutional review board approved the study. We recruited participants by emailing them through SurveyMonkey with an invitation to participate. We advertised the study on fliers placed on tables in the campus student center and in a PowerPoint slide prior to the start of the university's three-day-per-week chapel. While we did reach out to all full-time undergraduate students, we relied upon convenience sampling. At their leisure, participants completed the survey in SurveyMonkey. Students answered questions about the 14 campus spaces without being in them or seeing pictures of them. It was determined that these spaces were well known to all students and the students would be able to answer questions about each one. The survey included the measures discussed here, along with others that are not the focus of this study. Completing the full survey took approximately 35 minutes.

RESULTS

Initially, we examined the breakdown of personality traits of the final sample. The breakdown for each personality factor was examined by a breakdown of those low and high in a particular factor based on falling below or above a z-score of zero. Agreeableness had 25.9% low and 74.1% high representations. Extraversion had 53.2% low and 46.8% high. Openness had 79.1% low and 20.9% high. Neuroticism had 50.9% low and 49.1% high. Conscientiousness had 32.6% low and 67.4% high.

We averaged the PRS scores of the 14 campus spaces to form a global restorativeness rating of the campus environment. The global rating excluded all data for participants who indicated that they were not familiar with a specific campus space. Using data that asked students to indicate how frequently they used each of the 14 indoor campus spaces, we grouped spaces based on the largest use averages (Table 1). From this data, we calculated average PRS scores for each of the three use groupings (studying, socializing, taking a break), again removing data for participants who indicated they were not familiar with a specific campus space. Table 2 includes descriptive statistics and correlations of participant sex along with the focal variables of the five personality factors and the PRS (at the overall level and broken down by primary use of space). Correlations indicated significant relationships between most study variables.

Table 3 shows the results of the regressions used to examine the relationship between each of the FFM factors and campus PRS. We expected agreeableness, extraversion, and openness to positively predict restorativeness and that neuroticism would negatively predict restorativeness. The H1 predictions were supported at least at the $p < .05$ level. Additionally, conscientiousness was a significant predictor at $p = .005$. Proportions of variance in PRS scores were significantly explained by agreeableness ($R^2 = .07$, $F(1, 490) = 35.89$), extraversion ($R^2 = .05$, $F(1, 490) = 26.51$), openness ($R^2 = .01$, $F(1, 490) = 5.58$), neuroticism ($R^2 = .04$, $F(1, 490) = 22.39$), and conscientiousness ($R^2 = .02$, $F(1, 490) = 8.09$). These findings fully supported our H1 predictions that most of the FFM personality factors would predict restorativeness of indoor campus spaces.

Table 1. Primary Use of Each Campus Space

Campus Location	Study		Socialize		Break	
	M	*SD*	*M*	*SD*	*M*	*SD*
Euler class	**2.55**	1.35	2.08	1.15	1.60	0.96
Euler atrium	**2.34**	1.17	2.15	1.03	1.81	1.01
Study rooms	**2.68**	1.31	1.38	0.74	1.61	1.00
Geek room	**1.43**	0.91	1.06	0.32	1.13	0.51
Library 1st floor	**2.25**	1.11	1.26	0.60	1.46	0.83
Dorm lobby	1.83	1.05	**3.02**	1.23	2.13	1.22
Stu up	2.87	1.32	**3.41**	1.26	2.37	1.22
OIP	1.15	0.57	**1.33**	0.85	1.21	0.72
Stu couches	2.35	1.15	**2.84**	1.17	2.14	1.17
Jumping Bean	2.14	1.12	**2.96**	1.19	2.13	1.12
Dorm rooms	4.17	1.10	3.86	1.22	**4.37**	1.01
Laundry rooms	1.10	0.46	1.34	0.72	**1.47**	0.87
Memorial Chapel	1.19	0.58	1.45	0.76	**2.41**	1.22
Meredith Chapel	1.11	0.49	1.23	0.60	**1.84**	1.12

Note: Boldface indicates primary use.

Table 2. Descriptive Statistics and Correlations for Sex, Personality, and PRS

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
1. Sex[a]	—	—	1									
2. Agreeableness	93.39	9.89	.12*	1								
3. Extraversion	79.81	12.63	-.01	.08	1							
4. Openness	79.30	11.41	.11*	.22***	.10*	1						
5. Neuroticism	69.47	14.13	.21***	–.19***	–.54***	.10*	1					
6. Conscientiousness	91.08	12.65	.11*	.35***	.19***	–.14**	–.33***	1				
7. PRS all[b]	3.11	.43	.19***	.26***	.23***	.11*	–.20***	.13**	1			
8. PRS study[c]	3.16	.55	.11*	.18***	.08	.14**	–.11*	.09*	.75***	1		
9. PRS social[d]	2.92	.54	.20***	.17***	.32***	.07	–.21***	.07	.80***	.33***	1	
10. PRS break[e]	3.30	.49	.11*	.23***	.13**	.12*	–.15**	.12**	.74***	.38***	.41***	1

Notes: PRS=Perceived Restorativeness Scale.

[a] 1 = males and 2 = females. [b] PRS across all campus spaces. [c] PRS –across study spaces. [d] PRS across social spaces. [e] PRS across break spaces.

*$p < .05$ **$p < .01$ ***$p < .001$

Table 3. Regressions of Personality Predicting PRS

Variable	*B*	*SE*	*t*	*p*	95% CI
Agreeableness	.34	.06	5.99	<.001	[.23, .45]
Extraversion	.27	.05	5.15	<.001	[.17, .37]
Openness	.12	.05	2.36	.019	[.02, .22]
Neuroticism	–.24	.05	–4.63	<.001	[–.34, –.14]
Conscientiousness	.14	.05	2.84	.005	[.04, .24]

Note: PRS=Perceived Restorativeness Scale.

To gain additional insights into the predictive capability of the combined FFM personality traits on campus restorativeness in our sample, we ran a multiple regression analysis, controlling for sex. Table 4 shows these regression results, which indicated that 14.9% of the total variance in PRS scores was accounted for by the FFM personality traits ($F(6, 383) = 12.32$, $p < .001$). Agreeableness and neuroticism significantly predicted PRS scores. These findings provided partial support for our H2 hypotheses that extraversion, agreeableness, and conscientiousness would positively predict restorativeness while neuroticism would negatively predict restorativeness.

Table 4. Multiple Regression Analysis of Personality Predicting PRS Across All Campus Spaces

Variable	*B*	*SE*	*t*	*p*	95% CI
Sex	.39	.10	3.88	<.001	—
Agreeableness	.23	.07	3.42	.001	[.10, .35]
Extraversion	.12	.07	1.77	.078	[–.01, .25]
Openness	.09	.05	1.64	.102	[–.02, .19]
Neuroticism	–.19	.07	–2.84	.005	[–.32, –.06]
Conscientiousness	–.00	.06	–.03	.973	[–.11, .11]

Note: PRS=Perceived Restorativeness Scale.

Table 5 shows the results of the regressions used to examine the relationship between each of the FFM factors and each of the three space uses (H3). For spaces used primarily for studying, we expected agreeableness and conscientiousness to positively predict, and neuroticism to negatively predict, restorativeness. This hypothesis was partially supported with results showing positive prediction for agreeableness and conscientiousness. Proportions of variance in PRS scores for the study spaces were significantly explained by agreeableness ($R^2 = .02$, $F(1, 515) = 7.66$) and conscientiousness

(R^2 = .01, F(1, 515) = 5.56). For spaces used primarily for socializing, we expected agreeableness and extraversion to positively predict restorativeness and neuroticism to negatively predict restorativeness. These hypotheses were fully supported. Additionally, conscientiousness was a significant predictor. Proportions of variance in PRS scores for the social spaces were significantly explained by agreeableness (R^2 = .01, F(1, 515) = 6.89), extraversion (R^2 = .02, F(1, 515) = 12.32), neuroticism (R^2 = .02, F(1, 515) = 10.11), and conscientiousness (R^2 = .01, F(1, 515) = 6.72). For spaces used primarily for taking a break, we expected agreeableness to positively predict and neuroticism to negatively predict restorativeness. These hypotheses were fully supported with results also showing positive prediction for conscientiousness. Proportions of variance in PRS scores for the break spaces were significantly explained by agreeableness (R^2 = .03, F(1, 515) = 15.02), neuroticism (R^2 = .01, F(1, 515) = 4.79), and conscientiousness (R^2 = .01, F(1, 515) = 6.35).

Table 5. Linear Regressions of Personality Predicting PRS by Use of Space

Variable	*B*	*SE*	*t*	*p*	95% CI
Study spaces					
Agreeableness	.32	.12	2.77	.006	[.09, .55]
Extraversion	.03	.11	.28	.783	[–.19, .25]
Openness	.10	.10	.99	.324	[–.10, .30]
Neuroticism	–.19	.11	–1.81	.070	[–.40, .02]
Conscientiousness	.24	.10	2.36	.019	[.04, .44]
Social spaces					
Agreeableness	.27	.10	2.62	.009	[.07, .46]
Extraversion	.33	.09	3.51	<.001	[.15, .52]
Openness	.09	.09	1.07	.283	[-.08, .27]
Neuroticism	-.29	.09	-3.18	.002	[-.47, -.11]
Conscientiousness	.23	.09	2.59	.010	[.06, .40]
Break spaces					
Agreeableness	.51	.13	3.88	<.001	[.25, .77]
Extraversion	–.06	.13	–.43	.665	[–.30, .19]
Openness	.14	.12	1.20	.232	[–.09, .37]
Neuroticism	–.27	.12	–2.19	.029	[–.51, –.03]
Conscientiousness	.29	.12	2.52	.012	[.07, .52]

Note: PRS=Perceived Restorativeness Scale.

For the final analyses, we explored the relationship between all five personality factors to predict restorativeness in each of the three space uses (H4), while controlling for sex. Table 6 shows these multiple regression analysis results. For spaces used primarily for studying, 3.4% of the total variance in PRS scores was accounted for by the FFM personality traits ($F(6, 380) = 3.28$, $p < .01$). Agreeableness significantly predicted PRS scores. For spaces used primarily for socializing, 15.2% of the total variance in PRS scores was accounted for by the FFM personality traits ($F(6, 380) = 12.53$, $p < .001$). Agreeableness, extraversion, and neuroticism significantly predicted PRS scores. For spaces used primarily for taking a break, 9.7% of the total variance in PRS scores was accounted for by the FFM personality traits ($F(6, 380) = 7.92$, $p < .001$). Agreeableness and neuroticism significantly predicted PRS scores.

Table 6. Multiple Regression Analysis of Personality Predicting PRS for Each Use of Space

Variable	*B*	*SE*	*t*	*p*	95% CI
Study spaces					
Sex	.24	.13	1.88	.060	—
Agreeableness	.20	.08	2.40	.017	[.04, .37]
Extraversion	–.03	.09	–.36	.718	[–.20, .14]
Openness	.07	.07	1.12	.263	[–.06, .20]
Neuroticism	–.13	.09	–1.50	.134	[–.30, .04]
Conscientiousness	.01	.07	.07	.943	[–.14, .15]
Social spaces					
Sex	.48	.10	4.61	<.001	—
Agreeableness	.18	.07	2.67	.008	[.05, .32]
Extraversion	.27	.07	3.89	<.001	[.13, .41]
Openness	.03	.05	.62	.537	[–.07, .14]
Neuroticism	–.15	.07	–2.06	.040	[–.28, –.01]
Conscientiousness	–.10	.06	–1.68	.094	[–.22, .02]
Break spaces					
Sex	.27	.11	2.50	.013	—
Agreeableness	.24	.07	3.36	.001	[.10, .38]
Extraversion	.01	.07	.08	.940	[–.14, .15]
Openness	.07	.06	1.33	.185	[–.04, .18]
Neuroticism	–.22	.07	–3.04	.003	[–.36, –.08]
Conscientiousness	–.00	.06	–.03	.976	[–.12, .12]

Note: PRS=Perceived Restorativeness Scale.

DISCUSSION

H1 and H3: Individually Examining Personality Factors

When examining the predictive ability of each personality trait with restorativeness (H1), our results are in line with previous literature (Felsten 2014; Meagher 2016), finding significant prediction of restorativeness by agreeableness, extraversion, openness, and neuroticism. However, contrary to Felsten (2014), we found that conscientiousness was also a significant predictor of restorativeness. This corresponds to the relationship that Johnsen (2013) noted between conscientiousness and the ROS dimensions of relaxation and attention restoration. This suggests that conscientiousness has an unclear relationship with restorativeness, given the contradictory findings. It may be explained by space locations, however.

Conscientiousness is required to actively engage with an environment for any intended purpose, making those higher in conscientiousness better able to successfully participate in a space's tasks. In our research, students were actively thinking about using each indoor space for a specific purpose (studying, socializing, or taking a break); thus, conscientiousness may have contributed to restorativeness by empowering participants to engage with spaces in meaningful and intentional ways. This contrasts with outdoor environments, such as those in the work of Felsten (2014), where the lack of directed cognitive activity may make conscientiousness unnecessary for environmental interaction.

It seems that people engage with indoor environments differently from outdoor environments. People go outside to enjoy nature or, as in previous studies, to be in spaces to do mindless activities such as walking. These activities are often used to assess the restorativeness of those spaces. In our study, however, students rated indoor spaces that served specific purposes. Given that many indoor environments function this way and our focus is on the activities performed in those spaces, it is possible that personality influences perceptions of restorativeness differently between indoor and outdoor contexts.

We will now follow our discussion of H1 with H3. No studies up to this point have drawn together personality, restorativeness, and use of space. H3 predictions were therefore inherently exploratory and based logically off of understandings and descriptions of personality domains (e.g., Costa and McCrae 1992). Any contradictions to preliminary expectations therefore may simply be the result of having little available relevant literature from which to formulate predictions.

Across all three space uses, agreeableness and conscientiousness were significant predictors of restorativeness. Agreeable personalities go with the flow and find easier comfort in various spaces. It is likely that agreeable individuals naturally mold themselves to the task at hand, limiting the expenditure of directed attention and thus increasing the restorative potential of any space. Conscientiousness was a significant predictor in study spaces, but, contrary to our expectations, it also demonstrated a predictive role in social and break spaces. As with our explanation with H1, conscientiousness appears to play a critical role in engaging with an environment for an intended purpose. Those higher in conscientiousness are more easily able to interact with an environment, sparing DA capacities and leaving themselves to experience more restorativeness regardless of the usage of space.

Neuroticism has demonstrated a negative relationship with restorativeness in literature (Felsten 2014; Meagher 2016), so it was unsurprising to find the same association in our break spaces and social spaces. Neurotic tendencies may interfere with an optimistic perspective, shading space perceptions in an unfavorable way and reducing restorative potentials. It is interesting, however, that these effects were not significant in study spaces. While the meaning of this is not fully clear, one possibility may be that the unique characteristics of studying inhibit the effects of neuroticism seen in social and break spaces. Perhaps the mental energy required for studying mitigates the influence of this trait but socializing and taking a break leave more room for its interference.

Extraversion was a significant predictor of restorativeness, but only in spaces used for socializing. This is in line with the prominent characteristics associated with this trait. Those higher in extraversion are talkative and outgoing in social situations, in contrast to those higher in introversion, who are more uncomfortable with such situations. The social abilities of extraverted people may boost their restorative experiences in spaces that promote this type of engagement, as it falls more in line with their natural tendencies.

When we examine the results across the three uses of space, some trends emerge. Agreeableness and conscientiousness were consistent significant predictors of restorativeness regardless of whether a space was used primarily for studying, socializing, or taking a break. This pattern suggests that these two traits facilitate restorativeness for any use of space. The influence of emotional stability (the opposite of neuroticism) also seemed to indicate that this trait fosters restorativeness, specifically with spaces primarily used for socializing and taking a break. Lastly, it is likely that the characteristics of extraversion play a unique restorative role in spaces most comfortable for extraverted individuals: spaces used primarily for socializing.

H2 and H4: Collectively Examining Personality Factors

We constructed our H2 predictions with the findings of Lindborg and Friberg (2016) in mind but cautiously expected to discover similar results because their study was focused on soundscapes and noise sensitivity, with restorativeness seeming to be more of an afterthought. We used their results as a foundation, however, because theirs was the only study in related literature to conduct analyses considering personality holistically. In line with their research, we found that agreeableness and neuroticism played a significant role in restorativeness; however, no significant results were observed for any of the other personality traits. Although the analyses surrounding H1 indicated that each facet of personality held a significant relationship with restorativeness, agreeableness and neuroticism emerged as particularly important in the holistic approach of H2. Our results suggest that these traits may play a stronger or potentially overriding role in restorative outcomes, with agreeableness and emotional stability bolstering restoration across all campus spaces. This seems to be a logical finding when considering the tendencies of agreeable and neurotic people.

In line with the information presented above, agreeable individuals are adaptable to a variety of circumstances, feeling at ease in most situations. It is possible that agreeable

individuals more naturally engage with tasks that consume less effort and attention. Because of this, they more easily experience restorativeness in several types of spaces.

Neuroticism, however, seems to hold a prominent role in *decreasing* restorative outcomes. Highly neurotic individuals have greater amounts of unfocused energy and negative affect. This may be related to what has been termed *mental noise hypothesis*, which suggests that neurological instability in neurotic people compromises their cognitive and attentional control (Robinson and Tamir 2005). These characteristics are prohibitive to one's ability to relax and restore attentional capacities. In contrast, those high in emotional stability experience a greater calmness and more positive emotions that enable them to embrace a space more comfortably and effortlessly. The characteristics of people high in neuroticism seem to suppress the restorative potentials of environments, over and above the effects of other characteristics.

Even when use of space was factored in, the strong influence of agreeableness remained. Agreeableness emerged in all analyses as a significant predictor of restorativeness, whether or not the use of the space was considered, and regardless of whether personality traits were examined individually or together. Agreeable tendencies seem to supersede the effects of activity type or even other traits in promoting restoration.

The effects of neuroticism and extraversion seen in H3 remained when personality was considered holistically. Extraversion was a significant predictor of restorativeness, but only in social settings, where its qualities could be fully expressed and utilized. Neuroticism continued to compromise restoration in social and break spaces but became irrelevant when studying. The results of all four hypotheses showed neuroticism to be an important factor when considered by itself or in conjunction with the other traits, but H3 and H4 highlighted study spaces as an exception to this rule.

Conscientiousness consistently predicted restorativeness across all spaces and by use of space, but only when this characteristic was examined separately from the other traits. Its significant predictive ability disappeared in the holistic personality approach. A potential reason for this may be that the restorative influence of conscientiousness was overshadowed by other traits (namely agreeableness and neuroticism). Conscientiousness predicted lower proportions of variance in restorativeness, compared to other personality characteristics, which is likely why its significant influence disappeared when the whole of personality was looked at.

Although conscientiousness by itself can aid individuals in immersing themselves more effortlessly in their work, it does not appear to be a primary trait that best aids restorativeness. Characteristics such as being able to adapt to any space (i.e., agreeableness) seem to facilitate restorativeness more strongly across a variety of settings.

Implications

Our research represents a critical step forward for restorativeness literature by more closely examining indoor environments and the predictive role of personality traits, both individually and collectively. Another unprecedented step of this study is that it draws together personality, restorativeness, and how spaces are primarily used, to gain an understanding of the meaningful connections between them.

Individuals can and do venture outdoors to reap restorative benefits of those spaces (Menardo et al. 2021; Scopelliti et al. 2019), but people spend a significant portion of their waking hours indoors and are not always able to take restorative breaks outside because of such things as inclement weather and a lack of access to natural environments (Felsten 2009). Much time spent indoors is typically used for completing tasks, and these tasks deplete attentional capacities, especially among college students. Our results add to a growing body of literature on the importance of restorative spaces for success and well-being for this population. Students repeatedly engage in academic tasks that require extensive and prolonged use of DA (Yusli et al. 2021), which is critical to collegiate success (Felsten 2009). Their experience of DA fatigue may have undesired consequences mentally, socially, and academically (Felsten 2009; Yusli et al. 2021). Providing information to universities about how restorativeness functions can empower them to create indoor spaces that combat DA fatigue for a variety of personalities.

In our study, we discovered that restorative benefits are not limited to outdoor environments but can also be experienced in a variety of indoor settings. Although the personality-restorativeness links we found are similar to those in previous literature, there is limited research on this topic, as the exploration of restorativeness has largely been outdoors and focused on using a space primarily for restorative benefits. When considering the practical uses of indoor spaces, understanding the role of personality with restorativeness becomes critical to designing spaces for all personality types, not just at the individual factor level but as personality naturally exists: as a whole.

Although our results revealed relationships between the focal variables, results could also be used to educate individuals on how to seek out maximally restorative environments for their personality traits. Our findings indicated that the trait of openness may not contribute much to restorativeness. Perhaps it could be most useful with new and unknown spaces, but future research would need to confirm this relationship. Conscientiousness also did not appear to be very important. It showed most associations with restorativeness at the individual level but lost its importance when personality was examined collectively.

The restorative effect of neuroticism and agreeableness, in comparison, persisted. Neuroticism tends to be viewed negatively, but this was not true for all situations in our results. Spaces used primarily for studying may aid restoration for those high in neuroticism. In contrast to neuroticism, the trait of extraversion has been viewed and emphasized as important in recent personality literature, but its influence may be overstated, since it was only an aid to restoration in social spaces. The results are logical for this trait, and they indicate a strong need for extraverted individuals to be intentional with social interactions to best experience restorativeness. Agreeableness has shown some consistent relationships within broader literature, but our findings suggest that it has been wrongly neglected. Agreeableness, as perhaps the most important trait, fostered restoration across the board in environments used for several purposes.

Of note is that personality traits are not stable and unchangeable. They show natural fluctuations over time (e.g., Roberts and Mroczek 2008); but more importantly, through intervention, personality traits can change (e.g., Roberts et al. 2017). If an individual understands their personality and the links between personality and restorative

environments, they may have the knowledge to make productive modifications to reap maximal restorative benefits.

Strengths and Limitations

This research demonstrates several strengths. First, it was a comprehensive study focused on exploring and better understanding the relationships between personality, restorativeness, and space use. We conducted personality analyses that looked at traits both individually and combined, giving a well-rounded view of the traits' true impact on restorativeness. Prior research has not explored these relationships and has rarely examined collective personality, making our contribution an important initial step toward proactively working to maximize restorative experiences. Second, the large sample size lends confidence to the results and provides a foundational starting place for future research on these topics. Third, this research focused on gaining a comprehensive understanding of spaces on a university campus, used for a variety of purposes by college students. Students have infrequently been the focus of restorativeness research. This research takes a step in a positive direction toward a more comprehensive understanding of restorativeness and, given the sample, has external validity for other campuses interested in designing spaces for a variety of personality types.

As for limitations, although the survey was designed in such a way as to prompt students to think about how they use each space on campus, restorativeness was not assessed by students in those environments and performing the primary activities of those spaces. The results thus may not provide an entirely accurate understanding of the role of space usage in the personality-restorativeness relationship. Because of this, we encourage researchers to examine restorativeness in spaces while individuals are performing the tasks typically performed in those spaces. Additionally, our focus was on use of space, but physical features of spaces affect restorativeness as well (Felsten 2009). Although we found varying relationships between personality and restorativeness based on use of space, it is possible that some of those findings were not influenced only by what students do in those spaces but also by architectural components of those spaces. Related to this, some of our effect sizes were small. Although the effect sizes are supported by a larger sample size and strong significance values, we must recognize that there are variables we did not study that likely would explain greater proportions of variance. Finding overlap between the significant results of our study and other restorativeness studies gives greater confidence to the results, however. Similarly, although this study revealed relationships between personality and restorativeness, analyses do not explain why those relationships occur, or the other factors that could be influencing the findings. Finally, some spaces may not clearly fit into the categorizations we identified as primary uses. For example, a laundry room is used primarily for chores and a dorm room may be used primarily for sleeping or everyday tasks such as personal hygiene. Providing interpretive flexibility for how each student viewed their use of campus spaces was important to gain this initial understanding of how spaces are typically used, but future research could dive deeper into more detailed and varied uses of space.

Future Research

Directions for future research are diverse and numerous. Mentioned above, exploration of other types of spaces, such as new and novel ones, could provide important insights into the trait of openness. Additionally, more accurate assessments of restorativeness may be found by assessing restorativeness of environments while individuals are in those spaces. In light of the findings of Aeschbach et al. (2022), more attention could also be given to restorative outcomes in indoor spaces based on the duration of time spent there, and potential differences in maximally restorative duration depending on what that space is used for. Because of the significant correlations between sex and our variables of interest, future research could also explore sex differences in restorativeness as it relates to personality.

Although our research demonstrates that the experience of restorativeness differs by personality, the mechanisms that produce these variations are unclear. Studies in personality neuroscience suggest that meaningful differences exist in the functional architecture of the brain based on personality. Distinctions between the FFM traits have been identified in patterns of connectivity among various neurological networks when the brain is at rest (Adelstein et al. 2011; Sampaio et al. 2014; Simon, Varangis, and Stern 2019). It is possible that these neurological differences between personality traits drive the disparity in restorative outcomes that are experienced; however, no studies to this point have endeavored to explore the personality-restorativeness relationship at a neurological level. This leaves much room for future inquiry and study.

Finally, the unprecedented nature of our approach should prompt replication in other campus environments. Follow-up studies to confirm and expand our findings would benefit from random sampling, and such studies may also enhance the confidence of their results by utilizing experimental methodologies (rather than the observational approach of this study) and by more extensively operationalizing the use-of-space variable. This study demonstrates that a holistic approach to personality may yield differing results from the generally accepted method of separating traits. Future personality researchers should be aware of the ways that their approaches to analyses affect outcomes and implications of results.

CONCLUSION

Restoration is important for individuals to be able to regain attentional capacities and refocus on tasks at hand. Learning more about individual personality differences and their impact on restoration, specifically in everyday indoor contexts, is necessary and meaningful work in the pursuit of productive and quality living, especially on university campuses.

REFERENCES

Adelstein, J. S., Z. Shehzad, M. Mennes, C. G. DeYoung, X.-N. Zuo, C. Kelly, D. S. Margulies, A. Bloomfield, J. R. Gray, F. X. Castellanos, and M. P. Milham. 2011. "Personality Is Reflected in the Brain's Intrinsic Functional Architecture." *PLoS ONE* 6(11):e27633. doi:10.1371/journal.pone.0027633.

Aeschbach, V. M., H. Schipperges, M. A. Braun, S. Ehret, M. Ruess, Z. Sahintuerk, and R. Thomaschke. 2022. "Less Is More: The Effect of Visiting Duration on the Perceived Restorativeness of Museums." *Psychology of Aesthetics, Creativity, and the Arts*. Advance online publication. doi:10.1037/aca0000475.

Annechini, C., E. Menardo, R. Hall, and M. Pasini. 2020. "Aesthetic Attributes of Museum Environmental Experience: A Pilot Study with Children as Visitors." *Frontiers in Psychology* 11:508300. doi:10.3389/fpsyg.2020.508300.

Breitenbecher, Kimberly H., and Kathleen Fuegen. 2019. "Nature and Exercise Interact to Influence Perceived Restorativeness." *Ecopsychology* 11(1):1–10. doi:10.1089/eco.2018.0056.

Carrus, G., M. Scopelliti, A. Panno, R. Lafortezza, G. Colangelo, S. Pirchio, F. Ferrini, F. Salbitano, M. Agrimi, L. Portoghesi, P. Semenzato, and G. Sanesi. 2017. "A Different Way to Stay in Touch with 'Urban Nature': The Perceived Restorative Qualities of Botanical Gardens." *Frontiers in Psychology* 8:914. doi:10.3389/fpsyg.2017.00914.

Colley, K., C. Brown, and A. Montarzino. 2017. "Understanding Knowledge Workers' Interactions with Workplace Greenspace: Open Space Use and Restoration Experiences at Urban-Fringe Business Sites." *Environment and Behavior* 49(3):314–38. doi:10.1177/0013916516629194.

Costa Jr., Paul T., and Robert R. McCrae. 1992. *Revised NEO Personality Inventory (NEO PI-R™) and NEO five-factor inventory (NEO-FFI): Professional Manual*. Psychological Assessment Resources.

Dunlop, W. L. 2015. "Contextualized Personality, beyond Traits." *European Journal of Personality* 29(3):310–25. doi:10.1002/per.1995.

Ehret, S., S. Roth, S. U. Zimmermann, A. Selter, and R. Thomaschke. 2020. "Feeling Time in Nature: The Influence of Directed and Undirected Attention on Time Awareness." *Applied Cognitive Psychology* 34(3):737–46. doi:10.1002/acp.3664.

Evensen, K. H., R. K. Raanaas, C. M. Hägerhäll, M. Johansson, and G. G. Patil. 2017. "Nature in the Office: An Environmental Assessment Study." *Journal of Architectural and Planning Research* 34(2):133–46. https://www.jstor.org/stable/44987223.

Felsten, G. 2009. "Where to Take a Study Break on the College Campus: An Attention Restoration Theory Perspective." *Journal of Environmental Psychology* 29(1):160–67. doi:10.1016/j.jenvp.2008.11.006.

Felsten, G. 2014. "Personality Predicts Perceived Potential for Attention Restoration of Natural and Urban Scenes." *PsyEcology* 5(1):37–57. doi:10.1080/21711976.2014.881663.

Fleeson, W. 2007. "Situation-Based Contingencies Underlying Trait-Content Manifestation in Behavior." *Journal of Personality* 75(4):825–61. doi:10.1111/j.1467-6494.2007.00458.x.

Hartig, T. 2004. "Restorative Environments." *Encyclopedia of Applied Psychology* 3:273–79. doi:10.1016/B0-12-657410-3/00821-7.

Hartig, T., K. Korpela, W. E. Evans, and T. Gärling. 1997. "A Measure of Restorative Quality in Environments." *Scandinavian Housing & Planning Research* 14(4):175–94. doi:10.1080/02815739708730435.

Izenstark, D., and A. T. Ebata. 2016. "Theorizing Family-Based Nature Activities and Family Functioning: The Integration of Attention Restoration Theory with a

Family Routines and Rituals Perspective." *Journal of Family Theory & Review* 8(2):137–53. doi:10.1111/jftr.12138.

Johnsen, S. Å. K. 2013. "Exploring the Use of Nature for Emotion Regulation: Associations with Personality, Perceived Stress, and Restorative Outcomes." *Nordic Psychology* 65(4):306–21. doi:10.1080/19012276.2013.851445.

Johnson, J. A. 2014. "Measuring Thirty Facets of the Five Factor Model with a 120-Item Public Domain Inventory: Development of the IPIP-NEO-120." *Journal of Research in Personality* 51:78–89. doi:10.1016/j.jrp.2014.05.003.

Kaplan, S. 1995. "The Restorative Benefits of Nature: Toward an Integrative Framework." *Journal of Environmental Psychology* 15(3):169–82. doi:10.1016/0272-4944(95)90001-2.

Kaplan, R., and S. Kaplan. 1989. *The Experience of Nature: A Psychological Perspective*. Cambridge University Press.

Lindborg, P., and A. Friberg. 2016. "Personality Traits Bias the Perceived Quality of Sonic Environments." *Applied Science* 6(12):405. doi:10.3390/app6120405.

Matz, S. C., and G. M. Harari. 2021. "Personality-Place Transactions: Mapping the Relationships between Big Five Personality Traits, States, and Daily Places." *Journal of Personality and Social Psychology* 120(5):1367–85. doi:10.1037/pspp0000297.

Meagher, Benjamin R. 2016. "There's No Place Like a Neurotic's Home: Neuroticism Moderates the Prioritization of Restorative Properties in Home Environments." *Journal of Individual Differences* 37(4):260–67. doi:10.1027/1614-0001/a000213.

Menardo, E., Brondino, M., Hall, R., and Pasini, M. 2021. "Restorativeness in Natural and Urban Environments: A Meta-analysis." *Psychological Reports* 124(2):417–37. doi:10.1177/0033294119884063.

Ohly, Heather, Mathew P. White, Benedict W. Wheeler, Alison Bethel, Obioha C. Ukoumunne, Vasilis Nikolaou, and Ruth Garside. 2016. "Attention Restoration Theory: A Systematic Review of the Attention Restoration Potential of Exposure to Natural Environments." *Journal of Toxicology and Environmental Health* 19(7):305–43. http://dx.doi.org/10.1080/10937404.2016.1196155.

Payne, E. A., Loi, N. M., and Thorsteinsson, E. B. 2020. "The Restorative Effect of the Natural Environment on University Students' Psychological Health." *Journal of Environmental and Public Health* 2020:4210285. doi:10.1155/2020/4210285.

Payne, S. R., and C. Guastavino. 2018. "Exploring the Validity of the Perceived Restorativeness Soundscape Scale: A Psycholinguistic Approach." *Frontiers in Psychology* 9:2224. doi:10.3389/fpsyg.2018.02224.

Roberts, B. W., J. Luo, D. A. Briley, P. I. Chow, R. Su, and P. L. Hill. 2017. "A Systematic Review of Personality Trait Change through Intervention." *Psychological Bulletin* 143(2):117–41. doi:10.1037/bul0000088.

Roberts, B. W., and D. Mroczek. 2008. "Personality Trait Change in Adulthood." *Current Directions in Psychological Science* 17(1):31–35. doi:10.1111/j.1467-8721.2008.00543.x.

Robinson, M. D., and M. Tamir. 2005. "Neuroticism as Mental Noise: A Relation between Neuroticism and Reaction Time Standard Deviations." *Journal of*

Personality and Social Psychology 89(1):107–14. doi:10.1037/0022-3514.89.1.107.

Sampaio, A., J. M. Soares, J. Coutinho, N. Sousa, and Ó. F. Gonçalves. 2014. "The Big Five Default Brain: Functional Evidence." *Brain Structure and Function* 219:1913–22. doi:10.1007/s00429-013-0610-y.

Scopelliti, M., G. Carrus, and M. Bonaiuto. 2019. "Is It Really Nature That Restores People? A Comparison with Historical Sites with High Restorative Potential." *Frontiers in Psychology* 9:2742. doi:10.3389/fpsyg.2018.02742.

Simon, S. S., E. Varangis, and Y. Stern. 2020. "Associations between Personality and Whole-Brain Functional Connectivity at Rest: Evidence across the Adult Lifespan." *Brain and Behavior* 10(2):e01515. doi:10.1002/brb3.1515.

Subiza-Pérez, M., T. Pasanen, E. Ratcliffe, K. Lee, A. Bornioli, J. de Bloom, and K. Korpela. 2021. "Exploring Psychological Restoration in Favorite Indoor and Outdoor Urban Places Using a Top-Down Perspective." *Journal of Environmental Psychology* 78:101706. doi:10.1016/j.jenvp.2021.101706.

Takayama, N., T. Morikawa, and E. Bielinis. 2019. "Relation between Psychological Restorativeness and Lifestyle, Quality of Life, Resilience, and Stress-Coping in Forest Settings." *International Journal of Environmental Research and Public Health* 16(8):1456. doi:10.3390/ijerph16081456.

Yusli, N. A. N. M., S. Roslan, Z. Zaremohzzabieh, Z. Ghiami, and N. Ahmad. 2021. "Role of Restorativeness in Improving the Psychological Well-Being of University Students." *Frontiers in Psychology* 12:646329. doi:10.3389/fpsyg.2021.646329.