Identifying and Improving Green Spaces on a College Campus: A Photovoice Study

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Abstract:

Research suggests that a large percent of college students experience stress due to the demands of college life. Campus health professionals use a wide range of interventions to reduce student stress; however, the ability of green spaces on campuses to alleviate stress is often lacking in college health programs and related research. In this study, photovoice methodology was used to conduct a community-based participatory research project in order to identify and improve campus green spaces that students frequent for stress relief. Participants included 45 undergraduate students enrolled in an emotional health course. Students were instructed to take photos that addressed two open-ended questions: (1) What green spaces on campus do you visit to alleviate stress? (2) How could the green spaces on campus be improved for alleviating stress? Afterward, students analyzed and placed their photos into distinct themes. Results showed that students enjoyed green spaces that featured both man-made structures (e.g., swings, fountains, benches) and exclusively natural areas (e.g., magnolia trees, campus parks). Students indicated that campus areas in need of improvement for alleviating stress included trash cans, areas lacking landscaping, piles of cigarette butts, and a dilapidated campus tower. Spaces that helped alleviate stress and spaces that needed improvement were both reflective of Attention Restoration Theory. At the culmination of the project, the students shared their findings with the campus community at a photo exhibit. During the exhibit, students' voices were heard by campus administrators in positions of authority (e.g., chancellor, director of Facilities Operations, grounds crew supervisor).

Keywords: Green space | College | Attention Restoration Theory | Student | Stress

Article:

Introduction

A large portion of college students has experienced stress due to unique factors related to college life. According to the 2013 National College Health Assessment, nearly 65% of students felt overwhelmed in the past month by all the work they had to complete. In the same assessment, 32% of students reported feeling overwhelming anxiety in the past month (American College Health Association, 2013). Research suggests that students feel stress due to the pressure of studying, taking exams, transitioning into college life, living on a low budget (Robotham, 2008), and experiencing relational problems with peers, romantic partners, and college faculty members (Hurst et al., 2013).

Campus health professionals have used several interventions to alleviate stress felt by college students. Interventions tend to be offered during times of heightened stress in the academic year, such as freshman orientation and the week of final exams. Programs for students have included arts and crafts, games, comfort food, extended hours at the student gym and library, and free yoga classes and chair massages (Margaris, 2012; McCluskey, 2013; Montclair State University, 2013). One of the more popular college programs has been pet therapy (Young, 2012), in which dogs are brought on campus for students to interact with in order to lower stress levels (Adamle et al., 2012).

Although a variety of methods have been used to address student stress levels, there has been minimal focus on the ability of green spaces to help students relax. Green spaces (e.g., trees, landscapes, gardens, forests) positively impact many aspects of human wellness. Regardless of whether people simply view green spaces (e.g., seeing images of a forest) or spend time physically in green spaces (e.g., going on a walk in a forest), engaging with nature seems to impact human health and, in particular, reduce indices of stress (Reese & Myers, 2012; Ulrich et al., 1991). For example, Tennessen and Cimprich (1995) studied the attention of 72 undergraduate students utilizing a variety of attentional instruments. Researchers found that undergraduate students who had a view of green spaces (i.e., trees) from their living quarters performed significantly better on the attentional tasks than persons without views of green spaces. Park, Tsunetsugu, Kasetani, Kagawa, and Miyazaki (2010) studied 280 Japanese male college students in assessing physiological and psychological measures of stress. The researchers used 24 forest and city environments where participants viewed and walked throughout the areas. Participants rated their moods, and a variety of physiological measures were measured over a 2-day period. The researchers found significantly lower measures of salivary cortisol, pulse rate, and blood pressure, and increased parasympathetic nerve activity when participants were in forest settings relative to being in the city. Students also reported less depressive symptoms when exposed to forest environments. Thus, green spaces seem to impact human wellness, regardless of whether one is in the immediate presence of a green landscape or viewing one from a distance.

Nonetheless, relatively few studies have been dedicated to studying the use of green spaces on college campuses for alleviating stress. Abu-Ghazzeh (1999) utilized a phenomenological design

in studying the themes of preferred outdoor spaces at a university located in Jordan. The researcher interviewed student, faculty, and administrative staff participants in determining the types of places participants preferred, the affective quality of places, and participant behaviors that took place in the university outdoor spaces. Abu-Ghazzeh found that stakeholders visited most frequently the spaces between university buildings. The features of the most highly visited places included trees, lawns, and quiet landscaped areas. Other investigators have utilized survey designs. McFarland, Waliczek, and Zajicek (2008) surveyed 373 undergraduate students at a university located in Texas, in which they explored the uses of nature and quality of university life. Students were asked to rate the extent to which they partook in various activities outdoors on campus. Most students were considered high-users of campus green spaces, and of those students, most considered their overall quality of university life to be positive. The researchers found a significant and positive association between use of campus green spaces and quality of life. The more time students spent in nature, the higher they rated their quality of life on campus. McFarland, Waliczek, and Zajicek (2010) replicated this study with 79 graduate students. A smaller proportion of graduate students reported spending time outdoors on campus, though the research sample reported similar rates of campus quality, as did the undergraduate sample.

Finally, Speake, Edmondson, and Nawaz (2013) explored the perceptions and uses of nature on a college campus in the United Kingdom using a survey design via systematic sampling. They surveyed 205 undergraduate and postgraduate students. Eighty-two percent of the sample was aware of green spaces on campus, and most students indicated that they were aware of the term "green spaces." Eighty-four percent of the sample reported using the campus space for relaxation. More specifically related to the study at hand, participants were asked to rate the campus cleanliness, maintenance, and general appearance of the campus green spaces on a 5-point Likert scale, from *very good* to *very poor*. Eighty percent rated the cleanliness as very good; the general appearance of the green spaces were very good according to 77% of the sample; and 72% reported very good maintenance of the campus green spaces. Eighty-one percent of participants reported that they had a favorite green space on campus. The most frequented type of green space reported by the sample included human-touched areas, including formal and planned areas (i.e., a manicured field). The study's authors believed that the students underreported the naturalistic areas on campus (i.e., woodlands) on account of a lack of awareness of the ecological importance of natural areas. Scientific inquiries into the uses of green spaces on college campuses have been relatively sparse, but the findings reviewed suggest that exposure to green settings on college campuses reduces stress and increases perceptions of campus quality.

The ability for some green spaces to alleviate college study stress may be viewed from Attention Restoration Theory (ART; Faber Taylor & Kuo, 2009, 2011; Kaplan & Kaplan, 1989), in which four components have been proposed as promoting the restoration of attention (Kaplan, 1995). First, green environments provide the individual with a sense of being away, even if that person is resting in an arboretum outside the recreation hall on campus. Second, the individual

experiences an attentional shift from voluntary attention (attention that requires cognitive effort, often called “hard” fascination) to involuntary or “soft” fascination (e.g., observing a sunset or the passing clouds). Third, the green space possesses extent; that is, the area may seem larger than the space actually is (e.g., lying on one's back and observing the blue sky on a small patch of grass). Fourth, compatibility occurs when the individual fulfills her or his given purpose for spending time in a given green space (e.g., relaxation in an outdoor eating area on campus). If a campus green space possesses these four attributes, it seems that students may be more likely to experience attention restoration and the reduction of stress. For further reading on ART, see Kaplan (1995).

Generally speaking, the purposes of the studies cited above were to gather data with regard to which parts of campus were identified as restorative and how college students use green spaces on college campuses and also to discover students' satisfaction with these green spaces. To date, little if any research has been conducted with the specific aim of exploring how the green spaces of a campus might be improved to increase its restorative effects for students. The authors of this article conducted a photovoice study with the purpose of identifying and improving upon the campus green spaces students frequent for stress relief. Photovoice is a qualitative methodology used to conduct community-based participatory research. Typically, photovoice projects are conducted with people who have minimal influence, or “voice,” within their own community (Wang & Burris, 1994). In this methodology, participants are given cameras to take photos of the strengths and weaknesses of their community. Afterward, the photos are displayed at a public exhibit and used by participants as talking points to inform members of the community and policy makers about topics that surfaced from the project. Generally, photovoice research projects are conducted for three purposes: (1) to empower participants to document the needs of their community, (2) to stimulate critical discussion among participants and those who attend the photo exhibit, and (3) to provide an avenue for participants to have their voices heard by policy makers (Wang & Burris, 1997).

There were three general research questions that guided the photovoice project reported in this article: (1) What green spaces on a college campus attract students for the specific purpose of alleviating stress? (2) What are student perceptions of how green spaces might be improved for alleviating stress? (3) How might a photovoice project advocating for improvements to green spaces translate into changes made to green spaces on a college campus?

Methods

Participants

The project was approved by the university's Internal Review Board before participants were recruited. Participants included 45 undergraduate students enrolled in a public health education course titled Emotional Health during the fall of 2012. The project was designed to be a hands-on lesson in stress management, which was an integral part of the course's student learning

objectives. In order to avoid coercion, students were given the option to either participate in the project or complete an alternative assignment. Although a total of 46 students were registered for the course, one student did not participate in the study and opted to complete the alternative assignment related to stress management. It should also be noted that although 45 participants may be considered a small sample, most photovoice projects in the published literature have recruited less than 20 participants (Catalani & Minkler, 2010; Hergenrather et al., 2009).

Setting

The project was conducted at a public university in the Southeast of the United States. Although the university was in an urban location, landscaping efforts helped make the campus seem somewhat secluded from the surrounding city. The university was awarded with a Green Star Award from the Professional Grounds Management Society during the time of the photovoice project. The Green Star Award is a national award that recognizes dedication and excellence in grounds keeping. Over 18,000 students were enrolled at the university during the time of the project.

Training

Because they acted as co-investigators in the research process, students were required to complete the online CITI program regarding the protection of human participants prior to the project's starting date. Students were also required to attend a 3-hour in-class training session to learn basic photography techniques, the history and theory behind photovoice, and the ethics of taking photos of other people (e.g., others' consent, privacy laws, photo release process forms) (Wang & Redwood-Jones, 2001). At the end of the training, students were assigned to take photos that addressed two open-ended questions: What green spaces on campus do you visit to alleviate stress? How could the green spaces on campus be improved for alleviating stress? Students were given a 30-day period to take their photos. Students were not limited in the number of photos they could take.

Group discussion

After capturing their photos, students worked in small groups during an additional 3-hour class session. Their group discussions were guided by the SHOWeD mnemonic, which has become a popular method of facilitating group discussions in photovoice projects (Catalani & Minkler, 2010; Hergenrather et al., 2009). The SHOWeD mnemonic stands for

What do you See here?

What is really Happening?

How does this relate to Our lives?

Why does this problem or strength exist?

What can we Do about it? (Wang, 2006)

The purpose of using the SHOWeD mnemonic was to guide participants in dialogue about the deeper meaning behind their photographs. Essentially, the mnemonic helped participants critically think about the “who, what, where, when, and why” of their photos.

Caption writing

Students were directed to write a caption about each of their photographs based upon their small group discussions using the SHOWeD mnemonic. The captions were written to specify the meaning of each photo. In small groups, the students critically examined each other's writing to determine if the captions reflected what was talked about in their group discussions. The writing process had a major role in the project, since the captions were attached to the photos and read by those who attended the photo exhibit.

Analysis

After completing small group discussion and caption writing, students were directed to view the photos and captions of the entire class. In large group discussion, students analyzed photos by creating separate, distinct themes based from photo content. Once themes were identified, students voted which of their classmates' photos would best represent each theme in terms of capturing the voice of the class.

Photo exhibit

The class discussed which members of the campus community should be invited to the photo exhibit. Students determined that stakeholders of the project included key administrators (e.g., chancellor, vice chancellors, provost, student affairs, faculty senate, staff senate), Facilities Operations, the campus grounds crew, the university's Office of Sustainability, and the general student body. Invitations to the photo exhibit were given via e-mail and through word of mouth.

Results

Project themes

Students identified seven overarching themes based from 86 photos and captions. The themes included Swings, Famous Trees, the Campus Park, Fountains, the Salad Bowl, Bench Nooks, and Room for Improvement (Table 1).

Table 1. Distribution of Photos per Theme

THEME	NUMBER OF PHOTOS
Swings	3
Famous Trees	7
Fountains	8
Salad Bowl	12
Campus Park	12
Bench Nooks	15
Room for Improvement	29

Photos and captions in the Swings theme described a popular spot on campus nestled between the library and the student union building that contained a small swing set (Fig. 1). A variety of trees and shrubs surrounded the swing set area, giving students an opportunity to alleviate stress by swinging in green space. For many students, the swing set had become a campus staple. One student wrote in a caption about the swing set, “This is my go-to area to unwind and not think about responsibility for about an hour.”

Fig. 1. Student caption: “This is a great place to take a mental break from your classes. This area is located away from some of the busier areas of campus so you can enjoy your surroundings. The swings are a nice way to enjoy the fresh breeze in your face or just enjoy a slower pace.”

In the Famous Trees theme, students took photos of trees that had become well known on campus as ideal places for climbing, relaxation, and making memories. Most of the photos were of very tall magnolia trees on campus. The magnolias had several bulky branches and large leaves that gave students privacy and opportunities to climb and set up hammocks (Fig. 2).

During class discussion of photos, one student stated that a particular magnolia tree had special meaning for him. He said it was his favorite place on campus to relax and was the place where he asked his friend if she wanted to date him. It was under that tree where they shared their first hug. Other students stated that his story was common. These famous magnolia trees had become landmarks of where friendships and relationships were developed, made obvious by the large number of initials and dates carved in the trees' trunks and branches.

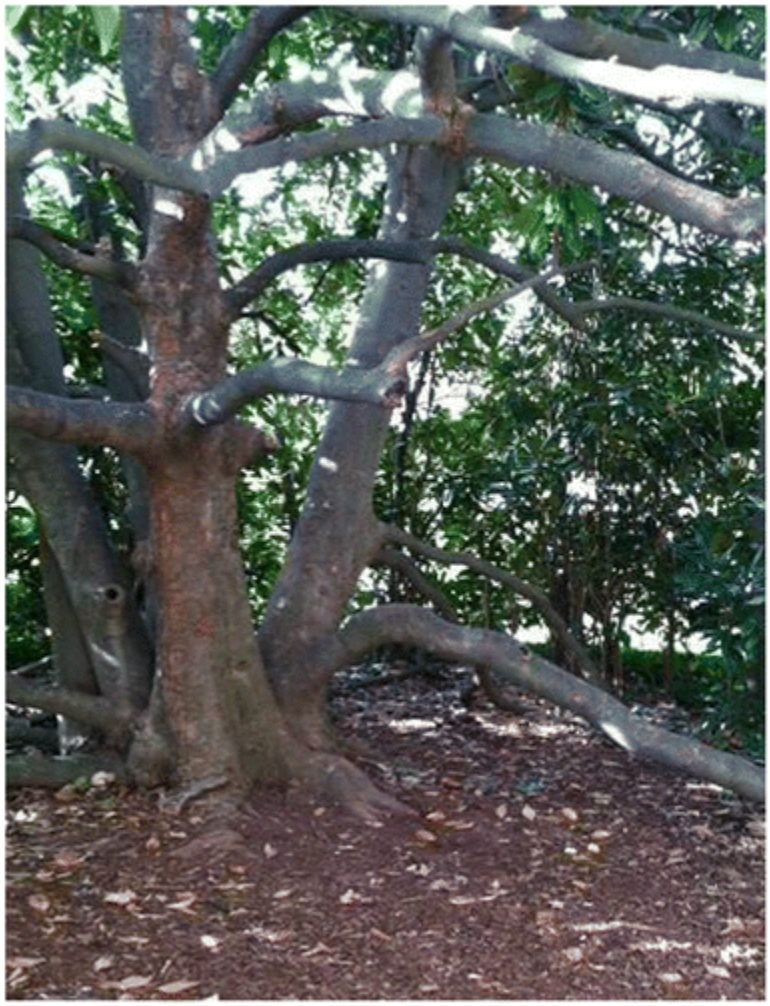

Fig. 2. Student caption: “This photo was taken outside the Petty Building on College Avenue. This tree is where I performed a dance for my dance appreciation class last semester. Not only is this tree awesome to climb, it created college memories! This is the most awesome tree on campus; it provides shade, relaxation, and lots of fun!”

The Campus Park theme consisted of photos that described a more secluded area of campus that featured large trees, rocks, and a small stream. Students wrote about alleviating stress by either walking through the park's trail or sitting on the rocks located next to the stream. A few students used the park to meditate and pray in solitude, while others noted that the park was a popular place for students to meet and talk. Although most students described the park as a private spot

that was beneficial for relieving stress (Fig. 3), a few students took photos of litter and exposed drainage pipes. The students made recommendations in their captions that the park be better maintained and that the pipes be covered up with earth-toned paint or ivy plants.

Fig. 3. Student caption: “This spot is located in Peabody Park beneath the bridge leading to the music building. This is a particularly interesting rock as it provides a seat for people to sit and observe nature. This is a great place to unwind after a stressful day and listen to the sounds of birds chirping, water flowing, and leaves moving in the wind.”

In the Fountains theme, students identified two locations on campus that featured a fountain. The fountains were very different from each other (e.g., location, level of seclusion, design); however, student captions were similar regarding the peacefulness of falling water. Students noted their appreciation of listening to the water and how the sound helped to alleviate their stress (Fig. 4).

Fig. 4. Student caption: “This fountain is located outside the music building and provides students with a relaxing, peaceful atmosphere. There is limited traffic around the area, as it is secluded from the main buildings on campus. It is quiet and surrounded by trees, flowers, and shrubbery where students can enjoy the nature and the calming sound of the fountain. There are rocks and benches surrounding the fountain where I like to come and sit when I have free time on campus.”

The Salad Bowl theme included photos of an on-campus park. The center of the park was lower in elevation than its perimeter, giving it a bowl-like appearance. The park contained a wide variety of trees and plants, giving the plant life an appearance of “salad” inside a bowl. “Salad Bowl” has been an endearing term used by students for decades when referring to the park. Photos and captions regarding the Salad Bowl described the area as a place for students to study, relax, or walk through on the way to class (Fig. 5). Students enjoyed the presence of the trees for shade, the changing leaves, and the opportunity to spend time in nature. A few students wrote that they enjoyed passing through the park when going to or from class because the area gave them a brief moment to calm down. One student wrote that the Salad Bowl had “been a faithful friend for the past five years.”

Fig. 5. Student caption: “I love walking through the Salad Bowl on my way to and from class. It gives me an outlet from the hustle of everyone walking the sidewalk along Spring Garden Street. This area allows me to relax and think about things like nature that don't stress me out. It takes me away from the chaos of life and gives me a moment to breathe.”

The theme that students titled Bench Nooks described small, private areas containing benches that were surrounded by trees, wildlife, and flowers. A consistent finding within the theme was an appreciation of how the nooks felt private, or “secret.” Students mentioned in small group discussions that few people were aware of certain nook locations, which made these areas very special. Students felt a connection with nature at these spots and felt relief from stress by observing birds, butterflies, and squirrels (Fig. 6). Photos and captions also specified that a variety of flowers in these hidden nooks were relaxing and aesthetically pleasing to the students, in terms of both sight and smell.

Fig. 6. Student caption: “These benches are behind Moore Strong Residence Hall near the golf course. They are such a great hide-away from the busyness of the rest of the campus. I love to relax and journal here because it is quiet, secluded, and surrounded by nature. There are trees everywhere with squirrels and chipmunks always rustling around.”

Finally, the Room for Improvement theme included photos about campus areas that could be enhanced in terms of alleviating stress. Students took photos of poorly placed trash cans, a dilapidated campus structure, and spots that needed landscaping or removal of cigarette butt litter. Most photos in the Room for Improvement theme were of trash cans, and recycling cans in some instances, that were placed directly beside several campus benches (Fig. 7). Students noted that the benches had potential for alleviating stress, since the benches were located either in or near nature; however, students complained that the trash cans smelled bad and also attracted swarms of bees. A number of photos also depicted a neglected campus structure known as the “cooling tower.” The tower had formerly been used by art students to cool their pottery that was taken out of kilns (Fig. 8). The tower had not been used in years and had become an area filled with graffiti and litter. Students also took photos of areas on campus that were bare, containing no trees, dead grass, dirt, and cigarette butts. These areas and the cooling tower had made students feel that the spots were unkept by the university and also disrespected by students who smoked cigarettes.

Fig. 7. Student caption: “These park benches are all throughout campus. The only drawback is that when I sit on these benches I don't want to be able to smell the trash cans next to them. Also, during the spring and summer, the bees and yellow jackets love to fly around the smelly trash cans. I would love to sit in these benches between classes but don't want to come away stung or smelling. One way to improve this is to move the trash cans away from the benches so that the smell and the bugs aren't swarming around.”

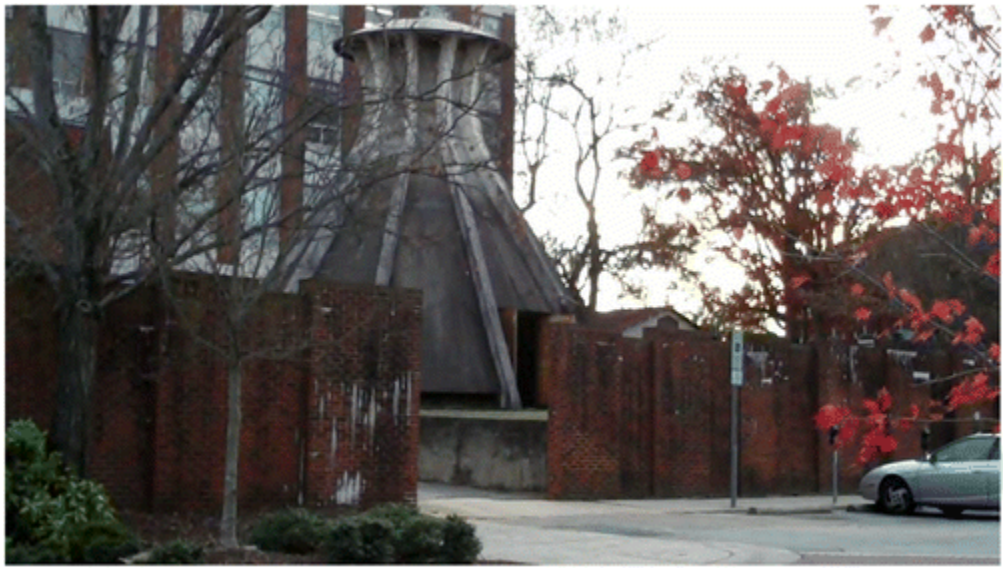

Fig. 8. Student caption: “I can't help but think that the tower thing [cooling tower] could be taken down. Also, to make this place seem less sketchy, maybe there can be paintings or flowers.”

Photo exhibit

A total of 23 community members attended the photo exhibit, including the university's chancellor, the director of Facilities Operations, the grounds crew supervisor, two members of

the grounds crew, two faculty, six staff, and ten students who were not enrolled in the Emotional Health course. The exhibit was held for 3 hours in a classroom at the university. During the photo exhibit, the students remained near their photos and conversed with attendees. Students shared their favorite places to relax on campus and also advocated that certain areas be improved.

Informing policymakers

Student advocacy during the photo exhibit produced several key outcomes. First, after viewing photos and speaking with students, the university's grounds crew supervisor asked that the exhibit be shown to the entire grounds crew. An electronic version of the exhibit (i.e., photos and related captions) was sent to the grounds crew supervisor via e-mail and viewed by roughly 20 grounds crew members. Second, the director of Facilities Operations spoke with the principal investigator during the photo exhibit and stated that he would brainstorm ideas with the grounds crew about where to move trash cans away from benches. Third, the university's chancellor mentioned that she had engaged in prior discussions with other administrators about the cooling tower. The chancellor indicated that plans were being made to either remove or improve the tower area. She said that the photos further demonstrated a need to take action and make the campus area better for student well-being.

In terms of having their voices heard, the first author observed, anecdotally, during the photo exhibit that students felt that their views had been listened to by campus leaders. For instance, one student approached the first author during the photo exhibit and whispered excitedly, “I can't believe the chancellor just talked to me about my photo!” Another student whispered to the first author, “Look, he's taking notes,” referring to the director of Facilities Operations, who had been taking notes while speaking with students about campus trash cans.

Discussion

The findings of the first research question can be grounded in the four major tenets of ART (Kaplan, 1995). Each of the seven themes that emerged from this study was grounded in a student's sense of “being away” from her or his typical environment and experiencing a whole different world (i.e., extent). For example, the bench nooks were experienced as remote and secret getaways to students, even though they were just several hundred feet away from major parts of campus. In addition, that so many of the photos included man-made structures (i.e., fountains, the campus swing set, and nooks that contained benches to sit on) was initially surprising to the study authors. However, these structures provided students with a familiar platform in order to connect with nature and alleviate stress in terms of ART's concept of compatibility. For example, the swing set and benches, which were not natural in themselves, gave students an opportunity to observe and engage with surrounding trees, bushes, flowers, animals, and insects. These findings are similar to those of Speake et al. (2013), who also found that students possessed preferences for green spaces with a human touch. One explanation for

this preference may be grounded in ART's concept of compatibility. Students may have viewed human-touched nature as the better mode of meeting the purpose of relaxation on account of a lack of familiarity and comfort with a strictly natural space. Future research should explore the differences between preferences for human-created green spaces and those more natural in experience.

Furthermore, campus parks and the large trees provided students with a drastic attentional shift, in which students could effortlessly engage in the beauty of the natural areas and bask in the seclusion from others. For example, the raised perimeter of the Salad Bowl and the trees and shrubs located in and around the park's border gave students the feeling that they were totally separated from the rest of the campus. Likewise, the large leaves and branches of the magnolia trees hid students from others' view, allowing students to escape the chaos of campus life and direct their attention to the natural environment. The sense of seclusion and being enveloped by green spaces allowed students to relax by taking attention away from campus buildings and the feelings often associated with those structures (e.g., lectures, homework, exams, e-mails). These green spaces provided students with a sense of being away and an opportunity to engage in soft fascination with nature that was seemingly effortless in between classes. This type of soft fascination allowed students to take a mental break from the hard fascination related to their campus lives and busy course schedules.

It is worth noting that although the project's focus was on green spaces, some students captured photos and wrote about human interaction as an integral part of those spaces and of the relaxation process. A few photos and captions within the Swings, Famous Trees, and Campus Park themes emphasized how the presence of friends made these spaces ideal areas for alleviating stress. The green space most frequently associated with the presence of groups of people was the Famous Trees theme. The size and number of the large magnolia trees for climbing or sitting on seemed perfect for the interaction of several people. Also, some of the green spaces that contained human-made structures were intentionally designed for groups of people to enjoy. For instance, since the campus swing set contained two swings, it is obvious that the area was built for two people to swing on. Likewise, benches located in private nooks were large enough to fit at least three people per bench. It is not surprising that some students made use of green spaces with other people in order to alleviate stress. Nature has been found to increase social contact with neighbors (Sullivan et al., 2004), contribute to intimate relationships between neighbors (Kuo et al., 1998), and influence people to be more caring (Weinstein et al., 2009). Additional research in the area of social connectedness and nature on college campuses might facilitate the innovative integration of natural spaces into college classrooms and community events.

In regard to the photovoice project's second research question, student photos and captions suggested that man-made spaces associated with hard fascination were ineffective in lowering student stress levels. In particular, students noted that the graffiti-covered cooling tower, smelly trash cans that attracted bees, and green spaces covered with cigarette butts were not helpful in

alleviating stress. These findings can also be explained from a perspective in ART. Specifically, the authors propose that certain areas were not suitable for alleviating stress because of a tendency toward hard fascination in those areas (e.g., focusing on cigarette butts, swatting away bees) that surpassed any level of soft fascination that may have taken place in those settings had the man-made structures been removed. The trash, pipes, and other distractions in these areas also took away from one's ability to experience a sense of being away, fulfilling one's end goal relaxation (i.e., compatibility), and one's ability to experience a different kind of natural world entirely (i.e., extent).

In response to the project's third research question, findings indicated that student advocacy efforts may have inspired future changes in the quality of a campus's green spaces. Although the photo exhibit did not result in any immediate changes, the exhibit generated an interest and spark for campus administrators to begin discussions about relocating the trash cans away from campus benches. In addition, the exhibit encouraged administrators to continue with previous discussions and plans regarding the removal of the campus cooling tower. Finally, it is important to note that although the project did not result in changes to green spaces on campus, the project did achieve one of the major purposes of conducting photovoice research: providing participants with an opportunity to have their voices heard by policymakers (Wang & Burris, 1997).

Limitations

The photovoice project possessed several limitations. First, because the project took place at only one university and did not include random sampling, its findings may not be applicable or generalizable to other universities. Specifically, students exposed to different campus structures at other universities may have photographed green spaces unlike those reported in this study.

Second, it is possible that students may have responded differently had they not been enrolled in the course. Moreover, campus administrators at other universities may not have reacted to a photo exhibit as did those who attended our project.

Third, while we feel that most students responded in genuine ways to the assignment, the limitations of extrinsic motivation (i.e., getting a good grade) for engaging in the course cannot be overlooked. For instance, some students may have captured photos of green spaces that they did not actually spend time at in order to relieve stress. However, it should be noted that authors attempted to avoid not only coercion but also extrinsic motivation by offering an alternative assignment to the photovoice project.

Fourth, stress and stress relief were not measured in this project. The amount of stress that students felt and the degree to which green spaces relieved that stress are unknown. Therefore, readers should consider the findings of this project in light of student self-report of perceived stress levels and stress relief.

Finally, the project was unable to create measurable change on campus (i.e., the movement of trash cans). The authors believe that neglecting to develop follow-up advocacy efforts after the photo exhibit may have contributed to the lack of change resulting from the project. Researchers who wish to utilize this methodology on their college campuses should have a clear strategy and intent for using the methodology to make the most of the community-based design in catalyzing systemic change. The authors suggest that those planning to use photovoice should develop a long-term plan for conducting continued advocacy beyond the project's photo exhibit.

Conclusion

The findings from the photovoice project have several implications for campus stakeholders. First, those responsible for planning the structure of college campuses may want to consider enhancing the quality and quantity of green spaces in terms of the ability of spaces to alleviate stress. The findings from the photovoice project provide a long list of green spaces and natural features preferred for alleviating stress that may be considered when planning campus landscapes. Second, campus health professionals should consider including the use of green spaces for health programs related to student stress relief. Similar to offering pet therapy or yoga classes during finals week, health professionals could offer a wide variety of creative programs that not only provide directions to ideal campus green spaces but also incentivize the opportunity to spend time in green spaces throughout the entire academic calendar.

Author Disclosure Statement

No competing financial interests exist.

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