THE IMPACT OF SMARTPHONE USE ON PARTICIPANT OUTCOMES IN OUTDOOR RECREATION

by

JERRY A. SCHEXNAYDER

(Under the Direction of B. Bynum Boley)

ABSTRACT

Despite the saturation of academic literature with articles espousing the benefits of outdoor recreation (OR) and the potential downsides of smartphone usage, there is a dearth of research regarding the impact of smartphone use on OR experiences. The purpose of this quantitative study was to determine if smartphone use on OR trips affects participants' psychological, social, educational, and physical outcomes. Sixty-eight participants were split between a treatment group and control group. Smartphone use was limited in the treatment group by encouraging participants to leave smartphones behind and giving them guidance on appropriate versus inappropriate smartphone use in the backcountry. Both groups participated in overnight backpacking trips and were surveyed before and after the experience. An analysis of the surveys revealed no significant relationship between smartphone usage and measured OR outcomes. These results carry important implications for OR practitioners because it will help them make policy decisions regarding participant smartphone use. The study also opens the door for further investigation into the relationship between smartphones and OR.

INDEX WORDS: Outdoor recreation, Participant outcomes, Smartphone usage, Outdoor adventure education, Outdoor adventure recreation program

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CHAPTER 1

INTRODUCTION

For decades, intuition has melded with academic research to produce an abundance of evidence that outdoor recreation (OR) positively contributes to various dimensions of an individual's wellbeing (Ewert, 1986; Puhakka, 2021). Psychologically, OR affords its practitioners relief from stress, anxiety, and depression primarily as a result of the lack of stimuli found in natural settings, which allows individuals the opportunity to avoid and/or process daily stressors (Davidson, Ewert & Zwart, 2022). Socially, OR offers individuals opportunities to create authentic connections with others and develop their interpersonal communication skills in order to accomplish shared goals (Ewert & Overholt, 2010). Educationally, OR can relieve stress which can improve classroom performance (Andre et al., 2017), as well as provide opportunities for applying classroom knowledge in practical environments (Quibell, Charlton & Law 2017). Physically, OR provides "inherently enjoyable" fitness opportunities such as hiking that many individuals are more likely to perpetuate compared to more traditional fitness activities like running or lifting weights (Dustin et al., 2017). The well-documented benefits of OR have led to its broad institutional adoption at campuses across the United States, with 128 colleges and universities offering undergraduate outdoor academic programs to meet the growing demand for outdoor professionals (Turner et al., 2022). OR programs have also become a common fixture within campus recreation departments due to their positive impact on university "recruitment, retention and satisfaction" (Andre et al., 2017, p.15).

While researchers have generally lauded OR for its myriad benefits on individual wellbeing, they have treated smartphone technology with far more ambivalence. On one hand, smartphones streamline a variety of tasks and provide nearly frictionless connectivity, while on the other hand they are detrimental physically by decreasing sleep quality, psychologically by decreasing self-esteem, and sociologically by decreasing interpersonal connection in social settings (Edwards, Zajchowski & Hill, 2021; Osorio-Molina et al., 2021). In the context of leisure activities, Harmon and Duffy (2022) argue that smartphones have made it more challenging for individuals to be cognizant of "what is happening while it is happening" (p. 2). This smartphone-fueled disconnection dulls the benefits of leisure activities and opens the door to greater alienation from the broader world. A growing body of literature on the role of mobile technology in OR specifically mirrors this broader ambivalence: smartphones can be a useful tool for navigating terrain, predicting weather, capturing memories, identifying flora and fauna, and summoning help in emergencies, but also a distracting barrier preventing someone from fully connecting with themselves, others, and nature (Clark & Nyaupane, 2023; Edwards, Zajchowski & Hill, 2021; Shepherd et al., 2021).

Despite the saturation of academic literature with articles espousing the benefits of OR and the ways mobile technology can both augment and detract from OR experiences, there is a dearth of quantitative research regarding the impact of smartphone use on participant wellbeing and goal attainment while participating in OR experiences. Existing research on the impacts of mobile technology on OR either focus on the perspectives of instructors (Bolliger et al., 2021; Shepherd et al., 2021), utilize qualitative methods (Bolliger & Shepherd, 2018; Edwards, Zajchowski & Hill, 2021; Shepherd et al., 2021), or focus on the implementation of specific mobile applications to enhance learning (Crawford, Holder & O'Connor, 2017; Palmárová &

Lovászová, 2012). There are no studies that experimentally explore if and to what extent smartphones impact OR participant experiences. In an attempt to begin filling this research gap, the purpose of this study is to determine if smartphone use on OR trips affects participant outcomes. Outcomes can be categorized into four dimensions (Ewert, 1986): psychological (resilience [Smith et al., 2008], life effectiveness [Neill, 2008], nature connectedness [Outward Bound International, 2021], and place attachment [Williams & Roggenbuck, 1989]), social (kindness to others [Outward Bound International, 2021], group cohesion [Salas et al., 2015], and emotional solidarity [Joo & Woosnam, 2020]), educational (outdoor competencies), and physical (likelihood to participate in OR in the future).

To determine if there is an association between smartphone use and OR trip outcomes, this study utilized a quasi-experimental design with a sample population of 68 University of Georgia college students divided into ten trip groups. Each trip group embarked on an overnight backpacking trip guided by trip leaders from the University's Outdoor Recreation Center. Five of the trip groups served as the treatment group and were encouraged by their trip leaders to leave their smartphones prior to beginning the trip. Participants who chose to keep their smartphones during the trip were given instructions on appropriate and inappropriate smartphone usage while in the backcountry. The other five trip groups served as the control group and received no guidance on smartphone usage from their trip leaders. All participants completed a pre-trip and post-trip survey immediately before and after the trip to assess differences in outcomes. The study carries important implications for OR practitioners and trip organizers because its results will help them make policy decisions regarding participant use of smartphones while on trips. More broadly, the study's results may shed light on how smartphone usage is impacting individuals' abilities to connect with themselves, others, and nature in a leisure context.

CHAPTER 2

LITERATURE REVIEW

Benefits of OR

As far back as the 1970s, national surveys in the United States revealed that leisure - any "un-coerced, contextually framed activity, pursued in free time and certain kinds of work, which people want to do and, using their abilities and resources, actually enact in either a satisfying or a fulfilling way" (Stebbins, 2017, p. 106) - was a significant contributor to life satisfaction (Kelly, 1981). Outdoor Recreation (OR) is a form of serious leisure, which Stebbins (1982) defines as any voluntary and enduring leisure pursuit that requires perseverance, leads to the acquisition of special knowledge and skills, encourages self and social actualization, promotes adoption of specific values and beliefs, and is a major part of one's identity. The benefits of OR for individuals are well documented in academic literature. Ewert (1986) provides a useful framework for dividing these benefits into four distinct categories: psychological, social, educational, and physical benefits.

Psychological Benefits of OR

Individuals who engage in OR tend to experience positive psychological benefits, including a reduction in stress, anxiety, and depression. In a report to the Director of Recreation Management for the U.S. Forest Service, Brown (1981) identified "highly valued specific experiences" that were common amongst studies on various OR activities including backpacking, hiking, fishing, and skiing. One of the most common highly valued experiences for individuals across all studies was an escape from both physical and social pressures (Brown,

1981). Later in the report, Buchanan (1981) similarly found that OR provides an escape from stress, which in turn improves the overall mental health of OR practitioners. This is because stress levels are positively correlated with mental health issues such as anxiety and depression (Chiba et al., 2012, Van Praag, 2004, Welcome, 2020, Wheatley, 1997). In a recent survey of quantitative studies that focus on the relationship between OR and mental health, Lackey et al. (2021) found that 12 of 16 studies reported a significant reduction in stress and anxiety and 5 of 8 studies reported a significant reduction in depression levels following subject participation in OR. Moreover, the authors found that qualitative research on the relationship between OR and mental health had the recurring theme of an "increased sense of well-being" (Lackey et al., 2021). Other psychological benefits of OR include greater nature connectedness (Choe, Jorgensen & Sheffield, 2020; Howell et al., 2011; Piccininni et al., 2018) and greater resilience (Li & Miller, 2017), both of which are moderating factors that can help individuals manage stress-related anxiety and depression. This body of research provides strong evidence that OR imparts clear psychological benefits to its practitioners including a reduction in stress, anxiety and depression.

Social Benefits of OR

OR also benefits individuals socially. Although OR is often viewed as a retreat from the many stimuli of contemporary society, Cheek (1981) notes that individuals rarely engage in OR alone and instead do so with family or peers. With regards to families, West and Merriam (2009) found that OR essentially forced family members to interact which led to an increase in family cohesiveness. Another study, which focused on families whose holidays incorporated outdoor adventure, found that subjects experienced "unmediated" family time free of distractions and made shared memories that became a source of family bonding after the trip (Pomfret & Varley,

2019). Many mental health professionals incorporate OR into treating dysfunctional families (Burg, 2000; Koltz, 2021, Mulholland & Williams, 1998; Tucker et al., 2016) because of its proven track record of improving family functioning (Bandoroff & Scherer, 1994; Harper et al., 2007; McLendon et al. 2009; Pommier & Witt, 1995; Stea et al., 2022), with Freeman and Zabriskie (2002) noting that the OR activities used in treatment can have similarly enriching effects for all families. Researchers have also recognized the positive effects of OR on team building amongst young adults, finding evidence for increased social cohesion following participation in group OR activities like rock climbing (Sutherland & Stroot, 2010, Zwart & Hines, 2022), hiking (Cohen, Davis & Taylor, 2023; Puhakka, 2023), and paddling (Puhakka, 2023, Zwart & Hines, 2022). To summarize these findings, extended OR activities lasting more than a day have been shown to positively impact social bonds.

Educational Benefits of OR

OR participation can benefit individuals' educational experiences as well. As discussed previously, OR has been shown to relieve stress-induced anxiety (Lackey et al., 2021). This reduction of stress and anxiety can lead to improved academic performance and a greater overall likelihood of remaining enrolled in school (Andre et al., 2017). At the curricular level, many institutions have developed curriculum-based learning designed to take place in an outdoor context. Quibell, Charlton and Law (2017) found that such "Wilderness Schooling" can lead to significantly greater learning attainment in core subjects like reading, writing, and math when compared to traditional schooling. Even students demonstrating behavioral issues have been shown to perform better academically when enrolled in OR programs either during school (Dismore & Bailey, 2005; Fox & Avramidis, 2003) or after school (Hignett et al., 2018).

Physical Benefits of OR

Specific physical benefits of OR include greater muscular strength and cardiovascular endurance (Nugraha et al., 2024) as well as improved sleep quality (Pasanen, Tyrväinen & Korpela, 2014). The link between OR and improved physical health is predictable, as OR is a specific category of physical activity. Individuals who are more physically active tend to have better cognitive function and a healthier weight than individuals who are less physically active, which in turn reduces the risk of morbidities such as cardiovascular disease, type 2 diabetes, infectious disease, and certain cancers (CDC, n.d.). However, not all physical activities are the same. According to Godbey (2009), physical activities like OR that are undertaken for pleasure (e.g. hiking, gardening) rather than to specifically improve health (e.g. lifting weights, running on a treadmill) are the mostlong-termo improve long-term physical health. This is because pleasure-focused physical activities are more likely to be perpetuated instead of given up due to a lack of intrinsic enjoyment (Dustin et al., 2017). Studies have shown that individuals engaging in OR had higher levels of physical activity over time than individuals given no recreational instruction (Gill et al., 2016) or individuals constrained to indoor environments (Pasanen, Tyrväinen & Korpela, 2014).

Benefits of Outdoor Adventure Education Programs

Unsurprisingly, these four categories of benefits coalesce to make OR participation very popular throughout the United States, with the Outdoor Foundation (2024) reporting that 175.8 million Americans six and older participated in OR in 2024, accounting for 5 million jobs and generating approximately $1.2 trillion in consumer spending. One of the most recognized sectors of the OR industry is outdoor adventure education (OAE) programs such as Outward Bound, the National Outdoor Leadership School (NOLS) and the many academic and non-academic outdoor

adventure recreation programs (OARP) housed at universities around the world. The consensus amongst researchers is that the general benefits of OR also manifest in OAE programs with participants benefitting psychologically (Mutz & Müller, 2016), socially (Daniel, Bobilya & Faircloth, 2022; Jostad, 2015; Jostad et al., 2015), educationally (Paisley et al., 2008), and physically (Hattie et al., 1997) through their participation in long term wilderness expeditions. Hattie et al.'s (1997) meta-analysis of 96 studies on OAE programs found that participants made gains in many leadership, self-concept, academic, personality, and interpersonal metrics and that these gains persisted over time following the conclusion of programming.

Psychologically, OARPs enhance self-esteem and mood, reduce stress, encourage resilience, promote a connection to nature, and provide restorative opportunities for students to detach from daily stressors (Andre et al., 2017; Davidson, Ewert & Zwart, 2022; Puhakka, 2021; Puhakka, 2023). Socially, OARPs help students transition into university life, make more friends, strengthen existing connections, and improve their teamwork and leadership skills (Andre et al., 2017; Cooley, Burns & Cumming, 2015; Puhakka, 2021; Wigglesworth & Heintzman, 2020). Educationally, OARPs not only provide opportunities for students to learn new technical skills related to recreating outdoors (Wigglesworth & Heintzman, 2020), but are also correlated with greater academic success (Bailey & Kang, 2014) because they require students to develop strategies for managing stress, self-learning, and working within groups (Andre et al., 2017). Physically, OARPs help students remain active and develop fitness practices that they are more likely to perpetuate even after graduation (Andre et al., 2017). Many of these benefits are intertwined, such as the educational benefits of OARPs stemming from improvements in cognition caused by physical activity. It should be noted that OARPs benefit institutions in addition to individual students. OARPs can help an institution differentiate itself

when marketing to prospective students (Dustin et al., 2017) and can have "positive effects on student recruitment, retention and satisfaction" (Andre et al., 2017, p. 15), particularly for first year students (Hill et al., 2023).

The undeniable benefits of OARPs have led to their widespread adoption at colleges and universities throughout the United States, with approximately 128 institutions supporting academic OARPs ranging from majors, minors, certificates, and specializations (Turner et al., 2022). An even greater number of U.S. colleges and universities offer non-academic OARPs to students through their respective campus recreation programs. Common attributes of campus OARPs include climbing walls, challenge courses, and adventure trips, which are typically overseen by professional staff but primarily staffed by students. While these OARP programs are often lauded for the multifaceted benefits mentioned above, little research has investigated the impact that smartphones have on OR experiences and if they pose a threat to the psychological, social, educational, and physical benefits of OR.

Consequences of Smartphone Usage

Since the introduction of the first iPhone in 2007, smartphones have quickly become a central fixture of modern life, with worldwide smartphone subscriptions exceeding 7 billion as of 2024 (Statista, 2024). Mobile phone usage has become so ubiquitous that there are now more mobile phone subscriptions than there are people in the world (Statista, 2025). In the United States alone, there were 296.8 million smartphone users in 2020 (Statista, 2022), which represents approximately 90% of the country's population according to the United States Census Bureau (n.d.). The rapid ascent of smartphones in society has been accompanied by problematic usage patterns, with the average American spending 4.5 hours a day on their mobile devices and 57% of Americans self-reporting as "mobile phone addicts" (Consumer Affairs, 2024). The

academic literature surrounding smartphone usage is fairly ambivalent, showing both positive and negative effects on an individual's psychological, social, educational, and physical health. In general, however, most research points to a negative relationship between smartphones and these four domains because of the pervasiveness of smartphone addiction, also known as problematic smartphone use (PSU).

Psychological Impacts of Smartphones

Smartphone users report many symptoms of psychological dependency, such as feelings of discomfort when away from their phones (Cheever et al., 2014) and panicking when their phones run out of battery (Consumer Affairs, 2024). These behaviors mirror symptoms of withdrawal that one might experience when dealing with substance addiction, as do the behaviors that lead to PSU in the first place. According to Elhai et al. (2017), addiction usually develops from activities that initially offer individuals enjoyment and mood enhancement but subsequently become compulsory. Eventually, individuals experience negative emotions when not engaging in the activity and gain less relief when engaging in the activity compared to earlier stages of use. Elhai et al.'s (2017) review of 23 studies found a significant correlation between both non-addictive and addictive smartphone use and stress, anxiety, and depression. Vahedi and Saiphoo (2018) conducted a similar meta-analysis of 39 studies and also found that smartphone use was positively correlated with stress and anxiety. Another important consequence of PSU is that it has been associated with lower levels of nature connectedness, leading individuals to miss out on the well-being and pro-environmental benefits of going outdoors (Richardson, Hussain & Griffiths, 2018). Ironically, nature connectedness can be a protective factor against stress, anxiety, and depression, as demonstrated in the previous section.

Social Impacts of Smartphones

Socially speaking, many individuals become attached to their smartphones because they offer virtually limitless opportunities for social interaction and engagement via social media. (Clayton, Leshner & Almond, 2015). Social media is a significant contributor to PSU, with Enez Darcin et al. (2016) finding that individuals who use their smartphones mainly for social media are significantly more likely to develop an addiction to their smartphone. The ability to constantly interact with "events, experiences and conversations happening across extended social circles" often heightens individuals' fear of missing out (FoMO) when not accessing social media via their smartphones (Przybylski et al., 2013, p. 1842). However, smartphones do not solve FoMO because individuals gain a heightened awareness of the many friends, activities, and experiences that they may be unable to access or are being actively excluded from. As Vogel et al. (2014) note, frequent social media use increases an individual's likelihood of comparing themselves to others with higher social standing, which results in lower self-esteem. The social consequences of PSU are not limited to the virtual world of social media, but extend to the real world, diminishing the quality of in-person interactions (Dwyer, Kushlev & Dunn, 2018; Misra et al., 2016; Rotondi, Stanca & Tomasuolo, 2017) and interpersonal relationships (Hwang, Yoo & Cho, 2012), as well as increasing the odds of family issues (Hawi & Samaha, 2017). These real-world consequences are a result of smartphones serving as a distraction and social crutch, thus preventing individuals from fully engaging with each other and the environment around them.

Educational Impacts of Smartphones

Another field that smartphone usage has impacted is education. Scholars are divided over whether smartphones augment or detract from student learning. Proponents argue that

smartphones create a constantly connective environment that allows for continual feedback, collaborative learning, and increased access to learning tools across various environments (Gikas & Grant, 2013). Detractors, on the other hand, see smartphones as difficult to implement effectively and more likely to cause distractions, less independent thinking, and a lower quality of face-to-face instruction (Anshari et al., 2017). From a practical perspective, Kibona and Mgaya (2015) found that almost half of surveyed students spent five to seven hours per day on their smartphones without considering using that time for academic purposes. Researchers have also found that smartphones can increase inattentiveness in educational settings (Alotaibi et al., 2022) due to absent-minded usage (Marty-Dugas et al., 2018). In terms of measurable academic outcomes like grades, high frequency smartphone use and PSU are associated with lower grade point averages (Asif & Kazi, 2024; Lepp, Barkley & Karpinski, 2014). While the net effect of smartphones on educational outcomes is a subject of ongoing debate, there is compelling evidence that a negative correlation exists between smartphone use and learning.

Physical Impacts of Smartphones

Negative physical effects that stem from smartphone usage are sometimes a consequence of the positive correlation between PSU and psychological issues such as stress, anxiety, and depression, with Demirci, Akgonul and Akpinar (2015) finding that PSU can contribute to stress, anxiety, and depression, which in turn leads to lower overall sleep quality. PSU can also negatively impact the sleep quality of individuals that do not show symptoms of psychological disorders. This is because smartphone use immediately before and during bedtime, which has become a widespread ritual for many, reduces both the quality and duration of sleep (Ratan et al., 2021). PSU has also been linked to neck, spinal, and wrist pain due to the poor posture that results from hunching over while sitting and using a smartphone (Xie, Dong & Wang, 2018).

Macular degeneration and chronic migraines are also repercussions of PSU because of the blue-violet light that smartphones emit, which can be particularly damaging in low-light settings (Wacks & Weinstein, 2021). Finally, smartphone use negatively correlates with physical activity (Pereira et al., 2020), meaning that individuals with PSU are far more likely to lead sedentary lifestyles and have reduced cardiovascular fitness (Lepp et al., 2013).

Potential Impact of Smartphone Usage on OR outcomes

A review of the literature regarding the outcomes of OR and smartphone use reveals a striking contrast. OR offers individuals numerous psychological, social, educational, and physical benefits, whereas smartphone use frequently leads to PSU, which is detrimental to individuals across these four categories. This divergence elicits an important question: does smartphone use diminish or altogether negate the benefits associated with OR? Within the broader context of leisure, Harmon and Duffy (2022) theorize that smartphones reduce an individual's ability to maintain presence while engaging in leisure activities. This occurs because smartphones constantly distract individuals and fragment their attention, thus reducing their ability to be open and receptive to connecting with themselves, others, and the environment around them. The recurring loss of presence in leisure can lead an individual to become increasingly alienated, meaning that they detach from "the relations that one has with oneself, others and the world [because] the opinions of others are prioritized over oneself" (Xue et al., 2014, p. 188).

Harmon and Duffy's (2022) theory on how smartphones lead to a loss of presence in leisure and subsequent alienation provides an exceptional framework for exploring the question of whether smartphones impact the positive outcomes of OR. Practically speaking, many OAE programs have addressed this question by banning smartphones on their trips (Herber, 2019;

Moondance Adventures, n.d.; Outward Bound International, 2023; Wilderness Adventures, 2025). However, there is a dearth of quantitative research regarding the impact of smartphone use on participant outcomes while engaging in OR experiences. Existing research on the impacts of smartphones on OR either focuses on the perspectives of instructors (Bolliger et al., 2021; Shepherd et al., 2021), utilizes qualitative methods (Bolliger & Shepherd, 2016; Edwards, Zajchowski & Hill, 2021; Shepherd et al., 2021), or focuses on the implementation of a specific mobile application to enhance learning (Crawford, Holder & O'Connor, 2017; Palmárová & Lovászová, 2012). There are no studies that experimentally explore if and to what extent smartphones impact OR participant experiences. Conducting a quantitative study on this topic would be beneficial to the field of OR because its results would be more generalizable than that of qualitative case studies. In an attempt to begin filling this research gap, the purpose of this study was to determine if smartphone use on OR trips affected psychological, social, educational, and physical outcomes of participants.

The factors of interest were smartphone usage on OR trips and participant outcomes. Specifically, this study measured college-aged participant outcomes on one-night backpacking trips run through the University of Georgia's Outdoor Recreation Center, a non-academic OARP. Participant outcomes that were measured included the development of outdoor skills, desire to recreate outdoors in the future, resilience, life effectiveness, kindness to others, nature connectedness, group cohesion, place attachment, and emotional solidarity, which were categorized into four domains: psychological, social, educational, and physical. This study hypothesized that participants who used their smartphones less on backpacking trips would have more positive trip outcomes than participants who used their smartphones more on backpacking trips. In this study, the independent variable was smartphone usage on campus OR trips. The

dependent variables were various trip outcomes, which are underlined in the hypotheses outlined below. The unit of analysis was campus OR trip participants.

Four hypotheses were tested to determine the effects of smartphone usage on participants' psychological outcomes. Hypotheses 1-3 used items adapted from the Brief Resilience Scale (Smith et al., 2008), Life Effectiveness Questionnaire (Neill, 2008), and Nature Connectedness Index respectively to measure participants' perceptions both before and after their backpacking trips. All three of these instruments are included in the Outward Bound Outcomes Survey - an exit survey for participants of various divisions of Outward Bound (Outward Bound International, 2021). Outward Bound's status as one of the world's leading OAE programs makes their exit survey, which has been administered to countless college-aged participants, an effective tool for measuring resilience, life effectiveness, and nature connectedness. Hypothesis 4 used items adapted from Williams and Roggenbuck's (1989) widely utilized Place Attachment Scale.

H1: Students who use their smartphones less while on an overnight backpacking trip are more likely to perceive themselves as resilient than students who use their smartphones more while on an overnight backpacking trip.

H2: Students who use their smartphones less while on an overnight backpacking trip are more likely to develop positive life effectiveness outcomes than students who use their smartphones more while on an overnight backpacking trip.

H3: Students who use their smartphones less while on an overnight backpacking trip are more likely to value their connection to nature than students who use their smartphones more while on an overnight backpacking trip.

H4: Students who use their smartphones less while on an overnight backpacking trip are more likely to develop an attachment to the place where they backpacked than students who use their smartphones more while on an overnight backpacking trip.

Three hypotheses were tested to determine the effects of smartphone usage on participants' social outcomes. Hypothesis 5 used items adapted from the Kindness to Others Scale to measure participants' perceptions both before and after their backpacking trip. This instrument is also included in the Outward Bound Outcomes Survey (Outward Bound International, 2021), making it an effective measure of how participants perceive their interactions with their peers. Hypothesis 6 used items adapted from Salas et al.'s (2015) five dimensions of Team Cohesion. Hypothesis 7 used items adapted from Joo and Woosnam's (2020) Emotional Solidarity Scale.

H5: Students who use their smartphones less while on an overnight backpacking trip are more likely to demonstrate kindness to others than students who use their smartphones more while on an overnight backpacking trip.

H6: Students who use their smartphones less while on an overnight backpacking trip are more likely to form a cohesive group than students who use their smartphones more while on an overnight backpacking trip.

H7: Students who use their smartphones less while on an overnight backpacking trip are more likely to feel solidarity with other recreationists than students who use their smartphones more while on an overnight backpacking trip.

Hypothesis 8 was tested to determine the effects of smartphone usage on participants' educational outcomes by having participants report their perceived level of competency in the following skills before and after the backpacking trip: planning an outdoor trip, packing for an outdoor trip, filtering water, choosing an appropriate campsite, pitching a tent, building a fire, operating a camp stove, storing food safely outdoors, practicing Leave No Trace principles. Participants received instruction on these skills during their respective trips. Participants were also surveyed on the extent to which they felt confident going outdoors both before and after the trip to assess the overall educational impact of the trip.

H8: Students who use their smartphones less while on an overnight backpacking trip are more likely to be competent in outdoor skills than students who use their smartphones more while on an overnight backpacking trip.

Last, Hypothesis 9 was tested to determine the effects of smartphone usage on participants' physical outcomes by surveying participants on how frequently they participated in OR prior to the trip and how likely they were to participate in OR after the trip. Participants that are more likely to participate in OR regularly are more likely to experience its physical benefits.

H9: Students who use their smartphones less while on an overnight backpacking trip are more likely to go outdoors in the future than students who use their smartphones more while on an overnight backpacking trip.

CHAPTER 3

METHODOLOGY

To test these hypotheses, this study utilized a quantitative quasi-experimental design with a sample population of 68 college students divided into ten trip groups. The sample population consisted of (1) students enrolled in UGA's PEDB 1100: Introduction to Backpacking and (2) students registered for UGA Outdoor Recreation's open enrollment backpacking trips, which included Pinhoti Trail Backpacking, Standing Indian Advanced Backpacking, Panthertown Backpacking, and Providence Canyon Backpacking. Trip groups 1-6 came from PEDB 1100, while trip groups 7-10 came from the Pinhoti, Standing Indian, Panthertown, and Providence Canyon trips, respectively. Trip groups 1-6 learned foundational backpacking skills in the classroom throughout the semester, then participated in separate overnight backpacking trips led by trip leaders from UGA's Outdoor Recreation Center. Trip groups 7-10 did not receive classroom instruction prior to the trip, as they were not enrolled in PEDB 1100.

Trip Groups 1, 3, 5, 6, and 7 served as the treatment group and were encouraged by their trip leaders to leave their smartphones on campus or in the departmental vehicle prior to beginning the trip. Participants in the treatment group who chose to keep their smartphones during the trip were given instructions on appropriate and inappropriate smartphone usage while in the backcountry. They were also provided with digital cameras to keep a record of the trip since they were encouraged to leave their phones behind. Trip Groups 2, 4, 8, 9, and 10 served as the control group and received no guidance on smartphone usage from their trip leaders. All participants completed a pre-trip survey immediately prior to the trip and a post-trip survey

immediately following their trip. The surveys consisted of questions that were designed to measure each of the hypotheses.

A quasi-experimental design was appropriate for this study because of the nature of campus outdoor recreation (OR) trips. Participants voluntarily signed up for trips, which made random assignment of individuals to the control or treatment groups impossible. Adopting a comparison group pretest/posttest design was beneficial because it helped control potential variance between groups (Rassel et al., 2020). By comparing the change in mean score from pretest to posttest for each group, more sound conclusions could be drawn regarding the impact of the treatment than by simply comparing the posttest results of each group because there may have been initial differences between them (Rassel et al., 2020).

While the voluntary nature of trips made true random assignment impossible, some degree of random assignment was used. As mentioned earlier, trip groups 1-6 were drawn from the course PEDB 1100: Introduction to Backpacking. This course enrolled a total of 44 students between two class sections, with 23 and 21 students enrolled in the respective sections. The students in each class section were assigned to one of three trip groups by the course instructor based on student availability, thus creating a total of six trip groups between the two class sections. The trip groups in the two class sections were randomly assigned to either the control group or treatment group using a single coin flip. As a result, the three trip groups in one class section all received the treatment, while the three trip groups in the other class section did not. All groups in the same class received the same treatment (or lack thereof) to avoid design contamination due to the Hawthorne Effect (Rassel et al., 2020). This would happen if groups within the same class received different treatments and became aware that data collection was occurring. This could result in them modifying their behavior in response to being observed.

Trip groups 1-6 all received identical instruction prior to their backpacking trip, as both class sections were taught by the same instructor and featured guest lectures by the same individual. All trip groups completed the same backpacking trip: the 4.7 mile Springer Mountain Loop on the Appalachian Trail and Benton Mackaye Trail. Although each group backpacked on a different weekend between September and November, Trip groups 1&2, 3&4, and 5&6 were each scheduled to respectively occur within two weeks of each other so that seasonal weather conditions were approximately the same for each pair of trips. Each trip group participated in a pre-trip meeting on the Monday before the trip with their two trip leaders. The pre-trip meeting was the first time that trip participants interacted with their trip leaders. During this meeting, they received information about the itinerary, packing list, weather conditions, and food menu for the trip. Each trip group then convened at Ramsey Student Center at approximately 8 a.m. on the Saturday after their pre-trip meeting to depart for the Springer Mountain trailhead. Trip leaders drove each trip group together in a departmental vehicle owned by the university. Trip groups 1-6 all camped at the Springer Mountain shelter, located approximately 3 miles into the 4.7 mile loop. The route had cell phone service at the summit and sporadically along the trail. Each trip group returned to Ramsey Student Center at approximately 2 p.m. the next day.

Each trip group was led by two student trip leaders employed by UGA's Outdoor Recreation Center. The study's lead researcher intentionally selected trip leaders for each trip so that there was not a skill discrepancy between trip leaders for the control group and treatment group. Trip groups 1, 2, 3, 5, 6, 7, and 10 had one veteran trip leader who demonstrated consistent attendance at trip leader training events, led at least 2 prior backpacking trips for the department and received favorable participant feedback in exit surveys. The second trip leader for trip groups 1, 2, 3, 5, 6, and 10 was newly hired and while they had attended trip leader

training events, they did not have prior trip-leading experience for the department. Trip group 7 did not have a second trip leader due to last minute illness. Trip groups 4, 8, and 9 had two veteran trip leaders who demonstrated consistent attendance at trip leader training events, led at least 2 prior backpacking trips for the department and received favorable participant feedback in exit surveys. Trip leaders taught the following skills to participants on the trip: packing and planning, filtering water, selecting a campsite, pitching a tent, building a fire, operating camp stoves, hanging a bear bag, and Leave No Trace principles. The teaching of these skills was standardized, with all trip leaders receiving training on how to teach each skill. Trip leaders facilitated relationship building through pre-trip meetings, ice breakers, van rides to and from Springer Mountain, fireside chats, and stargazing. Unlike the standardized teaching skills, relationship-building opportunities were less structured and may have varied more from one trip leader to the next depending on their leadership style.

Due to liability and ethics concerns and the fact that participants were adults, cell phones were not forcibly confiscated from participants in the treatment group prior to their trips. Instead, participants receiving the treatment were encouraged to leave their smartphones at Ramsey Student Center and also in the departmental vehicle immediately before beginning the backpacking loop. They were also provided with digital cameras to alleviate any concerns about not being able to take pictures while on the trip. See Appendix A for the script trip leaders used to encourage participants to leave their smartphones behind. Trip leaders gave participants in the treatment group who chose to keep their phones guidance on appropriate vs. inappropriate smartphone use in the backcountry at four standardized times: before departing Ramsey Student Center, upon arrival at the Springer Mountain trailhead on Saturday morning, upon arrival at the Springer Mountain shelter on Saturday evening, and during breakfast on Sunday morning. Table

1 delineates between appropriate and inappropriate smartphone use in the backcountry. See Appendix B for the script used by trip leaders to explain appropriate and inappropriate smartphone use.

Table 1

Appropriate vs. Inappropriate Phone Usage

Appropriate or Inappropriate	Example
Appropriate	
	Emergency communications
	Taking pictures
	Exchanging contact information with group mates
	Checking weather forecast
	Journaling about experience
Inappropriate	
	Watching movies/shows
	Listening to music (except at bedtime with earbuds)
	Scrolling on social media
	Non-emergency communications
	Playing video games

To gauge the effectiveness of guidance on appropriate vs. inappropriate smartphone usage, trip leaders conducted manipulation checks at noon Saturday, 3 p.m. Saturday, 6 p.m. Saturday, 8 a.m. Sunday, and 10 a.m. Sunday. These checks required trip leaders to simply observe and record the number of participants using their phones during each check. After their respective trips, trip leaders rated overall smartphone usage on a scale of 1 to 10 as well as selecting which of the following terms best described overall smartphone usage: Never, Rarely, Occasionally, Frequently, All the time.

Trip participants completed two surveys throughout the course of the study. The first survey was administered on Saturday morning before departing Ramsey Student Center, immediately before participants received guidance on appropriate vs. inappropriate smartphone

use and were given the first opportunity to leave their smartphones behind. The second survey was administered as soon as participants returned to the departmental vehicle at the Springer Mountain trailhead on Sunday morning.

CHAPTER 4

RESULTS

Demographics

Demographically speaking, study participants were typically white, female, and in their fourth year or more of undergraduate studies. The vast majority of participants primarily identified as Caucasian/white, with 48 (70.6%) identifying as Caucasian/white, 12 (17.6%) identifying as Asian, 5 (7.4%) identifying as Hispanic, 1 (1.5%) identifying as African American/black, 1 (1.5%) identifying as American Indian, and 1 (1.5%) not identifying. The majority of participants identified as female, with 37 (54.4%) identifying as female, 29 (42.6%) identifying as male, 1 (1.5%) identifying as non-binary, and 1 (1.5%) not identifying. Participants tended to be in their fourth year or more of undergraduate studies, with 4 (5.9%) in their first year, 6 (8.8%) in their second year, 7 (10.3%) in their third year, 50 (73.5%) in their fourth year or more, and 1 (1.5%) not identifying.

Reliability and Validity

The reliability and validity of the measures included on the pre-trip and post-trip surveys were assessed using Cronbach's Alpha and an Exploratory Factor Analysis (EFA) using Principles Components Analysis with Varimax Rotation, which are widely accepted in the academic community as rigorous tests for internal consistency and validity amongst items designed to measure the same concept (Tavakol & Dennick, 2011). Cronbach's Alpha ensures that all items used to measure a particular construct, such as resilience or outdoor competency, had consistent responses. An alpha value greater than .7 indicates that participants responded

consistently to all items used to measure a given construct. As shown in Table 2, all constructs measured on the pre-trip survey had an alpha value greater than .7, indicating sufficient reliability. All constructs measured on the post-trip survey had an alpha value greater than .7, except for items measuring H9, which had an alpha value of .696. The item “I know I have the ability to do anything I want to do” was removed from the Life Effectiveness Questionnaire due to its low factor loading on the pre-trip survey. The item “I take responsibility for caring for the environment” was removed from the Nature Connectedness Index as well due to its low factor loading on the pre-trip survey. Furthermore, the item “To what extent do you feel comfortable operating a camp stove” was removed from the Outdoor Competencies instrument due to its low factor loading on the post-trip survey. Finally, the item “In the next month, how likely are you to engage in outdoor recreation” was removed from the Future Participation in OR instrument due to its low factor loading on the post-trip survey. Following these adjustments, the EFA revealed that only one dimension was present within each scale and that the items had good convergent validity with items loading above 0.50. The results of the adjusted post-trip survey EFA are presented in Table 3.

Table 2

Loadings and Cronbach's Alpha Values for Pre-Trip Survey Measures

Items	Loadings	Eigenvalue	Variance Explained	Cronbach's Alpha
H1: Brief Resilience Scale		**3.125**	**62.494%**	**.842**
I deal with stressful events fairly well.	.688			
It does not take me long to recover from stressful events.	.762			
When something bad happens, I snap back fairly easily.	.846			
I usually come through difficult times with little trouble.	.780			
I tend to bounce back quickly after hard times.	.864			
H2: Life Effectiveness Questionnaire		**3.034**	**75.843%**	**.860**
When I apply myself to something, I am confident I will succeed.	.637			
I am successful in social situations.	.932			
I communicate well with people.	.930			
I am competent in social situations.	.945			
H3: Nature Connectedness Index		**1.978**	**65.927%**	**.733**
I have a connection to nature.	.946			
Spending time in nature is very important to me.	.874			
I always treat nature with respect.	.565			
H5: Kindness to Others Scale		**2.346**	**78.202%**	**.831**
Being sensitive to others' needs and helping others contribute to my well-being.	.887			
When others are suffering, I put my needs second.	.828			
I am able to help others when they need it, without being interested in anything in return.	.935			
H8: Outdoor Competencies		**5.561**	**69.516%**	**.934**
Planning an outdoor trip.	.776			
Packing for an outdoor trip.	.832			
Filtering water.	.872			
Choosing an appropriate campsite.	.923			
Pitching a tent.	.769			
Building a fire.	.871			
Storing food safely outdoors.	.855			
Practicing Leave No Trace principles.	.757			

Table 3

Loadings and Cronbach's Alpha Values for Post-Trip Survey Measures

Items	Loadings	Eigenvalue	Variance Explained	Cronbach's Alpha
H1: Brief Resilience Scale		**4.041**	**80.811%**	**.939**
I deal with stressful events fairly well.	.859			
It does not take me long to recover from stressful events.	.883			
When something bad happens, I snap back fairly easily.	.934			
I usually come through difficult times with little trouble.	.887			
I tend to bounce back quickly after hard times.	.930			
H2: Life Effectiveness Questionnaire		**3.102**	**77.542%**	**.903**
When I apply myself to something, I am confident I will succeed.	.610			
I am successful in social situations.	.955			
I communicate well with people.	.951			
I am competent in social situations.	.955			
H3: Nature Connectedness Index		**2.261**	**75.361%**	**.835**
I have a connection to nature.	.912			
Spending time in nature is very important to me.	.925			
I always treat nature with respect.	.756			
H4: Place Attachment		**2.788**	**92.943%**	**.960**
I am very attached to *(insert trip location)*.	.967			
(insert trip location) is very special to me.	.964			
I identify strongly with *(insert trip location)*.	.961			
H5: Kindness to Others Scale		**2.125**	**70.839%**	**.769**
Being sensitive to others' needs and helping others contribute to my well-being.	.911			
When others are suffering, I put my needs second.	.821			
I am able to help others when they need it, without being interested in anything in return.	.788			
H6: Group Cohesion		**4.185**	**83.698%**	**.947**
My group was committed to the goals of the trip.	.840			
I feel closer to my group mates based on our interactions on the trip.	.925			
I feel a sense of belonging with my group mates.	.937			
I am proud to be a part of my trip group.	.953			
I felt loyal to my group even when we faced adversity on the trip.	.915			
H7: Emotional Solidarity		**4.943**	**82.385%**	**.956**
I feel close to some of the people I have met at *(insert trip location)*.	.840			
I have made friends with some people at *(insert trip location)*.	.878			
I identify with other visitors at *(insert trip location)*.	.958			
I have a lot in common with *(insert trip location)* visitors.	.935			
I feel affection towards visitors of *(insert trip location)*.	.932			
I understand visitors of *(insert trip location)*.	.898			
H8: Outdoor Competencies		**4.989**	**62.364%**	**.894**
Planning an outdoor trip.	.738			
Packing for an outdoor trip.	.774			
Filtering water.	.825			
Choosing an appropriate campsite.	.887			
Pitching a tent.	.757			
Building a fire.	.606			

Storing food safely outdoors.	.860			
Practicing Leave No Trace principles.	.836			
H9: Future participation in OR		**1.868**	**62.251%**	**.696**
I am more likely to go outside because of this trip.	.578			
In the next month, I am likely to purchase and/or rent gear used for OR activities.	.864			
In the next month, I am likely to join a club or organization related to OR.	.887			

Pre-Trip Survey Results

In addition to collecting demographic information, pre-trip surveys were administered to determine if the characteristics of participants were roughly equivalent prior to the trip. This ensured that any post-trip differences in participant outcomes could be attributed to the treatment. Instruments for measuring H1, H2, H3, H5, and H8 were included in the pre-trip survey. The H4 (Place Attachment) instrument was not included because participants had not yet visited their backpacking destination and could therefore not develop an attachment beforehand. The H6 (Group Cohesion) and H7 (Emotional Solidarity) instruments were not included because participants had not yet had an opportunity to work as a group. The H9 (Future participation in OR) instrument was also omitted because it assessed how likely participants were to engage in OR following their trip experience. The results of the pre-trip survey are presented in Table 4.

The treatment and control groups had statistically insignificant differences in mean scores for instruments measuring H1, H2, H5, and H8, meaning they were statistically similar at the level $\alpha = .05$ prior to the trip. The mean score of the treatment group on the Brief Resilience Scale (M = 7.87, SD = 1.368) was statistically similar to the mean score of the control group (M = 7.37, SD = 1.064) with p = .66. The mean score of the treatment group on the Life Effectiveness Questionnaire (M = 8.06, SD = 1.464) was statistically similar to the mean score of the control group (M = 8.17, SD = 1.065) with p = .73. The mean score of the treatment group on the Kindness to Others Scale (M = 8.63, SD = 1.505) was statistically similar to the mean score

of the control group (M = 8.48, SD = 0.811) with p = .63. The mean score of the treatment group on the Outdoor Competencies Scale (M = 6.64, SD = 2.160) was statistically similar to the mean score of the control group (M = 6.97, SD = 1.966) with p = .52. The treatment and control group did, however, have a statistically significant difference in mean scores for the instrument measuring H3, meaning they were not statistically similar at the level $\alpha = .05$ prior to the trip. The mean score of the treatment group on the Nature Connectedness Index (M = 8.91, SD = 1.023) was statistically different from the mean score of the control group (M = 8.35, SD = 1.078) with p = .03. The statistically significant difference in nature connectedness prior to the trip must be considered when interpreting the results of post-trip survey for H3.

Table 4

Pre-Trip Survey Descriptive Statistics and Independent Samples T-Test Results

	Treatment			Control					
	M	SD	n	M	SD	n	MD	t	p
H1: Brief Resilience Scale[1]	**7.87**	**1.368**	**37**	**7.37**	**1.064**	**31**	**0.5**	**0.44**	**.66**
I deal with stressful events fairly well.	7.57	1.994	37	7.58	1.285	31	-0.01	-0.03	.98
It does not take me long to recover from stressful events.	7.95	1.840	37	7.97	1.326	30	-0.02	-0.05	.96
When something bad happens, I snap back fairly easily.	8.08	1.498	37	7.81	1.558	31	0.27	0.74	.46
I usually come through difficult times with little trouble.	7.81	1.670	36	7.42	1.587	31	0.39	0.97	.34
I tend to bounce back quickly after hard times.	7.94	1.585	36	7.94	1.209	31	0.00	0.03	.98
H2: Life Effectiveness Questionnaire[2]	**8.06**	**1.464**	**37**	**8.17**	**1.065**	**31**	**-0.11**	**-0.34**	**.73**
When I apply myself to something, I am confident I will succeed.	8.46	1.346	37	8.42	1.259	31	0.04	0.13	.90
I am successful in social situations.	7.70	1.730	37	7.77	1.407	31	-0.07	-0.19	.85
I communicate well with people.	8.05	1.649	37	8.19	1.352	31	-0.14	-0.38	.71
I am competent in social situations.	8.03	1.748	36	8.29	1.346	31	-0.26	-0.68	.50
H3: Nature Connectedness Index[3]	**8.91**	**1.023**	**37**	**8.35**	**1.078**	**31**	**0.56**	**2.17**	**.03***
I have a connection to nature.	8.76	1.211	37	8.19	1.515	31	0.57	1.70	.09
Spending time in nature is very important to me.	8.73	1.347	37	8.23	1.543	31	0.5	1.44	.16
I always treat nature with respect.	9.24	0.983	37	8.65	1.279	31	0.59	2.18	.03*
H5: Kindness to Others Scale[4]	**8.63**	**1.505**	**37**	**8.48**	**0.811**	**31**	**0.15**	**0.49**	**.63**
Being sensitive to others' needs and helping others contribute to my well-being.	9.08	1.320	37	8.90	0.870	31	0.18	0.64	.52
When others are suffering, I put my needs second.	7.97	2.075	37	7.74	1.365	31	0.23	0.53	.60
I am able to help others when they need it, without being interested in anything in return.	8.84	1.537	37	8.81	0.910	31	0.03	0.10	.92
H8: Outdoor Competencies[5]	**6.63**	**2.160**	**36**	**6.97**	**1.966**	**31**	**-0.34**	**-0.65**	**.52**
Planning an outdoor trip.	7.00	2.242	36	6.61	2.201	31	0.39	0.71	.48
Packing for an outdoor trip.	7.42	2.156	36	7.61	1.995	31	-0.19	-0.38	.70
Filtering water.	5.75	2.892	36	5.77	3.030	31	-0.02	-0.03	.97
Choosing an appropriate campsite.	6.42	2.612	36	6.97	2.664	31	-0.55	-0.85	.40
Pitching a tent.	7.14	2.910	36	7.65	2.214	31	-0.51	-0.79	.43
Building a fire.	5.64	3.053	36	6.29	2.559	31	-0.65	-0.94	.35
Storing food safely outdoors.	5.72	2.835	36	6.58	2.592	31	-0.86	-1.29	.20
Practicing Leave No Trace principles.	8.00	1.867	36	8.26	1.390	31	-0.26	-0.63	.53

[1]Measured on 1 to 10 Likert Scale using Brief Resilience Scale (Smith et al., 2008).
[2]Measured on 1 to 10 Likert Scale using Life Effectiveness Questionnaire (Neill, 2008).
[3]Measured on 1 to 10 Likert Scale using Nature Connectedness Index (Outward Bound International, 2021).
[4]Measured on 1 to 10 Likert Scale using Kindness to Others Scale (Outward Bound International, 2021).
[5]Measured on 1 to 10 Likert Scale using UGA Outdoor Recreation Competency Curriculum

Manipulation Check

Also included in the pre-trip survey were questions asking participants to estimate their daily smartphone and social media usage. As with other instruments on the pre-trip survey, these

questions were asked to ensure that the treatment and control groups had roughly equivalent smartphone and social media usage habits prior to the trip so that any post-trip differences in participant outcomes can be attributed to the treatment. The treatment and control groups had statistically insignificant differences in mean scores for smartphone and social media usage on the pre-trip survey, meaning they were statistically similar at the level $\alpha = .05$ prior to the trip. The mean score of the treatment group for smartphone usage on the pre-trip survey (M = 3.86, SD = 1.313) was statistically similar to the mean score of the control group (M = 3.65, SD = 1.404) with p = .52. The mean score of the treatment group for social media usage on the pre-trip survey (M = 2.53, SD = 1.320) was statistically similar to the mean score of the control group (M = 2.19, SD = 1.223) with p = .29.

Following the trip, participants were asked to estimate their daily smartphone and social media usage while on the trip. The treatment and control groups reported statistically significant differences in mean scores for smartphone and social media usage during the trip, which confirms that the steps taken to limit smartphone usage within the treatment group were effective and that the independent variable was successfully applied. These results are reported in Table 5. The mean score of the treatment group for smartphone usage during the trip (M = 0.56, SD = 0.695) was significantly lower than the mean score of the control group (M = 0.97, SD = 0.669) with p = .02. The mean score of the treatment group for social media usage during the trip (M = 0.25, SD = 0.500) was also significantly lower than the mean score of the control group (M = 0.58, SD = 0.564) with p = .01. In plain terms, the treatment group used their smartphones a little less than half as much as the control group. One of the reasons for this significant difference in smartphone usage is that 14 of the 37 participants in the treatment group (38%) opted to leave their phone behind for the trip, compared to 0 of the 31 participants in the control group (0%).

Table 5

Participant Smartphone and Social Media Usage Before and During Trip

	Treatment			Control					
	M[1]	SD	n	M[1]	SD	n	MD	t	p
Pre trip survey									
How much time do you spend on your smartphone on an average day?	3.86	1.313	36	3.65	1.404	31	0.21	0.65	.52
How much time do you spend using social media on an average day?	2.53	1.320	36	2.19	1.223	31	0.34	1.07	.29
Post trip survey									
How much time did you spend on your smartphone per day on the trip?	0.56	0.695	36	0.97	0.669	30	-0.41	-2.44	.02*
How much time did you spend on social media per day on the trip?	0.25	0.500	36	0.58	0.564	31	-0.33	-2.54	.01*

[1]Measured on 0 to 6 Likert Scale (0 = No time, 1 = less than one hour, 2 = between one and two hours, 3 = between two and three hours, 4 = between three and four hours, 5 = between four and five hours, 6 = five hours or more).

As mentioned previously, trip leaders also conducted manipulation checks during trips as a secondary measure in case participants' self-reported survey data did not demonstrate a clear difference in smartphone and social media usage between treatment and control groups. This data, presented in Table 6, only showed a small mean difference in smartphone usage (MD = -0.60, p = .35). Nevertheless, the manipulation check built into the pre-trip survey and the significant percentage of treatment group participants who left their phones behind for the trip provide enough evidence that the treatment group did use their smartphones less than the control group.

Table 6

Trip Leader Reports on Participant Smartphone Usage During Trip

	Treatment			Control					
	M	SD	n	M	SD	n	MD	t	p
How often did participants use their smartphones on the trip?	2.40	1.140	5	3.00	0.707	5	-0.60	-1.00	.35
Which of the following phrases indicates how often participants used their smartphones on the trip?[2]	1.40	0.548	5	1.40	0.548	5	0.00	0.00	1.00

[1]Measured on 1 to 10 Likert Scale (1 = Never, 10 = All the time).
[2]Measured on 1 to 5 Likert Scale (1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Frequently, 5 = All the time).

Confounding Variable Check

One instrument on the post-trip survey asked participants to rate the overall performance of their trip leaders across a variety of categories. The purpose of this measure was to test for consistency of trip leader performance across both the treatment and control groups. A statistically insignificant difference in means within this measure would indicate that trip leader performance did not influence the results of the post-trip survey. As shown in Table 7, all items within this measure had a non-significant difference in means, with the average difference of means for the treatment group (M = 9.69, SD = 0.557) being statistically similar to the average difference of means for the control group (M = 9.63, SD = 0.524), p = .65.

Table 7

Trip Leader Performance Descriptive Statistics and Independent Samples T Test Results

	Treatment			Control					
	M[1]	SD	n	M[1]	SD	n	MD	t	p
Trip Leader Performance	**9.69**	**0.557**	**36**	**9.63**	**0.524**	**31**	**0.06**	**0.46**	**.65**
My trip leaders demonstrated confidence in the activities we were doing.	9.50	0.941	36	9.58	0.564	31	-0.08	-0.42	.68
My trip leaders demonstrated concern for my physical well-being.	9.69	0.749	36	9.58	0.620	31	0.11	0.67	.51
My trip leaders demonstrated concern for my emotional well-being.	9.67	0.793	36	9.65	0.661	31	0.02	0.12	.91
My trip leaders communicated with me and my group in a timely manner.	9.69	0.786	36	9.77	0.497	31	-0.08	-0.49	.63
My trip leaders communicated with me and my group in a respectful manner.	9.86	0.424	36	9.81	0.477	31	0.05	0.50	.62
My trip leaders prepared me with the equipment I needed to be successful.	9.61	0.728	36	9.68	0.599	31	-0.07	-0.40	.69
My trip leaders prepared me with the information I needed to be successful.	9.78	0.637	36	9.61	0.667	31	0.17	1.03	.31
My trip leaders facilitated opportunities for group bonding.	9.75	0.692	36	9.42	1.025	31	0.33	1.57	.12

[1]Measured on 1 to 10 Likert Scale (1 = Strongly disagree, 10 = Strongly agree).

Assessment of Hypotheses

An analysis of post-trip surveys reveals that the treatment and control groups had statistically insignificant differences in mean scores for instruments measuring all hypotheses at

the level $\alpha = .05$ (see Table 8). Therefore, this study did not find any relationship between smartphone usage and psychological, social, educational, or physical outcomes of participants. The mean score of the treatment group on the Brief Resilience Scale (M = 8.04, SD = 1.578) was statistically similar to the mean score of the control group (M = 8.29, SD = 1.038) with p = .47. This result fails to support H1. The mean score of the treatment group on the Life Effectiveness Questionnaire (M = 8.40, SD = 1.355) was statistically similar to the mean score of the control group (M = 8.45, SD = 1.049) with p = .88. This result fails to support H2. The mean score of the treatment group on the Nature Connectedness Index (M = 8.96, SD = 1.034) was statistically similar to the mean score of the control group (M = 8.93, SD = 0.756) with p = .91. This result fails to support H3. The mean score of the treatment group on the Place Attachment Scale (M = 7.35, SD = 2.105) was statistically similar to the mean score of the control group (M = 6.84, SD = 2.122) with p = .34. This result fails to support H4. The mean score of the treatment group on the Kindness to Others Scale (M = 8.81, SD = 1.209) was statistically similar to the mean score of the control group (M = 8.72, SD = 0.504) with p = .73. This result fails to support H5. The mean score of the treatment group on the Five Dimensions of Team Cohesion (M = 9.07, SD = 1.084) was statistically similar to the mean score of the control group (M = 8.89, SD = 0.862) with p = .47. This result fails to support H6. The mean score of the treatment group on the Emotional Solidarity Scale (M = 7.73, SD = 1.928) was statistically similar to the mean score of the control group (M = 7.07, SD = 2.122) with p = .19. This result fails to support H7. The mean score of the treatment group on Outdoor Competencies (M = 8.79, SD = 1.200) was statistically similar to the mean score of the control group (M = 8.76, SD = 0.968) with p = .91. This result fails to support H8. The mean score of the treatment group on Future Participation in OR (M = 7.23, SD = 1.903) was statistically similar to the mean score of the control group (M = 7.34, SD

= 1.845) with p = .81. This result fails to support H9. Although none of the hypotheses were supported, the item “I have made friends with some people at _____” did have a significant difference between treatment and control groups (M = 8.44, SD = 1.664 and M = 7.40, SD = 2.159, respectively) with p = .03.

Table 8

Post-Trip Survey Descriptive Statistics and Independent Samples T Test Results

	Treatment			Control					
	M	SD	n	M	SD	n	MD	t	p
H1: Brief Resilience Scale[1]	**8.04**	**1.578**	**36**	**8.29**	**1.038**	**30**	**-0.25**	**-0.72**	**.47**
I deal with stressful events fairly well.	8.06	1.133	36	8.53	1.252	30	-0.47	-1.17	.25
It does not take me long to recover from stressful events.	8.14	1.515	36	8.10	1.470	30	0.04	0.11	.92
When something bad happens, I snap back fairly easily.	8.03	1.699	36	8.43	1.251	30	-0.40	-1.09	.28
I usually come through difficult times with little trouble.	7.94	1.804	36	8.07	1.081	30	-0.13	-0.33	.75
I tend to bounce back quickly after hard times.	8.03	1.678	34	8.30	1.022	30	-0.27	-0.77	.45
H2: Life Effectiveness Questionnaire[2]	**8.40**	**1.355**	**36**	**8.45**	**1.049**	**30**	**-0.05**	**-0.16**	**.88**
When I apply myself to something, I am confident I will succeed.	8.75	0.996	36	8.87	1.008	30	-0.12	-0.47	.64
I am successful in social situations.	8.11	1.737	36	8.17	1.289	30	-0.06	-0.15	.89
I communicate well with people.	8.31	1.618	36	8.33	1.295	30	-0.02	-0.08	.94
I am competent in social situations.	8.44	1.539	36	8.43	1.382	30	0.01	0.03	.98
H3: Nature Connectedness Index[3]	**8.96**	**1.034**	**36**	**8.93**	**0.755**	**30**	**0.03**	**0.11**	**.91**
I take responsibility for caring for the environment.	9.14	0.990	36	9.23	0.626	30	-0.09	-0.45	.65
I have a connection to nature.	8.89	1.105	35	8.80	0.997	30	0.09	0.33	.75
Spending time in nature is very important to me.	8.83	1.224	35	8.77	1.165	30	0.06	0.21	.84
I always treat nature with respect.	9.17	1.134	36	9.23	0.626	30	-0.06	-0.29	.78
H4: Place Attachment	**7.35**	**2.105**	**36**	**6.84**	**2.122**	**30**	**0.51**	**0.97**	**.34**
I am very attached to *(insert trip location)*.	7.50	1.935	36	6.90	2.155	30	0.60	1.19	.24
(insert trip location) is very special to me.	7.33	2.230	36	6.90	2.090	30	0.43	0.81	.42
I identify strongly with *(insert trip location)*.	7.22	2.497	36	6.73	2.212	30	0.49	0.83	.41
H5: Kindness to Others Scale	**8.81**	**1.209**	**36**	**8.72**	**0.504**	**30**	**0.09**	**0.35**	**.73**
Being sensitive to others' needs and helping others contribute to my well-being.	9.00	1.219	36	8.90	0.759	30	0.10	0.39	.70
When others are suffering, I put my needs second.	8.33	1.789	36	8.30	0.877	30	0.03	0.09	.93
I am able to help others when they need it, without being interested in anything in return.	9.08	1.025	36	8.97	0.765	30	0.11	0.52	.61
H6: Group Cohesion	**9.07**	**1.084**	**36**	**8.89**	**0.862**	**30**	**0.18**	**0.73**	**.47**
My group was committed to the goals of the trip.	9.28	0.974	36	9.30	0.702	30	-0.02	-0.10	.92
I feel closer to my group mates based on our interactions on the trip.	9.14	0.990	36	8.90	1.029	30	0.24	0.96	.34
I feel a sense of belonging with my group mates.	8.83	1.363	36	8.50	1.225	30	0.33	1.04	.30
I am proud to be a part of my trip group.	8.94	1.393	36	8.77	1.006	30	0.17	0.58	.56
I felt loyal to my group even when we faced adversity on the trip.	9.17	1.028	36	9.00	0.910	30	0.17	0.69	.49
H7: Emotional Solidarity	**7.73**	**1.928**	**36**	**7.07**	**2.122**	**30**	**0.66**	**1.33**	**.19**
I feel close to some of the people I have met at *(insert trip location).*	8.34	1.748	35	7.63	1.829	30	0.71	1.60	.12
I have made friends with some people at *(insert trip location).*	8.44	1.664	36	7.40	2.159	30	1.04	2.22	.03*
I identify with other visitors at *(insert trip location).*	7.62	2.349	34	6.93	2.518	30	0.69	1.13	.27
I have a lot in common with *(insert trip location)* visitors.	7.23	2.591	35	6.53	2.501	30	0.70	1.10	.28
I feel affection towards visitors of *(insert trip location).*	7.14	2.557	35	6.70	2.366	30	0.44	0.72	.47

I understand visitors of *(insert trip location).*	7.83	2.176	35	7.23	2.223	30	0.60	1.09	.28
H8: Outdoor Competencies[8]	**8.79**	**1.200**	**36**	**8.76**	**0.968**	**31**	**0.03**	**0.11**	**.91**
Planning an outdoor trip.	8.36	1.659	36	8.45	1.261	31	-0.09	-0.25	.81
Packing for an outdoor trip.	8.92	1.228	36	9.06	1.181	31	-0.14	-0.50	.62
Filtering water.	8.72	1.830	36	8.71	1.657	31	0.01	0.03	.98
Choosing an appropriate campsite.	8.94	1.530	36	8.87	1.088	31	0.07	0.22	.82
Pitching a tent.	9.31	1.064	36	9.13	1.118	31	0.18	0.66	.51
Building a fire.	7.72	2.300	36	7.81	1.740	31	-0.09	-0.17	.87
Operating a camp stove.	8.03	2.131	36	8.29	1.677	31	-0.26	-0.55	.58
Storing food safely outdoors.	8.92	1.519	36	8.74	1.094	31	0.18	0.53	.60
Practicing Leave No Trace principles.	9.42	1.156	36	9.29	0.783	31	0.13	0.52	.61
H9: Future participation in OR[9]	**7.23**	**1.903**	**37**	**7.34**	**1.845**	**31**	**-0.11**	**-0.24**	**.81**
I am more likely to go outside because of this trip.	8.76	1.832	37	9.16	1.157	31	-0.40	-1.06	.29
In the next month, I am likely to purchase and/or rent gear used for OR activities.	6.78	2.620	36	6.97	2.858	31	-0.19	-0.28	.78
In the next month, I am likely to join a club or organization related to OR.	6.08	2.601	36	5.90	2.797	31	0.18	0.27	.79

[1]Measured on 1 to 10 Likert Scale using Brief Resilience Scale (Smith et al., 2008).
[2]Measured on 1 to 10 Likert Scale using Life Effectiveness Questionnaire (Neill, 2008).
[3]Measured on 1 to 10 Likert Scale using Nature Connectedness Index (Outward Bound International, 2021).
[4]Measured on 1 to 10 Likert Scale using Place Attachment Scale (Williams & Roggenbuck, 1989).
[5]Measured on 1 to 10 Likert Scale using Kindness to Others Scale (Outward Bound International, 2021).
[6]Measured on 1 to 10 Likert Scale using 5 Dimensions of Team Cohesion (Salas et al., 2015).
[7]Measured on 1 to 10 Likert Scale using Emotional Solidarity Scale (Joo & Woosnam, 2020).
[8]Measured on 1 to 10 Likert Scale using UGA Outdoor Recreation Competency Curriculum
[9]Measured on 1 to 10 Likert Scale

Overall Trip Impact

While this study found no significant differences between the treatment and control groups, paired t-test comparisons of hypotheses found on both the pre-trip and post-trip surveys revealed statistically significant gains for treatment group participants in perceived life effectiveness (H2), outdoor competence (H8), and overall confidence going outdoors. The paired t-tests also revealed statistically significant gains for control group participants in perceived resilience (H1), life effectiveness (H2), nature connectedness (H3), outdoor competence (H8), and overall confidence going outdoors. When treatment and control group data was combined, paired t-tests revealed statistically significant participant gains in perceived resilience (H1), life effectiveness (H2), nature connectedness (H3), outdoor competence (H8), and overall confidence going outdoors. These results are reported in Table 9.

Table 9

Paired T Test Results of Hypotheses Included on Pre-Trip and Post-Trip Surveys

	Pre-Trip Survey			Post-Trip Survey					
	M	SD	n	M	SD	n	MD	t	p
TREATMENT ONLY									
H1: Brief Resilience Scale[1]	7.88	1.387	36	8.04	1.578	36	-0.16	-1.09	.28
H2: Life Effectiveness Questionnaire[2]	8.12	1.442	36	8.40	1.355	36	-0.28	-2.75	.009*
H3: Nature Connectedness Index[3]	8.89	1.030	36	8.96	1.034	36	-0.07	-0.57	.57
H5: Kindness to Others Scale[4]	8.69	1.488	36	8.81	1.209	36	-0.12	-1.04	.31
H8: Outdoor Competencies[5]	6.64	2.192	35	8.81	1.210	35	-2.17	-6.48	<.001*
To what extent do you feel confident going outdoors?[6]	8.33	1.474	36	8.75	1.500	36	-0.42	-2.32	.03*
CONTROL ONLY									
H1: Brief Resilience Scale[1]	7.70	1.056	30	8.29	1.038	30	-0.59	-4.62	<.001*
H2: Life Effectiveness Questionnaire[2]	8.17	1.083	30	8.45	1.049	30	-0.28	-2.37	.03*
H3: Nature Connectedness Index[3]	8.33	1.090	30	8.93	0.755	30	-0.60	-4.57	<.001*
H5: Kindness to Others Scale[4]	8.51	0.811	30	8.72	0.504	30	-0.21	-1.45	.16
H8: Outdoor Competencies[5]	6.97	1.966	31	8.76	0.968	31	-1.79	-6.38	<.001*
To what extent do you feel confident going outdoors?[6]	8.19	1.447	31	9.00	1.000	31	-0.81	-4.17	<.001*
TREATMENT AND CONTROL									
H1: Brief Resilience Scale[1]	7.79	1.241	66	8.15	1.355	66	-0.36	-3.46	<.001*
H2: Life Effectiveness Questionnaire[2]	8.14	1.282	66	8.42	1.217	66	-0.28	-3.65	<.001*
H3: Nature Connectedness Index[3]	8.64	1.086	66	8.95	0.911	66	-0.31	-3.28	.002*
H5: Kindness to Others Scale[4]	8.61	1.222	66	8.77	0.950	66	-0.16	-1.78	.08
H8: Outdoor Competencies[5]	6.79	2.079	66	8.79	1.094	66	-2.00	-9.02	<.001*
To what extent do you feel confident going outdoors?[6]	8.27	1.452	67	8.87	1.290	67	-0.60	-4.49	<.001*

[1]Measured on 1 to 10 Likert Scale using Brief Resilience Scale (Smith et al., 2008).
[2]Measured on 1 to 10 Likert Scale using Life Effectiveness Questionnaire (Neill, 2008).
[3]Measured on 1 to 10 Likert Scale using Nature Connectedness Index (Outward Bound International, 2021).
[4]Measured on 1 to 10 Likert Scale using Kindness to Others Scale (Outward Bound International, 2021).
[5]Measured on 1 to 10 Likert Scale using UGA Outdoor Recreation Competency Curriculum.
[6]Measured on 1 to 10 Likert Scale (1 = Not confident at all, 10 = Very confident).

CHAPTER 5

DISCUSSION

There is a dearth of quantitative research regarding the impact of smartphone use on the psychological, social, educational, and physical benefits associated with OR. Existing research on the impacts of mobile technology on OR either focus on the perspectives of instructors (Bolliger et al., 2021; Shepherd et al., 2021), utilize qualitative methods (Bolliger & Shepherd, 2016; Edwards, Zajchowski & Hill, 2021; Shepherd et al., 2021), or focus on the implementation of a specific mobile application to enhance learning (Crawford, Holder & O'Connor, 2017; Palmárová & Lovászová, 2012). There are no studies that quantitatively explore if and to what extent smartphones affect OR participant outcomes. In an attempt to begin filling this research gap, the purpose of this study was to determine if smartphone use on OR trips affected psychological, social, educational, and physical outcomes of participants. Psychological outcomes measured in the study included resilience, life effectiveness, nature connectedness, and place attachment. Social outcomes measured included kindness to others, group cohesion, and emotional solidarity. Educational outcomes measured included a variety of outdoor competencies such as pitching a tent and building a fire. Physical outcomes were measured by assessing how likely participants were to go outdoors in the future to recreate.

An analysis of the collected data revealed no statistically significant relationship between smartphone usage and the measured OR outcomes. Across psychological, social, educational, and physical dimensions, participants in the treatment group who used their smartphones less frequently did not have significantly different outcomes than participants in the control group

who used their smartphones more frequently. As a result, all nine hypotheses were rejected. Although the collected data failed to demonstrate a significant relationship between smartphone usage and OR outcomes, the data did confirm a significant increase in both treatment and control group participants' perceived life effectiveness, outdoor competency, and confidence going outdoors following the trip. Control group participants also reported a significant increase in resilience and nature connectedness following the trip. These results provide credence to the multifaceted benefits of participating in outdoor recreation.

One potential explanation of this study's statistically insignificant findings is that, although participants in the treatment group tended to use their smartphones less than participants in the control group while backpacking, participants across both groups naturally used their smartphones significantly less on a trip of this nature than they normally would. The mean smartphone usage for both groups fell from between three to four hours per day prior to the trip to less than one hour per day during the trip. Thus, while the treatment group had significantly lower smartphone usage than the control group, both groups had dramatically decreased average daily smartphone usage, meaning that neither group likely experienced many distractions due to smartphone use. This conclusion is supported by the fact that trip leaders for both treatment and control groups reported fairly low smartphone usage amongst their participants. The trip's constant flow of events, which sees participants consistently engaged in either the physical act of backpacking, learning new skills, or interacting with their peers and leaders, seemed to leave little room for the detrimental effects of excessive smartphone use.

Another important factor that may explain the insignificant results of the study is the duration of the backpacking trips. From start to finish, trips tended to last no more than 30 hours total and involved only one night in the backcountry. According to meta-analyses by Hattie et al.

(1997) and Cason and Gillis (1994), the average effect size of outdoor programming tends to increase as the length of the program increases. Consequently, this study may have found more pronounced differences between the treatment and control groups had the backpacking trip lasted for multiple days. This is because there would have been more time for the compounding differences in smartphone usage to lead to significant differences in how participants perceived themselves, interacted with their peers, engaged with learning opportunities, and desired to engage in OR as a routine physical activity.

Implications

An important implication that this study carries for managers of OAE programs and both academic and non-academic OARPs is that a hardline policy on participant smartphone use may not be necessary on day trips or overnight trips. As OAE programs such as Outward Bound and NOLS continue to serve thousands of people a year and campus OARPs have become a fixture at hundreds of institutions across the country, having data-driven policies on smartphone use becomes an increasingly important issue. While this study cannot conclude whether or not the presence of smartphones negatively impacts longer-duration trips, it does provide evidence that smartphones do not significantly impact participant outcomes on trips lasting only one night. This implication is useful for managers because smartphone confiscation could potentially cause friction between participants and leaders, as well as trigger withdrawal-related anxiety for individuals with symptoms of PSU. Particularly for managers that work with participants with little to no prior OR experience, allowing participants to use smartphones while on trips may remove a key participation constraint for these low-experience participants. On the other hand, no evidence was found that decreasing access to smartphones had a negative impact on participant outcomes, so programmers can develop policies limiting smartphone use without

significant fear of such a policy having negative consequences. At least for shorter duration trips, other factors seem to be more important in driving participant outcomes than the presence of smartphones, which gives programmers more flexibility when designing and running OR trips.

One theoretical ramification of this study is that participants in the control group did not experience a significant loss of presence as conceptualized by Harmon & Duffy (2022) compared to the treatment group. Although the control group did not receive guidance or recommendations on limiting their smartphone use, the survey data indicates that control group participants engaged in the experience similarly to treatment group participants and did not become alienated from themselves, their peers, or the experience. However, as the first quantitative study attempting to understand the impact of smartphones on OR participant outcomes, this study should be seen as setting the stage for broader research and debate on how smartphones might affect presence and lead to alienation, rather than providing a conclusive answer.

Limitations and Areas for Future Research

The primary limitation of this study is its sample size (N = 68), which is a result of the limited number of trips offered by the University of Georgia's Outdoor Recreation Center. Ideally, this study would have a total sample size greater than or equal to 100, as this sample size allows for greater resistance to outliers, increases the likelihood that groups are statistically similar prior to treatment, and increases the power of results. Although none of the hypotheses were supported, one item that measured H7 ("I have made friends with some people at *insert trip location*") did have a statistically significant difference, with the treatment group having a significantly higher mean than the control group. This result is accompanied by other practical score differences between the treatment and control group, particularly for items related to H4

and H7. Perhaps with a larger sample size, some of the insignificant differences between measures could become significant. Working with a larger sample size would also allow researchers to interpret demographic data to determine if factors such as gender, age, or race influenced the relationship between smartphone usage and participant outcomes. Although demographic information was collected in this study, the sample size proved too small for this data to be analyzed statistically.

Another limitation of this study is the inherent variability of outdoor trips. Despite steps being taken to control as many variables as possible in the study such as weather, trip leader experience, and route, full control was impossible in an outdoor setting due to the unpredictability of weather and personnel. For example, participants enrolled in PEDB 1100 were initially assigned to backpacking trips so that there were an equal number of participants in the treatment and control groups. However, these numbers changed as certain participants had to switch to different trips due to illness or scheduling issues. This resulted in unequal treatment ($n = 37$) and control ($n = 31$) group sizes. Additionally, some trip leaders had to switch trips or find substitutions due to illness or scheduling issues, leading to some variation in the experience level of trip leaders from one trip to the next. While a manipulation check found no significant differences in trip leader performance between the treatment and control groups, this variation is important to understand as future studies on the same subject will likely contend with a similar issue. One way to address this issue in future studies would be to add a qualitative component to the post-trip survey, which would allow participants to elaborate on their experiences with trip leaders. Providing written prompts or interviewing participants after the trip may provide more context for how trip leaders influenced participant experiences and if trip leader influence varied significantly from trip to trip.

This study was designed to explore an untapped area of research. As a result, there are abundant opportunities for future research stemming from this study. Conducting a similar study on trips that last multiple days would shed light on whether smartphone usage plays an increasingly significant role in shaping participant outcomes as the duration of the trip lengthens. An alternative to studying longer-duration trips is studying the longitudinal effects of smartphone use on OR participants. This study collected data from participants immediately before and after their trip. A future study could mirror this study but collect data again at a set interval (e.g. one month) after the trip to see if participants retained the psychological, social, educational, and physical benefits of OR. Perhaps participants in the treatment group would retain these benefits more than participants in the control group, even if the mean differences of the initial post-trip survey were not statistically significant. Additionally, future studies could have two treatment groups; one treatment group could be given the option of leaving their smartphones behind and receiving guidance on appropriate and inappropriate phone use, while the other treatment group is forced to leave their phones behind. Adding this second treatment group could reveal if unilaterally banning smartphones magnifies the benefits of OR compared to the other treatment group. Alternatively, banning smartphones could in fact diminish the benefits of OR because it removes agency from participants and could potentially induce withdrawal-related anxiety. Expanding the scope of the study to include other types of OR trips (e.g. rock climbing, canoeing, pack rafting) is also an important area of future research, as different types of trips may increase or decrease participant sensitivity to the impact of smartphones. One last area for future research involves measuring different constructs such as perceptions of safety, anxiety, loneliness, and boredom to see if smartphone usage (or lack thereof) impacts participants' OR experiences positively, negatively, or not at all. After all, though the instruments used in this

study did not reveal any statistically significant differences in participant outcomes, other constructs may be more sensitive to differences.

To conclude, smartphone usage on overnight backpacking trips was found to have an insignificant effect on participants' psychological, social, educational, and physical outcomes. Nevertheless, this study confirms the benefits of OR and sets the stage for further investigation of the relationship between smartphones and OR.

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APPENDICES

Appendix A - Trip Leader Script for Encouraging Participants to Leave Smartphones

- We are asking you to leave your phones behind because we want you to get the most out of this trip and have a great time!
- Smartphones have been shown to decrease social interactions, which could negatively impact your trip experience. Since this trip is only 24 hours, you will not be without your phones for long. This is a great opportunity to unplug and reset!
- In terms of safety, we (the trip leaders) will have our phones on us at all times. In the event of an emergency, we have your emergency contact info and medical history. We also have Wilderness First Aid training to administer care in the event of an emergency.
- We will also be providing each of you with a digital camera for the duration of the trip. That way, you'll be able to get plenty of pictures and videos even if you choose to leave your phone behind. At the end of the trip, we'll collect the cameras and make a shared photo album.

Appendix B - Trip Leader Script for Appropriate vs. Inappropriate Phone Usage

- If you've chosen to keep your phone, we strongly recommend you turn your phone off and keep it stowed in your backpack.
- If you choose to use your phone on the trip, we strongly recommend you only use it for appropriate reasons, including taking pictures, exchanging contact information with each other, checking the weather forecast and journaling about your trip experience.
- We strongly discourage you from using your phone for streaming shows and movies, listening to music (except at bedtime with earbuds), scrolling on social media, or playing games.

Appendix C - Pre-Trip Survey

UGA Outdoor Recreation Study

UNIVERSITY OF GEORGIA
Warnell School of Forestry & Natural Resources

Recreational Sports
Student Affairs
UNIVERSITY OF GEORGIA

You have been selected to participate in the following survey because of your participation in PEDB 1100. Your answers will help organizers understand the effectiveness of trips and inform programming decisions. Your responses are confidential, and your participation is voluntary.

1. **What are the last four digits of your 81#?** _____ *(This will be used to pair your pre-trip and post-trip surveys but will NOT be used for specific identification and will be deleted once the surveys are matched)*

2. **Which of the following indicates the correct dates of your trip?** *(Please mark only one)*

☐ 9/14-15 ☐ 9/28-29 ☐ 10/12-13 ☐ 10/19-20 ☐ 10/26-27 ☐ 10/31-11/3 ☐ 11/9-10 ☐ 11/23-24

3. **To what extent do you agree or disagree with the following statements? The scale ranges from 1 = "Strongly Disagree" to 10 = "Strongly Agree."** *(Please circle one number per statement)*

STATEMENT	Strongly Disagree ◄——► Strongly Agree									
I know I have the ability to do anything I want to do.	1	2	3	4	5	6	7	8	9	10
I deal with stressful events fairly well.	1	2	3	4	5	6	7	8	9	10
When I apply myself to something, I am confident I will succeed.	1	2	3	4	5	6	7	8	9	10
I take responsibility for caring for the environment.	1	2	3	4	5	6	7	8	9	10
Being sensitive to others' needs and helping others contribute to my well-being	1	2	3	4	5	6	7	8	9	10
It does not take me long to recover from stressful events.	1	2	3	4	5	6	7	8	9	10
I have a connection to nature.	1	2	3	4	5	6	7	8	9	10
When something bad happens, I snap back fairly easily.	1	2	3	4	5	6	7	8	9	10
Spending time in nature is very important to me.	1	2	3	4	5	6	7	8	9	10
I usually come through difficult times with little trouble.	1	2	3	4	5	6	7	8	9	10
When others are suffering, I put my needs second.	1	2	3	4	5	6	7	8	9	10
I am successful in social situations.	1	2	3	4	5	6	7	8	9	10
I communicate well with people.	1	2	3	4	5	6	7	8	9	10
I am competent in social situations.	1	2	3	4	5	6	7	8	9	10
I tend to bounce back quickly after hard times.	1	2	3	4	5	6	7	8	9	10
I am able to help others when they need it, without being interested in anything in return.	1	2	3	4	5	6	7	8	9	10
I always treat nature with respect.	1	2	3	4	5	6	7	8	9	10

4. **To what extent do you feel confident going outdoors?** *(Please circle one of the following numbers)*

Not Confident at All *Very Confident*

1 2 3 4 5 6 7 8 9 10

5. **About how often do you engage in outdoor recreation?** *(e.g. non-commute walking, hiking, biking, backpacking, outdoor climbing, outdoor running)*

☐ Never ☐ Once every few months ☐ Once a month ☐ Once a week ☐ Several times a week

6. **How important is it for you to go outdoors regularly?** *(Please circle one of the following numbers)*

Not Important at All *Very Important*

1 2 3 4 5 6 7 8 9 10

7. **To what extent do you feel comfortable performing the following outdoor activities? The scale ranges from 1 = "Very Uncomfortable" to 10 = "Very Comfortable."** *(Please circle one number per statement)*

ACTIVITY	Very Uncomfortable ⟷ Very Comfortable									
Planning an outdoor trip	1	2	3	4	5	6	7	8	9	10
Packing for an outdoor trip	1	2	3	4	5	6	7	8	9	10
Filtering water	1	2	3	4	5	6	7	8	9	10
Choosing an appropriate campsite	1	2	3	4	5	6	7	8	9	10
Pitching a tent	1	2	3	4	5	6	7	8	9	10
Building a fire	1	2	3	4	5	6	7	8	9	10
Operating a camp stove	1	2	3	4	5	6	7	8	9	10
Storing food safely outdoors	1	2	3	4	5	6	7	8	9	10
Practicing Leave No Trace principles	1	2	3	4	5	6	7	8	9	10

8. **Which racial/ethnicity group(s) do you identify with?** (*Please mark all that apply)*

☐ African American/Black ☐ Asian ☐ American Indian ☐ Caucasian/White ☐ Hispanic ☐ Other: _____

9. **What is your gender?**

☐ Female ☐ Male ☐ Other: _____

10. **What year of school are you in?**

☐ 1st year ☐ 2nd year ☐ 3rd year ☐ 4th year or more

11. **How much time do you spend on your smartphone on an average day?**

☐ No time ☐ <1 hour ☐ 1-2 hours ☐ 2-3 hours ☐ 3-4 hours ☐ 4-5 hours ☐ 5+ hours

12. **How much time do you spend using social media on an average day?**

☐ No time ☐ <1 hour ☐ 1-2 hours ☐ 2-3 hours ☐ 3-4 hours ☐ 4-5 hours ☐ 5+ hours

Thank you for completing the survey!

If you have any additional questions, please contact J.T. Schexnayder at the University of Georgia.

*jtschexnayder@uga.edu *706-542-5016* 330 River Rd. Athens, GA, 30602*

Appendix D - Post-Trip Survey

UGA Outdoor Recreation Study

UNIVERSITY OF GEORGIA
Warnell School of Forestry & Natural Resources

Recreational Sports
Student Affairs
UNIVERSITY OF GEORGIA

You have been selected to participate in the following survey because of your participation in PEDB 1100. Your answers will help organizers understand the effectiveness of trips and inform programming decisions. Your responses are confidential, and your participation is voluntary.

1. **What are the last four digits of your 81#?** _____ *(This will be used to pair your pre-trip and post-trip surveys but will NOT be used for specific identification and will be deleted once the surveys are matched)*

2. **How likely are you to participate in another UGA Outdoor Rec trip?** *(Circle one of the following numbers)*

Not likely at all *Very likely*

1 2 3 4 5 6 7 8 9 10

3. **To what extent do you agree or disagree with the following statements? The scale ranges from 1 = "Strongly Disagree" to 10 = "Strongly Agree."** *(Please circle one number per statement)*

STATEMENT	Strongly Disagree ← → Strongly Agree									
I enjoyed the trip and had fun.	1	2	3	4	5	6	7	8	9	10
Overall, I am satisfied with my trip experience.	1	2	3	4	5	6	7	8	9	10
I am more likely to go outside because of this trip.	1	2	3	4	5	6	7	8	9	10
I felt safe during the trip.	1	2	3	4	5	6	7	8	9	10
I developed meaningful relationships with my group mates on this trip.	1	2	3	4	5	6	7	8	9	10

4. **To what extent do you feel confident going outdoors?** *(Circle one of the following numbers)*

Not confident at all *Very confident*

1 2 3 4 5 6 7 8 9 10

5. **Was the equipment and transportation provided for the trip reliable?** *(Circle one of the following numbers)*

Not reliable at all *Very reliable*

1 2 3 4 5 6 7 8 9 10

6. **How would you rate your overall sleep quality on the trip?** *(Circle on of the following numbers)*

Terrible *Excellent*

1 2 3 4 5 6 7 8 9 10

7. **To what extent do you agree or disagree with the following statements? The scale ranges from 1 = "Strongly Disagree" to 10 = "Strongly Agree."** *(Please circle one number per statement)*

STATEMENT	Strongly Disagree ← → Strongly Agree									
I know I have the ability to do anything I want to do.	1	2	3	4	5	6	7	8	9	10
I deal with stressful events fairly well.	1	2	3	4	5	6	7	8	9	10
When I apply myself to something, I am confident I will succeed.	1	2	3	4	5	6	7	8	9	10
I take responsibility for caring for the environment.	1	2	3	4	5	6	7	8	9	10
Being sensitive to others' needs and helping others contribute to my well-being.	1	2	3	4	5	6	7	8	9	10
It does not take me long to recover from stressful events.	1	2	3	4	5	6	7	8	9	10
I have a connection to nature.	1	2	3	4	5	6	7	8	9	10
When something bad happens, I snap back fairly easily.	1	2	3	4	5	6	7	8	9	10
Spending time in nature is very important to me.	1	2	3	4	5	6	7	8	9	10
I usually come through difficult times with little trouble.	1	2	3	4	5	6	7	8	9	10
When others are suffering, I put my needs second.	1	2	3	4	5	6	7	8	9	10
I am successful in social situations.	1	2	3	4	5	6	7	8	9	10
I communicate well with people.	1	2	3	4	5	6	7	8	9	10
I am competent in social situations.	1	2	3	4	5	6	7	8	9	10
I tend to bounce back quickly after hard times.	1	2	3	4	5	6	7	8	9	10
I am able to help others when they need it, without being interested in anything in return.	1	2	3	4	5	6	7	8	9	10
I always treat nature with respect.	1	2	3	4	5	6	7	8	9	10
My group was committed to the goals of the trip.	1	2	3	4	5	6	7	8	9	10
I feel closer to my group mates based on our interactions on the trip.	1	2	3	4	5	6	7	8	9	10
I feel a sense of belonging with my group mates.	1	2	3	4	5	6	7	8	9	10
I am proud to be a part of my trip group.	1	2	3	4	5	6	7	8	9	10
I felt loyal to my group even when we faced adversity on the trip.	1	2	3	4	5	6	7	8	9	10
I am very attached to Springer Mountain.	1	2	3	4	5	6	7	8	9	10
Springer Mountain is very special to me.	1	2	3	4	5	6	7	8	9	10
I identify strongly with Springer Mountain.	1	2	3	4	5	6	7	8	9	10
I feel close to some of the people I have met at Springer Mountain.	1	2	3	4	5	6	7	8	9	10
I have made friends with some people at Springer Mountain.	1	2	3	4	5	6	7	8	9	10
I identify with other visitors at Springer Mountain.	1	2	3	4	5	6	7	8	9	10
I have a lot in common with Springer Mountain visitors.	1	2	3	4	5	6	7	8	9	10
I feel affection towards visitors of Springer Mountain.	1	2	3	4	5	6	7	8	9	10
I understand visitors of Springer Mountain.	1	2	3	4	5	6	7	8	9	10

8. **How much time did you spend on your smartphone per day on the trip?**

☐ No time ☐ <1 hour ☐ 1-2 hours ☐ 2-3 hours ☐ 3-4 hours ☐ 4-5 hours ☐ 5+ hours

9. **To what extent do you feel comfortable performing the following activities outdoors? The scale ranges from 1 = "Very Uncomfortable" to 10 = "Very Comfortable."** ***(Please circle one number per statement)***

ACTIVITY	Very Uncomfortable ← → Very Comfortable									
Planning a trip	1	2	3	4	5	6	7	8	9	10
Packing for a trip	1	2	3	4	5	6	7	8	9	10
Filtering water	1	2	3	4	5	6	7	8	9	10
Choosing an appropriate campsite	1	2	3	4	5	6	7	8	9	10
Pitching a tent	1	2	3	4	5	6	7	8	9	10
Building a fire	1	2	3	4	5	6	7	8	9	10
Operating a camp stove	1	2	3	4	5	6	7	8	9	10
Storing food safely	1	2	3	4	5	6	7	8	9	10
Practicing Leave No Trace principles	1	2	3	4	5	6	7	8	9	10

10. **To what extent do you agree or disagree with the following statements about your trip leaders? The scale ranges from 1 = "Strongly Disagree" to 10 = "Strongly Agree."** *(Please circle one number per statement)*

My trip leaders…	Strongly Disagree ← → Strongly Agree									
Demonstrated confidence in the activities we were doing	1	2	3	4	5	6	7	8	9	10
Demonstrated concern for my physical well-being	1	2	3	4	5	6	7	8	9	10
Demonstrated concern for my emotional well-being	1	2	3	4	5	6	7	8	9	10
Communicated with me and my group in a timely manner	1	2	3	4	5	6	7	8	9	10
Communicated with me and my group in a respectful manner	1	2	3	4	5	6	7	8	9	10
Prepared me with the equipment I needed to be successful	1	2	3	4	5	6	7	8	9	10
Prepared me with the information I needed to be successful	1	2	3	4	5	6	7	8	9	10
Facilitated opportunities for group bonding	1	2	3	4	5	6	7	8	9	10
Took time to teach me practical outdoor skills	1	2	3	4	5	6	7	8	9	10

11. **How likely are you to take the following actions sometime within the next month? The scale ranges from 1 = "Very Unlikely" to 10 = "Very Likely."** *(Please circle one number per statement)*

I plan to…	Very Unlikely ← → Very Likely									
Engage in outdoor recreation (e.g. non-commute walking, hiking, biking, backpacking, outdoor climbing, outdoor running, etc.)	1	2	3	4	5	6	7	8	9	10
Purchase and/or rent gear used for outdoor recreation activities	1	2	3	4	5	6	7	8	9	10
Join a club or organization related to outdoor recreation	1	2	3	4	5	6	7	8	9	10
Interact with my group mates outside of an academic setting	1	2	3	4	5	6	7	8	9	10

12. **How much time did you spend on social media per day on the trip?**

☐ No time ☐ <1 hour ☐ 1-2 hours ☐ 2-3 hours ☐ 3-4 hours ☐ 4-5 hours ☐ 5+ hours