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The Perfect Fit? Relationships Between Recreationist-Environment Fit, Benefit Attainment, and Place Attachment

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THE PERFECT FIT? RELATIONSHIPS BETWEEN RECREATIONIST-ENVIRONMENT FIT, BENEFIT ATTAINMENT, AND PLACE ATTACHMENT

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by
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ABSTRACT

Management efficacy in parks and protected areas can be assessed and improved with knowledge about park visitors' compatibility with the setting, their ability to attain desired visitation or recreational benefits, and the development of place-based connections. Additionally, the relationships between compatibility (i.e., recreationist-environment fit), the attainment of benefits, and place-based connections such as place attachment have been perennial interests to a suite of disciplines, including landscape architecture, urban and regional planning, environmental psychology, conservation social sciences, and human-dimensions of natural resource management. Therefore, this study employed a quantitative, cross-sectional survey research design to determine the degree that the attainment of specific benefits derived from protected area visitation mediates the relationship between recreationist-environment fit and place attachment. This study also explored the moderating effect of visitation frequency on the relationship between benefit attainment and place attachment. Data analysis was conducted in SPSS and R-lavaan software and included confirmatory factor, structural regression modeling, and a series of moderation and mediation models. The results reflect significant increases in place identity, place dependence, and place social bonding as recreationist-environment fit increases. However, the results did not display an indirect effect of mental and physical health benefit attainment on the relationship between recreationist-environment fit and place dependence nor did the results indicate a moderating effect of visitation frequency on the relationship between benefit attainment and place attachment.

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CHAPTER ONE

Introduction

By understanding visitors' relationship to parks and protected areas, managers can increase their ability to meet visitors' needs and optimize benefits, while protecting important physical, social, and cultural resources (Driver, 2008; Manning et al., 2022). As such, parks and protected areas often strive to create and manage compatible settings that actualize benefits. In other words, managers endeavor to maximize the fit between visitors[1] and their environment, referred to as 'recreationist-environment (R-E) fit', which is realized when an environment provides resources and opportunities that meet the demands of outdoor recreationists (Tsaur et al., 2012). Achievement of R-E fit can result in desirable outcomes such as high-quality park experiences, states of flow, overall satisfaction, destination loyalty and perhaps most important, visitors' ability to obtain desired benefits from park experiences (Driver, 2008; Tsaur et al., 2012)

Benefit attainment within parks and protected areas stems from the idea that experiences facilitated by park settings, programs, and infrastructure satisfies higher-order demands (Driver, 2008). For example, a visitor having a direct experience with nature may benefit by developing a greater appreciation for nature or increasing knowledge about nature during a visit. These higher-order demands reside at the top of Haas, Drive, and Brown's (1980) outdoor recreation demands hierarchy and establish goals for Outcomes-Focused Management (OFM). The OFM framework acknowledges the benefits offered by outdoor recreation and helps managers create and manage

[1] This thesis uses the terms "visitors" and "outdoor recreationists" synonymously.

environments that facilitate positive outcomes for visitors, which often leads to visitors developing strong place-based connections, commonly referred to as place attachment.

Predictors of place attachment pertinent to this study are benefit attainment, visitor frequency, and R-E fit. Researchers use the R-E fit scale (REFS) to assess the compatibility between recreationists and an environment through six domains reflecting characteristics of recreation settings (e.g., Tsaur et al., 2014). While benefits are associated with R-E fit, whether the attainment of outdoor recreation benefits can explain the relationship between R-E fit and place attachment has yet to be studied. Additionally, no study has employed these concepts in a comprehensive statistical model to understand moderating and mediating influences. Therefore, this study expands our collective understanding of the relationship between R-E fit and place attachment while providing park managers with information about how compatible environments can yield desirable outcomes for visitors. Identification of settings that inhibit or fail to facilitate the attainment of benefits can alert managers to recreation opportunities lacking within a protected area. A lack of compatibility can also indicate unfavorable or ineffective management decisions.

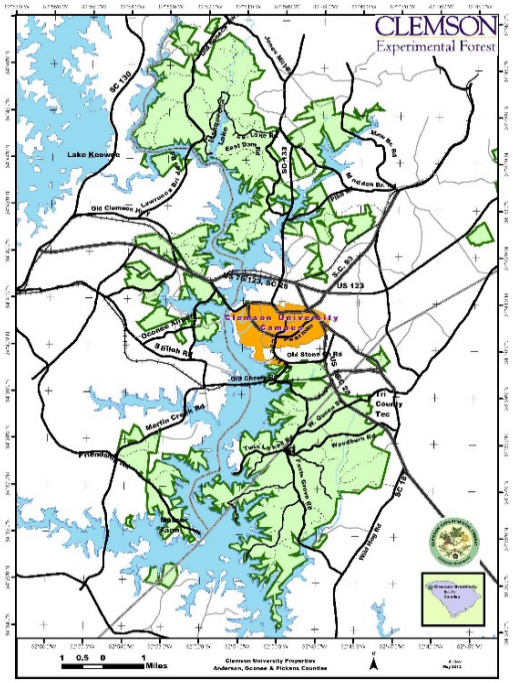
Study Area

Using the Clemson Experimental Forest (CEF), a university forest located in Clemson, South Carolina, as a backdrop for this study, I administered surveys to visitors to gather data so that I could test the association between R-E fit, benefit attainment, and place attachment. University forests, natural areas owned and/or operated by a university, possess multi-prong goals of research, education, recreation, and outreach (Coleman et

al., 2018; Straka, 2010). The CEF's mission is "to be a well-managed, self-sustaining, ecologically healthy, living laboratory, classroom and recreational resource for the benefit of the university, commerce and citizenry of South Carolina." (Baldwin et al., 2022, p. 22). At 17,000 acres, being one of the largest protected areas in the region, surrounding communities, Clemson University students, and other people in the 'Charlanta' corridor, utilize the CEF as a place to recreate (Baldwin et al., 2022). The CEF permits horseback riding, hiking, and biking, among other recreational activities, on its approximate 105 miles of trails. Additionally, university professors and staff take advantage of the forest through field-based demonstrations with their classes and research projects that range from archaeological investigations of African American use of the land to entomological research (Baldwin et al., 2022).

Figure 1

Map of the Clemson Experimental Forest (Clemson University, 2012)



Results and management implications derived from this thesis have the capacity to benefit the future management at the CEF and other protected areas. With no specific position dedicated to recreation management, the CEF Forest Manager balances the tasks of coordinating sustainable harvest operations, addressing recreation concerns, and removing storm debris from trails (Baldwin et al., 2022). In the report, *Faculty Senate Clemson Experimental Forest Report and Recommendations*, Baldwin et. al. (2022) recommends the creation of a recreation management position to oversee community engagement and recreation opportunities. Once realized, the findings of this thesis can be used to guide that individual in their management approach of the CEF's recreation setting.

Problem and Purpose

While studied independently from one another, limited research has investigated the relationships between recreationist-environment fit, benefit attainment, and place attachment as well as the influence of visitation frequency on these relationships. Enhanced knowledge of these relationships carries important implications for park and protected area managers within and beyond the CEF. First, recreationist-environment fit, benefit attainment, and place attachment have been shown to result in visitor satisfaction, improved well-being, and pro-environmental behaviors (Halpenny, 2010; Liang & Peng, 2019; Rice, Taff, et al., 2020). Second, understanding the effect of visitation frequency on the relationships between recreationist-environment fit, benefit attainment, and place attachment will further assist managers and leisure science researchers because like the other factors, increased visitation can lead to positive outcomes like willingness to pay

(Preko et al., 2020). Third, managers with knowledge of these aforementioned factors and their interactions can enhance a recreation setting with an Outcomes-Focused Management approach that helps formulate specific management objectives and encourages collaboration with stakeholders (Driver, 2008). In summary, a robust investigation into these relationships will enhance scientific knowledge, encourage further research, and provide managers with useful information to improve visitor experiences and positive outcomes. Interest in the possibility of enhancing recreation outcomes influenced the formulation of my research questions.

Research Questions

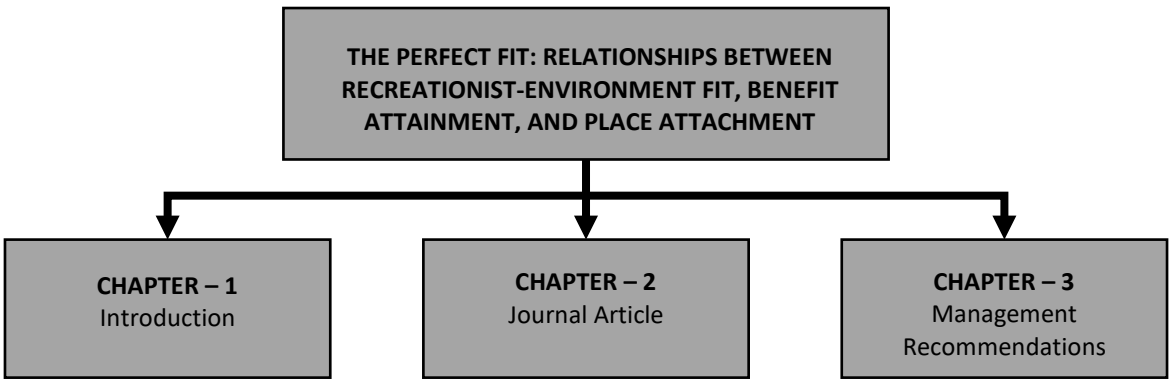
R1: How does the attainment of specific benefits mediate the relationship between recreationist-environment-fit and place attachment dimensions?

R2: What is the moderating effect of visitation frequency on the relationship between benefit attainment and place attachment?

Thesis Structure

Figure 2

Model of Thesis's Three Chapter Structure



CHAPTER TWO

Journal Article

Introduction

By understanding visitors' relationship to protected areas, managers can increase their ability to meet visitors' needs and optimize benefits, while protecting important physical, social, and cultural resources (Driver, 2008). As such, parks and protected areas often strive to create and manage compatible settings that actualize benefits. In other words, managers endeavor to maximize the fit between visitors[2] and their environment, referred to as 'recreationist-environment (R-E) fit', which is realized when an environment provides resources and opportunities that meet the demands of recreationists (Tsaur et al., 2012). Achievement of R-E fit can result in desirable outcomes such as high quality park experiences, states of flow, overall satisfaction, destination loyalty and perhaps most important, visitors' ability to obtain desired benefits from park experiences (Driver, 2008; Tsaur et al., 2012)

Benefit attainment within parks and protected areas stems from the idea that experiences facilitated by park settings, programs, and infrastructure satisfies higher-order demands (Driver, 2008). For example, a visitor having a direct experience with nature may benefit by developing a greater appreciation for nature or increasing knowledge about nature during a visit. These higher-order demands reside at the top of Haas, Drive, and Brown's (1980) outdoor recreation demands hierarchy and establish goals for Outcomes-Focused Management (OFM). The OFM framework acknowledges

[2] This thesis uses the terms "visitors" and "outdoor recreationists" synonymously.

the benefits offered by outdoor recreation and helps managers create and manage environments that facilitate positive outcomes for visitors, which often leads to visitors developing strong place-based connections, commonly referred to as place attachment.

Predictors of place attachment pertinent to this study are benefit attainment, visitor frequency, and R-E fit. Researchers use the R-E fit scale (REFS) to assess the compatibility between visitors and an environment through six domains reflecting characteristics of recreation settings. While benefits are associated with R-E fit, whether the attainment of outdoor recreation benefits can explain the relationship between R-E fit and place attachment has yet to be studied. Additionally, no study has employed these concepts in a comprehensive statistical model to understand moderating and mediating influences. Therefore, this study expands our collective understanding of the relationship between R-E fit and place attachment while providing park managers with information about how compatible environments can yield desirable outcomes for visitors. Identification of settings that inhibit or fail to facilitate the attainment of benefits can alert managers to recreation opportunities lacking within a protected area. A lack of compatibility can also indicate unfavorable or ineffective management decisions.

While studied independently from one another, limited research has investigated the holistic relationships between recreationist-environment fit, benefit attainment, and place attachment as well as the influence of visitation frequency on these relationships. Enhanced knowledge of these relationships carries important implications for park and protected area managers. First, recreationist-environment fit, benefit attainment, and place attachment have been shown to result in visitor satisfaction, improved well-being,

and pro-environmental behaviors (Halpenny, 2010; Liang & Peng, 2019; Rice, Taff, et al., 2020). Second, understanding the effect of visitation frequency on the relationships between recreationist-environment fit, benefit attainment, and place attachment will further assist managers and leisure science researchers because like the other factors, increased visitation can lead to positive outcomes, such as willingness to pay (Preko et al., 2020). Third, managers with knowledge of these aforementioned factors and their interactions can enhance a recreation setting with an OFM approach that helps formulate specific management objectives and encourages collaboration with stakeholders (Driver, 2008). In summary, a robust investigation into these relationships will enhance scientific knowledge, encourage further research, and provide managers with useful information to improve visitor experiences due to the positive outcomes associated with the four factors.

Literature Review

Research has shown that parks and protected areas provide visitors with space to attain various benefits, which are associated with visitors' motivations (Kil et al., 2021; Li et al., 2010; Meyer et al., 2019; Nowak et al., 2014). With support from the literature, I contend that R-E fit facilitates the successful attainment of these benefits, and benefit attainment explains the relationship between R-E fit and place attachment (Figure 1). However, absent in the literature are investigations that test benefit attainment as a mediator in the relationship between R-E fit and place attachment in protected areas, as well as visitation frequency as a moderator in the relationship between benefit attainment and place attachment. In the literature review, I expand on the relationships centered on

R-E fit, place attachment, and benefit attainment while providing an overview of the theoretical perspectives, conceptualizations, and previous research. Finally, I present two hypothesized models of the R-E fit, benefit attainment, and place attachment relationship that provide foundation for the methods and analysis.

Recreationist-Environment Fit

Recreationist environment (R-E) fit exists when a recreation setting meets the demands of recreationists. Tsuar et al. (2012) conceptualized R-E fit and developed the R-E Fit Scale (REFS) by adapting person-organization (P-O) fit theory (Kristof, 1996) within an outdoor recreation context. P-O fit describes the congruence between people and organizations and, thus, is predominantly situated within an organizational management context (Kristof-Brown et al., 2005).

Kristof (1996) provided two types of P-O fit – supplementary fit and complementary fit. Supplementary fit exists when an individual possesses similarities with other people in an environment (Muchinsky & Monahan, 1987) while complementary fit exists when an organization meets the needs of its employees and employees' abilities meet the organization's requirements. Supplementary and complimentary fit are also referred to as needs-supplies fit, and requirements-abilities fit, respectively.

The basis for situating fit within recreation settings relied on the underpinnings of Attention Restorative Theory (ART) (Kaplan & Kaplan, 1989) and Affordance Theory (Turvey, 1992). ART states that, over time, sustained attention depletes one's directed attention and that natural environments like parks help restore mental clarity (Kaplan &

Kaplan, 1989). Stress is a common experience that negatively affects one's well-being, therefore, attention restoration is in high demand (Baghurst & Kelley, 2014). Affordance Theory in a recreation context proposes that when people realize the benefits, opportunities, or resources provided by an environment, otherwise known as affordances, the desired user experiences are achieved (Pierskalla & Lee, 1998). Using these two theories, Tsuar et al. (2012) synthesized the compatibility element of ART with the realization of fit within an environment, as explained by Affordance Theory, to describe the congruence of recreation settings and recreationist demands as R-E fit.

The REFS identifies six dimensions of R-E fit that reflect the supplementary fit, needs-supplies fit, and requirements-abilities introduced in the P-O fit theory. These dimensions capture various aspects of recreational settings, including natural resources, interpersonal opportunities, environmental functions, activity knowledge/skills, facilities, and operation/management (Tsaur et al., 2012). The operation/management dimension assesses shared values between recreationists and park and protected area managers. Li et al. (2010) showed that recreationists' preferences for recreation services are affected by their held and assigned values. Natural resources, interpersonal opportunities, environmental functions, and facilities are attributes of recreation settings that provide recreationists with needs satisfaction. Needs-supplies fit is best depicted by push and pull motivation factors (Crandall, 1980; Kabanoff, 1982). The knowledge/skills dimension reflects the compatibility between a recreationist's knowledge and skills and a recreation setting's requirements to engage in an activity. A recreation setting's requirements to engage in an activity might call for specialized knowledge of a landscape, skills that

reflect competency, prior experience, and equipment that allows recreationists to safely and successfully participate in an activity (Bryan, 1977; Scott & Shafer, 2001).

Researchers have used R-E fit to study place attachment, recreationist delight, flow experience, and visitor satisfaction. Tsuar et al. (2014) discovered that certain domains of R-E fit preceded place attachment and visiting frequency, evidencing a logical yet important relationship – if the place setting is compatible for a recreationist, then that recreationist is likely to engage in repeat visits and be bonded with that place.

Also logically, Liang and Peng (2019) found that higher levels of R-E fit yield higher levels of delight among golfers. Wang et al. (2018) revealed that, among cyclists, R-E fit positively impacted flow experience and acted as a mediator in the relationship between recreation specialization and flow experience. In their study of tour member fit and tour member-leader fit on group package tours, Chang et al. (2020) demonstrated that R-E fit positively correlated with tour satisfaction. While the R-E fit literature indicates broad applicability, R-E fit's reach remains limited. Therefore, I utilized Tsuar et al.'s (2012) initial conceptualization of R-E fit and Tsuar et al.'s (2014) study of R-E fit and place attachment to inform the direction of this study to contribute to the growing body of R-E fit literature. Two aspects inherent in the achievement of R-E fit is the motivation for visiting and the attainment of benefits due to met expectations. This postulation appears further strengthened by the literature on motivations and benefits.

Motivation, Benefit Attainment, and Outcomes-Focused Management

Motivations are different psychological, physical, or social factors that influence human behavior (Iso-Ahola, 1999). The presence and influence of these factors informed

Lawler's (1973) expectancy-value model of motivation, which suggests that expectations of personal benefit fuel individual motivations. Crompton's (1979) description of push-pull motivation factors depicts psychological and social push motivators interacting with physical pull motivators. Push factors entail the individual motives that drive someone to participate in an activity, and pull factors include site attributes that entice people to a specific environment.

Theoretical frameworks surrounding motivation helped to increase our understanding of human behavior. Driver & Tocher (1979) used early motivation frameworks to contribute to the understanding of motivation in an outdoor recreation setting. The two authors suggested that the motivation to attain various social, physical, and psychological benefits powers outdoor recreation participation. Driver and his colleagues paired this conceptualization with the development of the Recreation Experience Preferences (REP) scale, a tool comprising 19 domains (e.g., autonomy, escape, and introspection) that capture the motivations of recreationists (Manfredo et al., 1996). For Driver and Tocher (1979), motivations are the expectation that participation in an activity will yield beneficial physical, psychological, or social outcomes (Manfredo & Driver, 2002). Attainment of these benefits is not guaranteed. However, the hope that one might receive benefits drives participation and visitation to parks worldwide (Zajchowski et al., 2020).

‘Benefits’ are important desired outcomes of outdoor recreation, influence individuals, groups, or society, and often divided into three categories. First, benefits can be an improved change in a condition (Driver, 2008), such as improved mental or

physical health from burning calories while hiking in nature (Wolf & Wohlfart, 2014). Second, benefits can also encapsulate instances when negative impacts are reduced or thwarted, and desired conditions are maintained (Driver, 2008). Protected areas, and their visitors, sometimes help prevent undesired conditions by mitigating the adverse effects of development (Coleman et al., 2020; Straka, 2010) Third, benefits include realizing a satisfying recreation experience (Driver, 2008). Visitor satisfaction reflects enjoyable experiences and can sometimes be linked to direct benefits (Crilley et al., 2012). When satisfaction is discernable, the 'Benefit Chain of Causality' posits that one benefit can lead to another, suggesting the realization of additional benefits will follow satisfying experiences (Driver & Bruns, 1999).

Whereas the REP scale identifies visitor motivations for participating in outdoor recreation, managers can use the OFM approach to evaluate motivators and benefits of recreation engagement present in their park or protected area (Kil, Holland, and Stein, 2015; Rice et al., 2020). Outcomes-Focused Management (OFM) helps consider and optimize the benefits provided by outdoor recreation and avoid or reduce adverse effects (Driver, 2008). OFM utilizes the multi-faceted outcomes of a particular setting to guide planners and managers in setting distinct management objectives. This management technique improves upon past techniques like activity-based management by accounting for all four recreation demands: activities, setting, experience/motivations, and benefits Haas et al., 1980; Manning, 2010; Marin et al., 2011). The OFM framework depicts outcomes as outputs that require inputs from recreationists, environments, and relevant stakeholders (Driver, 2008). Inputs include motivations held by people as they enter a

particular recreation setting and other physical, social, and administrative components. With OFM both monitoring the benefits of recreation and accounting for recreational settings, it supplements the conceptualization of R-E fit (Tsaur et al., 2012). A key difference between R-E fit and OFM is OFM's consideration of both positive and negative outcomes whereas R-E fit focuses on positive attributes that contribute to fit. However, R-E fit is further supported by OFM through its emphasis of stakeholder involvement in setting management objectives (Driver, 2008). This allows managers to create compatible recreation settings that provide benefits to visitors in diverse places.

Place Attachment

Place attachment is one manner of conceptualizing and measuring the bond individuals form with place following meaningful interactions with place. Due to its multidimensionality, place attachment and similar terms such as sense of place (SOP) have garnered various definitions attempting to describe their dimensions. Williams et al. (1992) laid out a two-dimensional conceptualization of place attachment, with place dependence representing the functional aspect and place identity representing the emotional aspect. In this concept, place dependence and identity measure place attachment. Place dependence is the functional attachment that forms when a recreational setting provides the necessary resources to meet visitors' goals and needs (Stokols & Shumaker, 1981). For example, an avid mountain biker may form an attachment to a local forest because it is the closest place where they can mountain bike. Place identity is one's self-image or identity rooted in physical environments (Proshansky, 1978). For example, people often incorporate their place of birth or hometown into their identity. I

included place dependence and place identity, as the first and second dimensions of place attachment in this study.

In their conceptualization, Jorgensen & Stedman (2001) used the term SOP and proposed that place attachment, dependence, and identity were the subdimensions. In this definition, place attachment, dependence, and identity represent the affective, behavioral or conative, and cognitive components of person-place bonds, respectively. Scannell & Gifford (2010) introduced a tripartite framework with dimensions consisting of who is attached (person), the three physiological components of attachment: affective, behavioral, and cognitive (process), and the qualities of a setting (place). Kyle et al. (2004), acknowledging the importance of social ties to place, built upon past place attachment concepts by incorporating social bonding as a third dimension. Place social bonding encompasses the meaningful relationships formed or maintained in specific environments (Kyle et al., 2005). A group of friends that meet weekly at a park to exercise experience place social bonding because the park provides the context for that group to maintain their friendship. This example highlights a critical antecedent of place attachment, visitation frequency. Due to nature's ability to facilitate community and improve social well-being (Driver, 1976; Hartig et al., 2011; Khotdee et al., 2012; Ritter & Dauksta, 2013), I included place social bonding as the third dimension of this place attachment model.

Place attachment has been studied extensively in various domains, including neighborhoods, tourist destinations, and, relevant to this study, parks and protected areas (Lewicka, 2011). Understanding place attachment helps managers assess visitor

satisfaction (Ramkissoon et al., 2014), perceptions of ecological impacts (Price et al., 2017), support for infrastructure (Brownlee et al., 2014), and willingness to participate in park volunteer projects (Halpenny, 2010; Ramkissoon et al., 2012). Research on the antecedents of place attachment can provide a direction for managing recreation settings and opportunities that meet visitor demands (Kil et al., 2012; Tsaur et al., 2014; van Riper et al., 2019). For example, Kil et al. (2012), in a study of visitors at Ocala National Forest, found benefit attainment to positively influence place attachment. Van Riper et al. (2019) found that worldviews positively influenced the attachment process. These studies indicated that increased knowledge of the causal conditions facilitating place attachment and the interaction with recreation settings may enhance the implications stemming from place attachment research.

Visitation Frequency

The number of times an individual visits a place is often referred to as visitation frequency, which can be a useful benchmark for park and protected area managers. Baur et. Al. (2014) found that increased visitation to urban parks resulted in increased public support for natural resource management decisions. While their study took place in a museum, Preko et. Al.'s (2020), finding of visitation frequency as a significant moderator between satisfaction and willingness to pay has major implications to park management; the topic of visitor's willingness to pay is regularly explored among park and protected area researchers and managers (Halkos et al., 2022; Henderson-Wilson et al., 2017). Lastly, relevant to this study, Hammitt et. Al. (2003) study of trout anglers found visitation to be a good predictor of place attachment. These studies influenced my use of

visitation frequency as a moderator between the relationship of benefit attainment and place attachment.

Place Attachment, Recreationist-Environment Fit, and Benefit Attainment

My conceptual model was influenced by examining the relationships between place attachment, recreationist-environment fit, and benefit attainment found in the literature. Studies investigating the relationship between place attachment and motivation (or benefits) tend to analyze motivation's influence on place attachment (e.g., Anderson & Fulton, 2008; Kyle et al., 2004; Warzecha & Lime, 2001). For example, Anderson & Fulton (2008) used the REP scale to examine motivation as a mediator between activity participation and place attachment. Sampling recreationists within Waterfowl Production Areas, they found that motivation partially mediated the relationship between wildlife-related activity participation, such as hunting and wildlife viewing, and place attachment. Budruk and Wilhelm Stanis (2013) used the REP scale to identify that place attachment's prediction of motivation was stronger than motivations' prediction of place attachment. Even though their findings brought attention to some discrepancies in the literature, Budruk and Stanis highlighted that their findings do not discredit models depicting motivations positively influencing place attachment. These findings are significant because my benefit attainment measurement derives from the motivations outlined in the REP scale.

Studies examining the relationship between R-E fit and place attachment remain limited. In their study of R-E fit as an antecedent to place attachment, Tsuar et al. (2014) surveyed hikers in Yangmingshan National Park in Taiwan measuring six dimensions of

R-E fit: natural resources, interpersonal opportunities, environmental functions, activity knowledge/skills, facilities, and operation/management. Their measurement of place attachment included hikers' place dependence, place identity, and social bonding and their hypothesized model included visitation frequency as predictors of the three place attachment dimensions. Their results showed that of the six R-E fit dimensions, all but one (facilities) predicted place dependence and place identity. Interpersonal opportunities and operation/management showed positive impacts on social bonding. Lastly, visiting frequency was a strong predictor of place attachment. This study indicates that the relationship between R-E fit and place attachment exists but could benefit from additional application and investigation, particularly additional explanatory constructs.

Studies of benefit attainment alongside R-E fit are lacking, but certain benefits exhibit potential and logical congruence with R-E fit dimensions, such as interpersonal opportunities (Tsaur et al., 2014). The lack of empirical knowledge surrounding R-E fit and its ability to yield benefits indicates a gap in the literature. OFM encourages managers to provide a recreational setting that allows visitors to receive desirable outcomes. Therefore, benefit attainment would likely occur when an environment fits with a person's desires. Using the Benefit Chain of Causality, it is reasonable to assume that R-E fit leads to attaining benefits, and then leads to place attachment.

Hypothesized Model

Given that R-E fit likely predicts place attachment, and no known studies analyze R-E fit, benefit attainment, and place attachment together, exploring the mediation of R-E

fit and place attachment over a moderation effect is warranted. Consequently, I present two hypothesized models based on the reviewed literature.

Since the study situates within an outdoor recreation context, I derived four benefit attainment domains from Driver (2008) to serve as mediators in my hypothesized mediation model (Figure 3). The four benefit domains (Physical Health, Nature Connection, Mental Health, and Socialization) reflect significant benefits of outdoor recreation found in the literature. First, park and protected areas give people space to exercise, thus, providing an array of physical health benefits to visitors (Twohig-Bennett & Jones, 2018). Second, parks and protected areas provide settings for nature-oriented people to enjoy nature and in some places, these spaces are utilized as outdoor classrooms, offering students hands on experiences with the environment (Burkhardt et al., 1988; Lin et al., 2014). Third, parks and protected areas also offer a respite from life's pressures, a vital opportunity for stressed individuals to improve their mental health (Baghurst & Kelley, 2014; Hartig et al., 2011). Finally, parks and protected areas act as conduits of relationship building and maintenance, two important social benefits (Wolf et al., 2015).

I hypothesized that increases in R-E fit would significantly and directly increase place identity, place dependence, and place social bonding with the largest effect on place dependence (H1). I hypothesized that the Mental Health and Physical Health benefit domain would mediate the relationship between R-E fit and place dependence (H2). Since parks and protected areas create spaces that allow visitors to foster community and strengthen relationships among friends, families, and neighbors, I hypothesized that the

Socialization benefit domain would mediate the relationship between R-E fit and Social Bonding (H3).

Additionally, I present a moderation model (Figure 4) with visitation frequency serving as the moderator. Because visitation frequency is a strong predictor of place attachment (Hammitt, 2003; Tsaur et al., 2014), I hypothesized that visitors with higher visitation frequency would exhibit a stronger benefit attainment-place attachment relationship (H4).

Research Questions and Hypotheses

R1: How does the attainment of specific benefits mediate the relationship between RE-Fit and place attachment dimensions?

H1: Increases in R-E fit will significantly increase place identity, place dependence, and place social bonding with the largest effect on place dependence.

H2: The attainment of mental health and physical health benefits will mediate the relationship between R-E fit and place dependence.

H3: The attainment of socialization benefits will mediate the relationship between R-E fit and place social bonding.

R2: What is the moderating effect of visitation frequency on the relationship between benefit attainment and place attachment?

H4: Visitors with higher visitation frequency will exhibit a stronger benefit attainment place attachment relationship.

Figure 3

Partially Mediated Model Depicting R-E fit, Benefit Attainment Domains, and Place Attachment

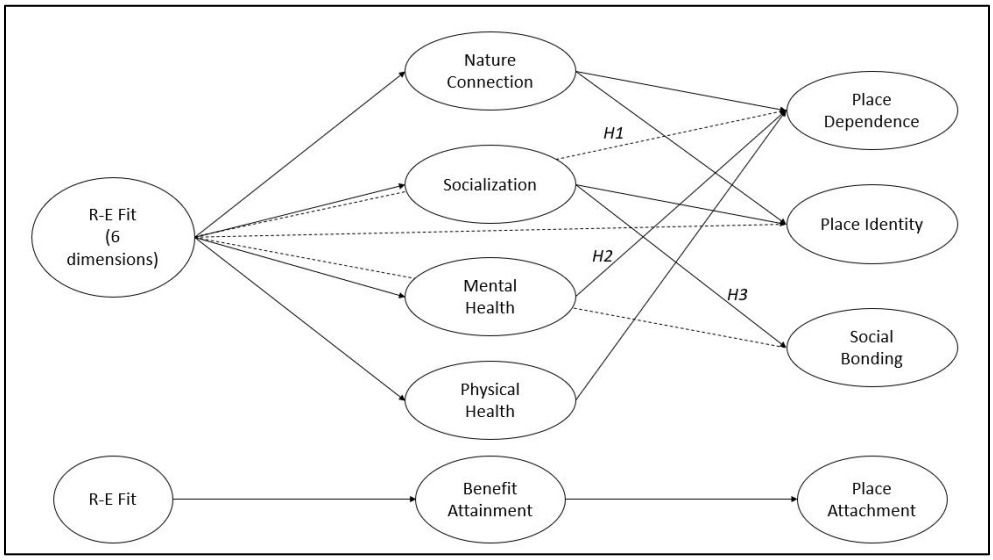
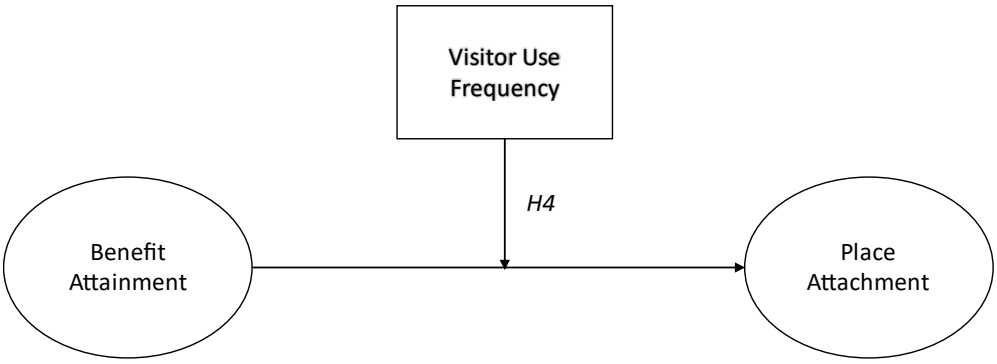


Figure 4

Moderated Model Depicting Visitor Use Frequency Moderating the Relationship Between Benefit Attainment and Place Attachment



Methods

Study Area and Sampling

Using the Clemson Experimental Forest (CEF), a university forest located in Clemson, South Carolina, as a backdrop for this study, I conducted visitor intercepts to gather data to test the associations between R-E fit, benefit attainment, and place attachment. University forests, wooded areas owned and/or operated by a university, possess multi-prong goals of research, education, recreation, and outreach (Straka, 2010). The CEF's mission is "to be a well-managed, self-sustaining, ecologically healthy, living laboratory, classroom and recreational resource for the benefit of the university, commerce and citizenry of South Carolina." (Baldwin et al., 2022, p. 22). At 17,000 acres, being one of the largest protected areas in the region, surrounding communities, Clemson University students, and other people in the 'Charlanta' corridor, utilize the CEF as a place to recreate (Baldwin et al., 2022). The CEF permits horseback riding, hiking, and biking, among other recreational activities on its approximate 105 miles of trails. Additionally, university professors and staff take advantage of the forest through field-based demonstrations with their classes and research projects that range from archaeological investigations of African American use of the land to entomological research (Baldwin et al., 2022). The CEF is also the primary location for many outdoor recreation groups in the area to meet including, cross-country teams, mountain biking clubs, and horseback riding groups. The forest's multiple uses and proximity to a densely populated suburban area make it an appropriate site to build upon existing visitor-use

literature concerning benefit attainment, place attachment and R-E fit to answer the study's research questions.

Visitor intercepts occurred at two popular trailheads in the north section of the CEF, Issaqueena Trailhead and Waldrop Stone Falls Trailhead. Additionally, due to the spatial and temporal distribution of horseback riders in the CEF, an important stakeholder group, an online questionnaire was created using the Qualtrics survey platform that was then shared by posting on the Clemson horseback riding Facebook group for seven consecutive days. Participants selected for this study included visitors to the Clemson Experimental Forest above 18 years of age. For the on-site portion, trained field researchers from the Parks Solutions Lab used a random probability sampling approach stratified over the time of the day between October 20, 2022, and February 10, 2023 (34 days) with the aim to represent fall/winter outdoor recreationists to the CEF. Prior to sampling, Clemson University Institutional Review Board (IRB; Office of Research Compliance) reviewed the study approach for engaging human subjects, instrumentation, and sampling protocol, which resulted in an exempt determination (IRB2022-0481; FWA00004497).

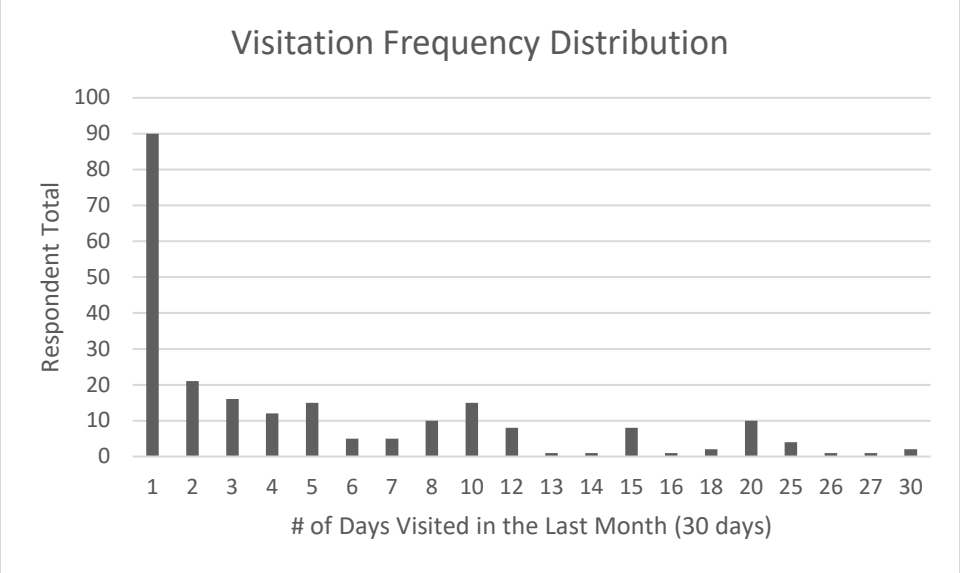
Measures

The questionnaire contained approximately 25 questions (completion time: m_{minutes}=12.5), comprised of validated scales and questions about visitors' past-use history (Section 1), benefit attainment (Section 2), RE-fit (Section 3), place attachment (Section 4), and visitor demographics based on US census bureau categories (Section 5).

Regarding visitation frequency, I asked study participants to self-report their past-use by completing visitation questions well-recognized in the literature (Kyle et al., 2004; Mowen et al., 2007; Rushing et al., 2019). Participants self-reported the number of days in the last month, days in the last year, first year of visit, and total years they have visited. For my analysis, I utilized the number of days in the last month someone visited the CEF to represent visitation frequency. The response distribution for this question is displayed in Figure 5.

Figure 5

Visitation Frequency Distribution



R-E fit was measured using items adapted from an instrument introduced in Tsaur et al. (2012) and implemented in Tsaur et al. (2014). This instrument measures the six dimensions of the R-E fit conceptual model: natural resources, interpersonal

opportunities, environmental functions, activity knowledge/skills, facilities, and operation/management. However, I substantially modified Tsaur et al.'s (2014) scale resulting in 24 R-E fit items (four items for each dimension). The survey asked participants to report their levels of agreement with each RE-Fit item on a 7-point Likert scale that ranged from "Strongly Disagree" to "Strongly Agree."

Following Tsuar et al.'s (2014) study of R-E fit and place attachment, in order to determine visitor place attachment, I utilized Kyle, Graefe, and Manning's (2005) scale items that measure place dependence, place identity, and social bonding with slight alterations to the wording for context. Four items assessed each place attachment dimension, resulting in the utilization of 12 total place attachment scale items. The survey asked participants to report their levels of agreement with each place attachment item on a 7-point Likert scale that ranged from "Strongly Disagree" to "Strongly Agree."

Like Rice et al. (2020), this study incorporates the OFM framework, however, in my case, I adapted the REP scale to attained benefits of visiting university forests. For example, the motivation "to be close to nature" was converted to the following benefit attainment: "enhance my connection with nature" (Rice, Taff, et al., 2020). Based on previous literature (Hartig et al., 2011; Meyer et al., 2019; Wolf & Wohlfart, 2014), I selected four dimensions to represent the benefits attained in university forests: Nature Connection, Socialization, Mental Health, and Physical Health. Sixteen scale items measured benefit attainment, with four items for each dimension. The creation of benefit attainment scale items was based on a beneficial outcomes checklist in Driver (2008) to fit the context of the study. The benefit attainment evaluation scale asked participants to

agree with the following phrase, “By visiting the Clemson Experimental Forest, I was able to…” on a five-point Likert scale that ranged from “Not at all accomplished” to “Accomplished a great deal.”

Analysis

I used a multistep process for analysis. First, I used standard calculations to evaluate data distribution, verify multivariate normality, and identify statistical outliers (Tabachnick & Fidell, 2018). This screening detected 36 study participants as multivariate non-normal outliers, which were excluded from further analyses. Second, I used R-lavaan software to evaluate the measurement performance of the items for RE-fit, benefit attainment, and place attachment by combining them into a single measurement model and then testing for reliability and validity using a confirmatory factor analysis (CFA) (Table 1). Convergent validity was assessed using factor loadings (λ), Cronbach’s Alpha, and Average Variance Extracted (AVE) of R-E fit, Benefit Attainment, and Place Attachment scale items, first order factors, and second order factors (Byrne, 2008) Discriminant validity was assessed with between factor correlations levels to determine if factors are sharing additional variance than accounted for (Table 2) (Byrne, 2008).

Third, to answer the research questions, I used structural regression modeling (SEM) in R-laavan. To assess RQ1 (How does the attainment of specific benefits mediate the relationship between RE-Fit and place attachment dimensions?) I tested for mediational effects. Mediation significance was calculated using the Sobel Test (Byrne, 2008; Sobel, 1982). For RQ2 (What is the moderating effect of visitation frequency on the relationship between benefit attainment and place attachment?) I evaluated a

moderated model using factor scores to determine the significance of the interaction effect (Hayes, 2015).

Results

Sample

My initial sample was 265 (5.13% C.I. at 95% C.L.) but following removal of multivariate outliers (36), the sample size for analyses was 229 (212 derived from onsite intercept; 17 sourced from online sampling). The response rate for onsite sampling was 90.82%, which only reflects the onsite intercepts and responses because the online response rate (17 cases) was unknown due to posting a link to the survey on an organization's Facebook site for seven days.

The primary activities of CEF visitors were hiking (52.84%), trail running (19.21%), biking (16.16%), and horseback riding (10.92%). The sample consisted of 46.72% females, and 52.84% males. Participant age ranged from 18 to 82 with the average being 42. Those with no affiliation to Clemson University comprised 41.05% of the sample and undergraduate students comprised 20.52%. Most participants identified as white (90.83%), 31% obtained a graduate or professional degree, and 27.07% were with friends during their visit.

Confirmatory factor analysis

As demonstrated in Table 1, no scale items posed a threat to overall model fit and all were included in further analyses. Initial confirmatory factor analysis yielded appropriate fit indices: $\chi^2(df)= 2193.28$ (1258), $p<.001$, CFI=0.902, TLI=0.896, RMSEA=0.057 (90%, CI 0.053 to 0.061). The Management first order factor showed

poor loading ($\lambda = .424$) but removal of this factor failed to provide significant improvement to model fit and thus was included in the final measurement model (Byrne, 2008). Examination of covariance matrices and modification indices highlighted two item pairs that shared high covariances. These pairings were both data-driven and theory-driven as they exist between scale items in the same dimensions. Following the inclusion of covaried items, the CFA yielded improved fit measures, indicating reasonable overall fit: χ^2 (df)= 2063.40 (1256), p<.001, CFI=0.915, TLI=0.910, RMSEA=0.053 (90%, CI 0.049 to 0.053).

Table 1

Convergent and Discriminant Validity in the Measurement Model

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15
F1. Natural Resources #															
F2. Facilities #	.587*														
F3. Environment and Setting #	.751*	.609*													
F4. People #	.48*	.388*	.497*												
F5. Knowledge and Skills #	.611*	.496*	.634*	.404*											
F6. Management #	.36*	.292*	.374*	.238*	.304*										
F7: RE-Fit ##	.851	.690	.883	.563	.718	.424									
F8: Nature Connection #	.359*	.291*	.373*	.238*	.303*	.179*	.422								
F9: Socialization #	.203*	.165*	.211*	.134*	.172*	.101*	.239	.322*							
F10: Physical Health #	.309*	.251*	.321*	.204*	.261*	.154*	.363	.489*	.277*						
F11: Mental Health #	.313*	.254*	.325*	.201*	.264*	.156	.368	.496*	.28*	.426*					
F12: Place Dependence #	.291*	.236	.302*	.193*	.246*	.145	.342	.232*	.131*	.2*	.203*				
F13: Place Identity #	.256*	.208	.266*	.169*	.216*	.127	.301	.204*	.115	.176*	.178*	.732*			
F14: Social Bonding #	.241*	.196	.25*	.16*	.204*	.12	.284	.192*	.109	.166*	0.168*	.69*	.606		
F15: Place Attachment ##	.319	.259	.331	.211	.269	.159	.375	.255	.144	.219	.222	.913	.802	.756	
F16: Benefit Attainment ##	.477	.386	.494	.315	.402	.237	.560	.754	.427	.649	.657	.308	.271	.255	.338

*Note: # indicates 1st Order Factor; ## indicates 2nd Order Factor; AVE is Average Variance Extracted; √AVE is the square root of AVE; * $p < .05$

Table 2:

Final Confirmatory Factor Analysis Results

Factor/Item	◊***M*** **(*SD*)**	**λ**	α	**AVE**
Recreationist-Environment Fit**			.844	.499
Natural Resources	-	.851		
Facilities	-	.690		
Environment and Setting	-	.883		
People	-	.563		
Knowledge and Skill	-	.718		
Management	-	.424		
Natural Resources*			.900	.703
The terrain is suitable for me.	6.30 (0.87)	.658		
Most of the natural resources fit my needs for what I do at the forest.	6.38 (0.76)	.821		
The natural aspects of the forest match my desires.	6.36 (0.84)	.918		
On average, the nature at the forest is fitting for me.	6.48 (0.74)	.929		
Facilities*			.922	.749
The facilities are in line with what I expect.	6.00 (1.14)	.850		
The forest facilities for my activity with what I need.	6.20 (0.86)	.809		
The state of facilities at the forest are good for me.	6.02 (1.16)	.918		
The services at the forest meet my desires	6.00 (1.12)	.882		
Environment and Setting*			.954	.838
The setting at the forest allows me to engage in the activity I want.	6.51 (0.66)	.897		
Regarding my activity, the forest environment works well for me.	6.52 (0.62)	.934		
The forest environment suits me.	6.55 (0.61)	.953		
For my purposes, the forest environment meets my needs.	6.52 (0.65)	.875		
People*			.849	.592
Being here allows me to share my experience with others.	6.03 (1.14)	.614		
The forest provides me with the opportunity to meet others.	5.36 (1.39)	.761		
Most types of people using the forest are a good fit for me.	5.71 (1.16)	.843		

I and other visitors can share certain activities in this place.	5.96 (1.11)	.838		
Knowledge and Skill*			.935	.785
My skills fit the requirements of my activity and setting.	6.43 (0.78)	.810		
My equipment is a match for my activity and the environment.	6.43 (0.78)	.876		
The knowledge level I have fits my activity and the place.	6.44 (0.83)	.914		
My past experiences match the needs for my activity at the forest.	6.45 (0.84)	.938		
Management*****			.964	.869
The forest managers' way of doing things works for me.	5.53 (1.40)	.951		
The management approach at the forest is what I like.	5.50 (1.40)	.946		
I enjoy the way the area is managed ●	5.545 (1.43)	.905		
The management of the area aligns with my desires. ●	5.59 (1.39)	.926		
Benefit Attainment**			.716	.401
Nature Connection	-	.754		
Socialization	-	.427		
Physical Health	-	.649		
Mental Health	-	.657		
Nature Connection*			.857	.611
View the scenery.	4.47 (0.69)	.619		
Be close to nature.	4.67 (0.52)	.864		
Enjoy nature.	4.68 (0.53)	.867		
Experience things that are natural.	4.59 (0.63)	.750		
Socialization*****			.925	.756
Do something with people I care about.	4.43 (1.01)	.819		
Bring my family or friends closer together.	4.08 (1.15)	.930		
Spend time with members of my group.	4.20 (1.14)	.904		
Connect with others who enjoy the same things I do.	4.089 (1.14)	.820		
Physical Health*			.880	.654
Get exercise. #	4.68 (0.61)	.717		
Keep physically fit. #	4.61 (0.66)	.735		

Feel good after being active.	4.71 (0.55)	.889		
Move my body during an activity.	4.69 (0.59)	.878		
Mental Health*			.920	.744
Lower my stress level.	4.62 (0.59)	.849		
Improve my outlook on things.	4.43 (0.77)	.912		
Take a mental break.	4.54 (0.67)	.878		
Bring about a better state of mind.	4.55 (0.65)	.807		
Place Attachment**			.864	.683
Place Identity	-	.802		
Place Dependence	-	.913		
Social Bonding	-	.756		
Place Identity*			.945	.815
The Clemson Forest means a lot to me.	6.09 (1.15)	.797		
I am very attached to this forest.	5.52 (1.45)	.925		
I identify strongly with the Clemson Forest.	5.39 (1.45)	.942		
This forest is very special to me.	5.56 (1.41)	.939		
Place Dependence*			.920	.744
The Clemson Forest is the best place for the activities I like to do.	5.48 (1.37)	.849		
I enjoy my activities in this forest more than any other location.	4.94 (1.47)	.912		
Participating in activities at this forest is more important to me than doing activities in other places.	4.77 (1.51)	.878		
No other place can compare to the Clemson Forest for the type of activities that I do.	4.31 (1.64)	.807		
Social Bonding*			.879	.659
The people who use this forest are very important to me.	4.85 (1.27)	.919		
Other people that use the Clemson Forest mean a great deal to me.	4.77 (1.63)	.905		
I have a lot of ties with people that use this forest.	4.33 (1.55)	.762		
Many of my friends or family use the Clemson Forest.	4.77 (1.62)	.626		

Note: ◊Means (***M***) are based upon complete case values; **λ**: standardized coefficient (factor loading); **α** indicates Cronbach's Alpha; * indicates 1st Order Factor; ** indicates 2nd Order Factor; #, ● indicates error terms of these items are covaried, due to evidence of high shared variance beyond that reflected by the factor

Hypothesis testing

Since the measurement model provided reasonable fit, I created four models to examine each of the four hypotheses: (1) a linear regression model (Model 1) with recreationist-environment fit predicting place dependence, place identity, and place social bonding, (2) a mediated model (Model 2), with physical health benefit attainment and mental health benefit attainment mediating the relationship between recreationist-environment fit and place dependence, (3) a mediated model (Model 3), with socialization benefit attainment mediating the relationship between recreationist-environment fit and place social bonding, and (4) a moderated model (Model 4), with visitation frequency influencing the relationship between benefit attainment and place attachment.

Table 3

Fit indices and test results for model structure, mediation, and moderation

Model	**CFI**	**TLI**	**RMSEA**	**SBχ^2 (*df*)**
Measurement Model	0.915	0.910	0.053	2063.40* (1256)
Model 1 (H1)	0.922	0.916	0.063	848.52* (455)
Model 2 (H2)	0.920	0.913	0.060	1060.80* (583)
Model 3 (H3)	0.916	0.908	0.068	6189.45* (496)
Model 4 (H4)	0.904	0.895	0.069	664.11* (66)

Note: CFI = comparative fit index; df = degrees of freedom; SBχ2 = Satora-Bentler Scaled Chi-Squared; TLI = Tucker-Lewis index; asterisk indicates significance at p<.001

Model 1, testing the first hypothesis (*H1: Increases in R-E fit will significantly increase place identity, place dependence, and place social bonding with the largest effect on place dependence*), indicated reasonable fit: SBχ2 (df)= 848.520 (455), p<.001,

CFI=0.922, TLI=0.916, RMSEA=0.063 (90%, CI 0.058 to 0.068). Recreationist-environment fit explained 11.9% of the variance of place dependence, 8.8% of the variance of place identity, and 7.9% of the variance of place social bonding. Recreationist-environment fit significantly predicted all three place attachment dimensions: place dependence (B = .368 β = .345, SE = .081, p < .001) place identity (B = .311 β = .297, SE = .074, p < .001), and place social bonding (B = .293 β = .281, SE = .071, p < .001) (Figure 6).

Model 2, testing the second hypothesis (*H2: The attainment of mental health and physical health benefits will mediate the relationship between R-E fit and place dependence*), demonstrated overall goodness of fit : SBχ2 (df)= 1060.803 (583), p<.001, CFI=0.920, TLI=0.913, RMSEA=0.060 (90%,CI 0.054 to 0.065). Within this mediated model, recreationist-environment fit had a significant effect on the attainment of physical health benefits (B = .337 β = 0.384, SE = 0.103, p < .001), the attainment of mental health benefits (B = .415 β = 0.320, SE = 0.091, p < .001), and place dependence (B = .331 β = .308, SE = .086, p < .001). However, the attainment of physical health benefits (B = .003 β = .003, SE = .073, p = .970) and the attainment of mental health benefits (B = .112 β = .111, SE = .081, p = .164) did not have a significant effect of place dependence. Recreationist environment fit explained 14.7% of the variance of physical health benefit attainment and 10.2% of the variance of mental health benefit attainment. Recreationist-environment fit, physical health benefit attainment, and mental health benefit attainment explained 13% of the variance of place dependence. The non-significant effects in the

model (Figure 7), demonstrate a lack of support for this hypothesis (H3) and indicated a test of mediation was inappropriate for model 2.

Model 3, testing the third hypothesis (*H3: The attainment of socialization benefits will mediate the relationship between R-E fit and place social bonding*), also indicated reasonable fit: SBχ2 (df)= 6189.451 (496), p<.001, CFI=0.916, TLI=0.908, RMSEA=0.068 (90%,CI 0.062 to 0.074). In this model, recreationist-environment fit had a significant effect on the attainment of socialization benefits (B = .347 β = .328, SE = .100, p = .001) and place social bonding (B = .227 β = .213, SE = .072, p = .002). Socialization benefit attainment had a significant effect on place social bonding (B = .207 β = .206, SE = .061, p = .001). Recreationist-environment fit explained 10.8% of the variance of socialization benefit attainment. Recreationist-environment fit and socialization benefit attainment explained 11.7% of the variance of place social bonding (Figure 8). These results prompt further testing of significant mediational effects in the model using the Sobel test. Sobel test results indicated the presence of significant mediational effects (β = 2.426, SE = .029, p = .015), suggesting that recreationist-environment fit positively influences place social bonding indirectly through the attainment of socialization benefits.

Model 4, testing the moderating effect denoted in the third hypothesis (*H4: Visitors with higher visitation frequency will exhibit a stronger benefit attainment place attachment relationship*), indicated poor fit: SBχ2 (df)= 664.11 (66), p<.001, CFI=0.904, TLI=0.895, RMSEA=0.069 (90%,CI 0.054 to 0.085).There was no significant moderating influence of visitation frequency on the relation between benefits attainment

and place attachment (B = -.026, β = -.126, SE = .019, p = .189) (Figure 9). However, benefit attainment did have a significant positive direct effect on level of place attachment (B= .372, β = .299, SE = .094, p < .001). Additionally, visitation frequency had a positive effect on place attachment, (B = .049, β = .356, SE = .012, p < .001). Given the lack of a significant interaction effect of visitation frequency on the relation between benefits attainment and place attachment, it is unsurprising that each of the simple slopes were significant and parallel [e.g., simple slopes for the relation between benefits attainment and place attachment were tested for low (-1 SD below the mean), average (mean centered), and high (+1 SD above the mean) levels of visitation frequency].

Figure 6

Model 1: Testing H1

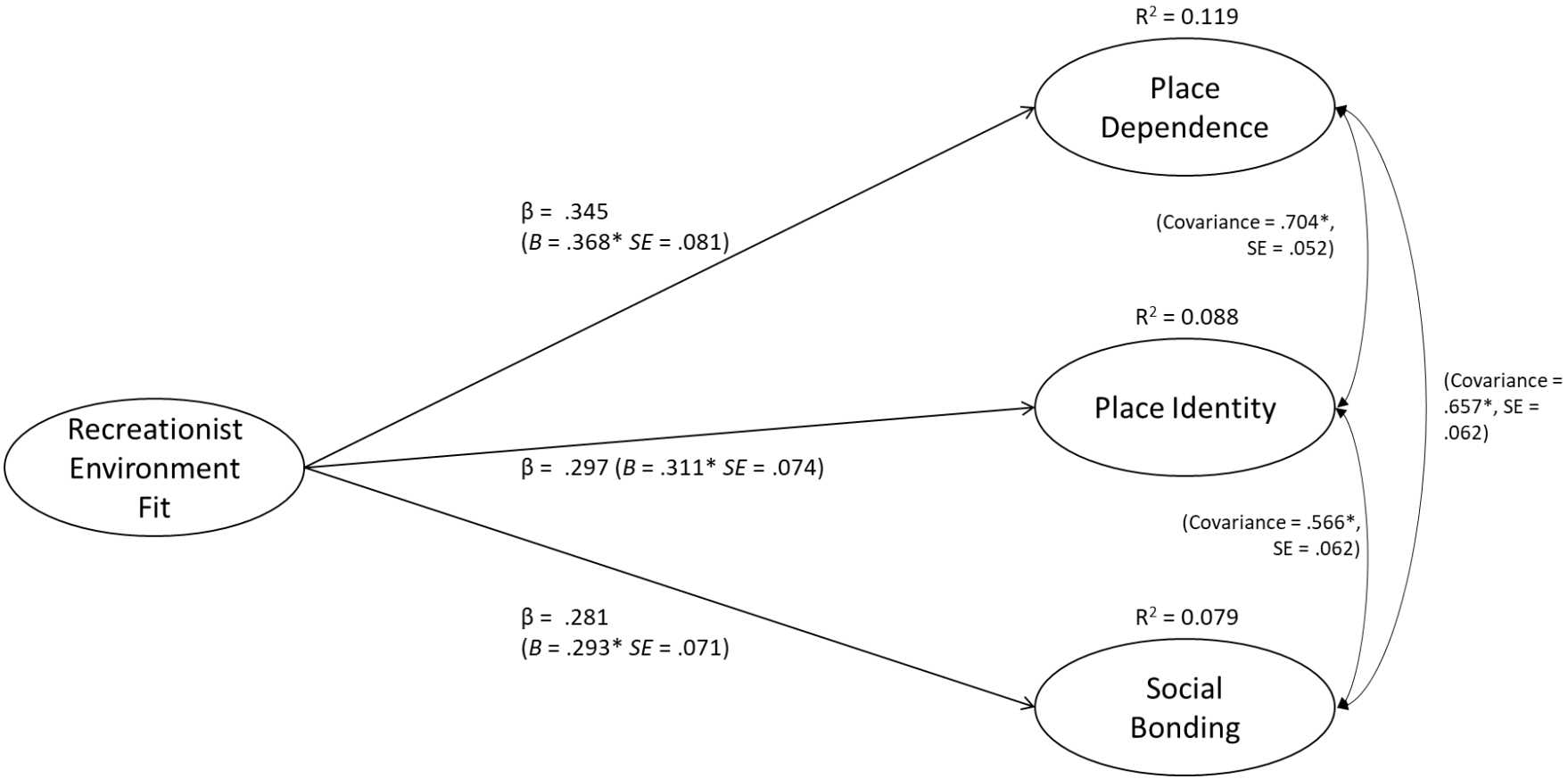


Figure 7

Model 2: Testing H2

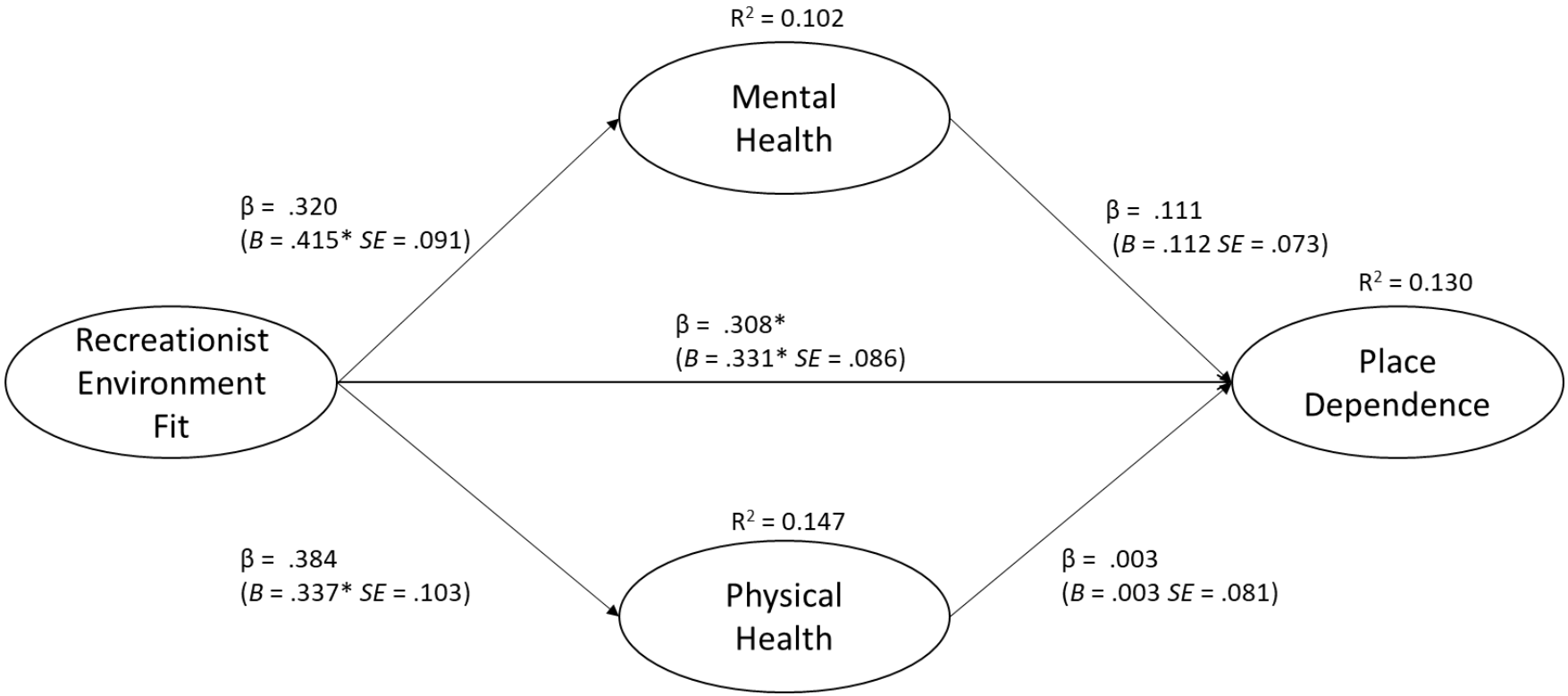


Figure 8

Model 3: Testing H3

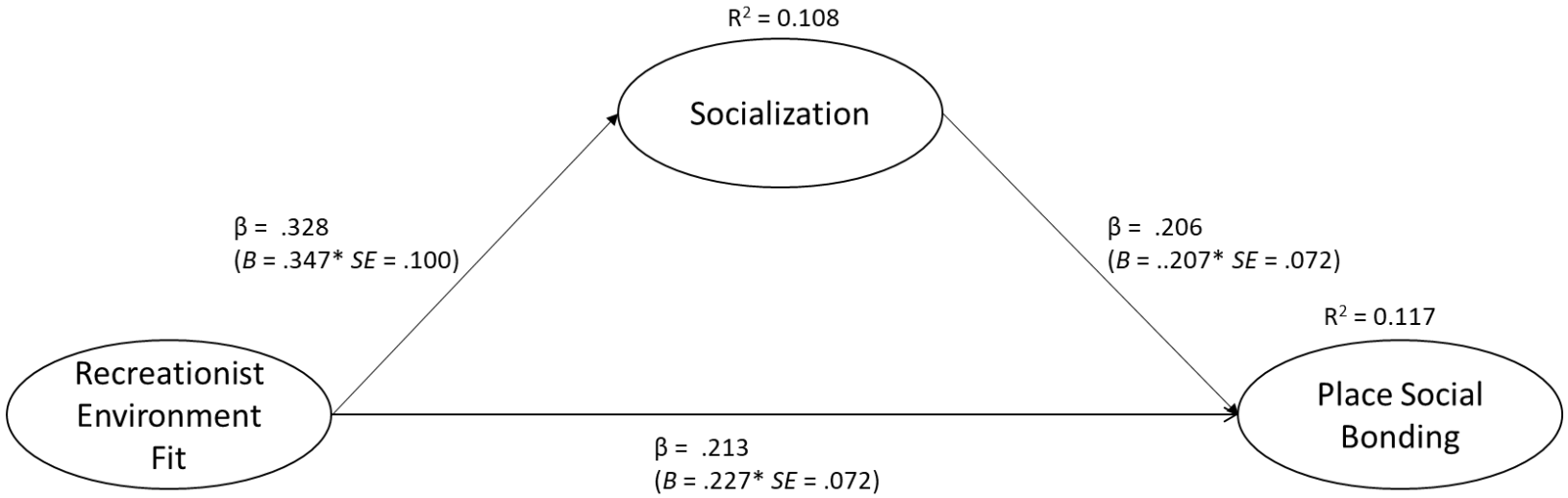
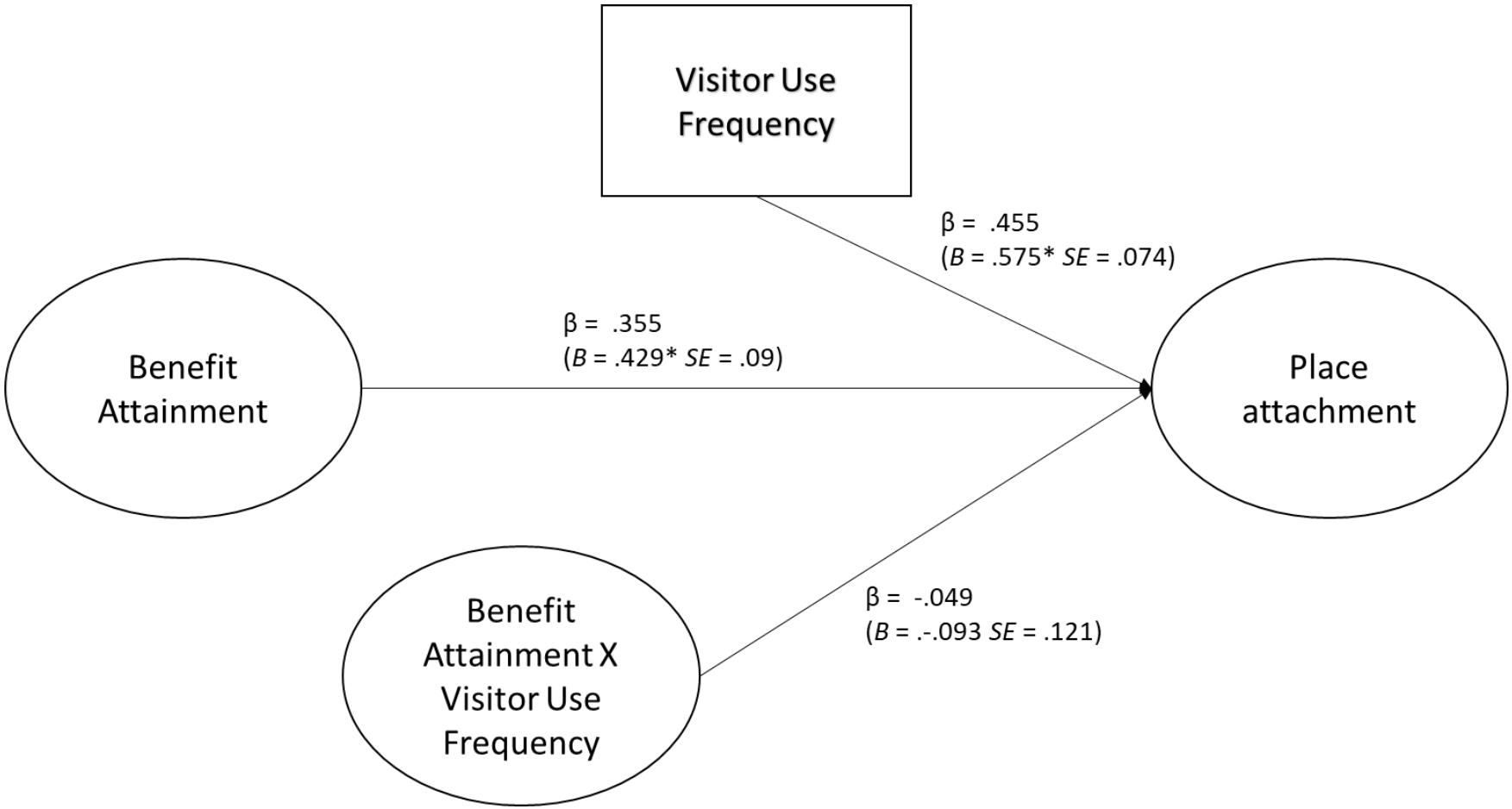


Figure 9

Model 4: Testing H4



Discussion

This study examined whether recreationist-environment fit and the attainment of specific benefits explained place dependence, place identity, and place social bonding; different domains of place attachment. Additionally, we tested the influence of visitation frequency on the relationship between benefit attainment and place attachment. Using data from university forest visitors, analyses supported two of the four hypotheses. Understanding these relationships carries implications for expanding theoretical knowledge and enhancing the management of the study site, as well as other parks and protected areas.

R-E fit was found to significantly influence place dependence, place identity, and place social bonding. This positive relationship posits that compatible recreation settings encourage place attachment. This finding is akin to Tsuar et al.'s (2014) R-E fit and place attachment study. Whereas they used first order factors of R-E fit and I used the second order factor, both studies resulted in R-E fit having a positive effect on place dependence, place identity, and place social bonding, aside for the facilities dimension in Tsuar et al.'s (2014) study. While this study's findings align with existing literature, it also encourages the continued analysis of the recreationist-environment fit-place attachment relationship in different recreation settings. With recreationist-environment fit exhibiting a larger influence on place dependence than the other two place attachment factors, the management of compatible recreation settings can have a substantive impact on a visitor's functional attachment to a park or protected area. In other words, when managers of a park maintain trails, bathrooms, and other park components to meet the

expectations of visitors (Lawler, 1973), they are providing visitors with a space to partake in outdoor recreation, enhancing attachment levels (Driver, 2008). By managing for or maintaining high quality recreation settings that provide visitors beneficial outcomes, parks and protected areas can encourage emotional attachment (place identity) and social attachment (place social bonding) and increase visitors' civic engagement (Bleam, 2018; Payton et al., 2005; Shaykh-Baygloo, 2020). Civic engagement in the context of parks and protected areas includes conservation volunteers and engagement during public comment periods. Therefore, researchers and managers should utilize the knowledge of R-E fit's positive influence on place attachment in future investigations and management decisions to determine what aspects of R-E fit, and what aspects of the recreation setting, contribute to place attachment.

The non-significant indirect effect of physical health benefit attainment and mental health benefit attainment on place dependence indicates the presence of additional settings supporting Clemson Experimental Forest (CEF) visitors' ability to attain mental and physical health benefits. While the CEF provides mental and physical health benefits, as illustrated by respondents' scores, this finding suggests that the attainment of benefits in the forest does not significantly increase visitors' place dependence. In other words, a runner may use the CEF to exercise, but they are not dependent on the CEF for exercise as there are additional options to achieve that benefit. This may also be reflective in the modest place dependence scale item scores for the sample (Table 2). Older urban residents may possess high place dependence scores with a community park that offers a

sense of safety and opportunities to exercise (Levinger et al., 2022). Therefore, we recommend further testing of this relationship in different recreation settings.

Finding no significant mediational effect of mental health benefit attainment and physical health benefit attainment on the relationship between recreationist-environment fit and place attachment does not diminish the importance of managing for health benefits in parks and protected areas. In fact, recreationist-environment fit significantly influenced the attainment of mental health and physical health benefits. This supports other findings in the literature such as recreationist-environment fit as an antecedent for various positive outcomes, but expands it by identifying benefit attainment, specifically mental health and physical health benefits, as potential recreationist-environment fit outcomes (Liang & Peng, 2019; Wang et al., 2018). While the term 'recreationist-environment fit' is not used, the relationship between managing recreation settings to enhance visitors' ability to attain various benefits has already been established in Driver's (2008) OFM. Using OFM to frame their research, Rice et al.'s (2020) study of visitor motivations and outcomes found that desired outcomes were being attained. In line with our findings, the presence of benefit attainment, OFM encourages the management of parks and protected areas to provide visitors with beneficial outcomes.

Adoption of an OFM approach is further supported by our findings as recreationist-environment fit also proved to significantly influence socialization benefits. The presence of socialization benefits in the CEF supports literature on nature's ability to promote social health and connection (Hartig et al., 2011; Khotdee et al., 2012; Wolf et al., 2015). R-E fit has potential to aid the design of new recreation settings or

improvements to existing ones. new recreation areas or changes to existing ones seeking to enhance socialization benefits may include increasing parking availability as friend groups sometimes travel in separate vehicles, providing families with picnic tables, and coordinating events that foster community. The presence of an indirect effect of socialization on the relationship between recreationist-environment fit and place social bonding highlights a logical connection between the attainment of socialization benefits and the development of social attachment to outdoor spaces. These results suggest that the CEF ought to maintain the current recreation setting as it is, supporting the attainment of socialization benefits. COVID-19 enhanced people's desire for outdoor spaces so that they could meet up with friends and family and that desire remains (Levinger et al., 2022; Rice, et al., 2020). Therefore, it is imperative that park and protected areas create, enhance, or maintain recreation settings that address the social needs of their visitors.

Visitation frequency did not moderate the relationship between benefit attainment and place attachment. The lack of a significant interaction effect and thus, the lack of support for H4, indicates that benefit attainment's relationship with place attachment does not significantly change based on the number of times a visitor uses a place. However, visitation frequency and benefit attainment demonstrated significant positive direct effects on place attachment. These findings reflect literature suggesting positive associations between visitation frequency and place attachment (Kyle et al., 2004; Tsaur et al., 2014; van Riper et al., 2019). Evidence of recreationist-environment fit's, visitation frequency's, benefit attainment's positive effect on place attachment demonstrates place attachment's complexity and warrants further investigation to the factor's antecedents.

The novel use of the selected R-E Fit, benefit attainment, and place attachment measures in a university-forest setting introduces many opportunities for further research. The results of this quantitative study highlight statistical relations between outdoor recreation outcomes in a university forest. With limited research concerning outdoor recreation outcomes in university forests, we recommend continued research of recreation in this setting using the factors employed in this study, new factors, or a combination of both. Future studies should employ a mixed methods approach so that managers have qualitative data to corroborate the quantitative data with specific successes and failures of the recreation setting. Additionally, future studies should pair examinations of R-E fit with an Importance-Performance Analysis (IPA) of specific recreation setting features or prompt respondents to select recreation settings features they would add or remove from a space (Martilla & James, 1977). Results from an IPA or respondent identification of recreation setting deficits would provide managers with key target areas for future management actions.

Limitations

Although this study presents implications for parks and protected area management and broadens our understanding of theoretical relationships, this study features a few limitations. First, the R-E fit measurement fails to capture specific areas where management needs to direct their attention. This is why I recommend future studies pair R-E fit measurements with an IPA. Second, due to logistics of data collection, not all CEF user groups are represented in the sample. For example, hunters and anglers that use the forest were not included in the sample due to their scattered

distribution and varying use periods. Future visitor-use studies within the CEF should include hunters and anglers as well as Clemson University personnel using the forest for research and teaching opportunities. Third, financial limitations required one researcher to conduct the data collection process, thus allowing room for selection bias and response bias to affect the data and subsequential results (Heckman, 1990; Paulhus, 1991). While I was cognizant of this possibility, I recommend that future CEF visitor use studies employ more than one data collectors to reduce biases. Last, due to time constraints, data collection was conducted during late fall and winter months, presenting researchers with low levels of use to sample. However, given this seasonality limitation, it is possible that those that visit during winter months are more connected to the space. Furthers CEF visitor use studies should sample during spring and summer seasons to analyze how use patterns change and if perceptions of forest conditions differ.

Conclusion

With visitation numbers on the rise, park and protected area managers are seeking to better understand their visitors. Greater understanding of visitors can be achieved through knowledge of different theoretical relationships. In this study recreationist-environment fit, the compatibility of a recreation setting to a visitor, facilitated the attainment of different benefits and the attachment to a place. Additionally, only the attainment of socialization benefits mediated the relationship between recreationist-environment fit and place attachment. Furthermore, visitation frequency and benefit attainment were found to be antecedents of place attachment. These relationships expand upon theoretical knowledge that exist in the literature. Moreover, these relationships

provide a foundation for managers to approach management with a focus on enhancing the beneficial outcomes offered by outdoor recreation.

CHAPTER THREE

Management Implications/Recommendations

Knowledge of visitors' recreationist-environment fit (R-E Fit), benefit attainment, and place attachment possesses implications for park and protected area management. R-E Fit seeks to understand the compatibility between a recreationist and their recreation setting and thus, can provide useful insight into visitors' perception of various recreation setting components (Tsaur et al., 2014). Benefit attainment presents managers with an understanding of the positive outcomes of recreation that exist within their park or protected area in addition to the ones visitors are failing to attain (Driver, 2008). Place attachment among visitors is linked with community and a greater interest in the management of that place (Halpenny, 2010; Mook et al., 2022).

An area with a population of attached visitors may see increased volunteer engagement as well as negative feedback stemming from unfavorable management decisions. R-E fit was found to be a good predictor of benefit attainment and place attachment, highlighting an opportunity for park and protected managers to frame management decisions with goals of facilitating R-E fit so that visitors may receive beneficial outcomes from outdoor recreation.

In this chapter, I present three main themes of management recommendations for the Clemson Experimental Forest (CEF) based on the findings in this thesis which may be applicable to other recreation settings. The three main themes are monitoring, communication, and interpersonal opportunities. Results indicated that visitors to the CEF expressed high R-E fit with the forest. While these results fail to draw attention to

deficits present in the CEF, managers should conduct monitoring of recreationists and the recreation setting to ensure these levels of fit remain and the setting is compatible for future visitors.

Monitoring

Even though the results of this thesis showed that visitors to the CEF possess high R-E fit, it is important to note that this study is cross-sectional, capturing only a snapshot of forest users at a specific time, and R-E fit levels may decline in the future. To monitor visitor-use and the quality of the recreation setting in the CEF, managers should first, develop and administer a survey that measures R-E fit and identifies specific areas in need of management intervention. When paired with an Importance-Performance Analysis (IPA) mentioned in Chapter 2, R-E fit has the ability to highlight the physical state of trails, facilities, and other recreation setting features (Martilla & James, 1977). Continuous monitoring of these measures annually will allow managers to identify trends present in their visitor population and whether management actions are needed.

Managers should also monitor the condition of recreation resources throughout the CEF. The top three user groups sampled in the CEF for this thesis were hikers, bikers, and horseback riders. These groups all rely on trails for their recreation needs, albeit trail preferences may slightly differ among different recreation groups and individuals. Therefore, it is imperative that CEF managers continually assess trail conditions through measurement of erosion levels, vegetation growth, and flooding on designated trail systems (Hammitt et al., 2015). Since the CEF operates with a small group of employees, the forest could continue to partner with natural resource and park management classes to

provide Clemson University students with practical experience in visitor use and recreation resource monitoring. This partnership helps to integrate the university forest into Clemson's Land Grant mission. Managing certain natural resources of a recreation setting may fall out of a manager's purview but through continuous monitoring and evaluation, managers can promote R-E fit and thus, the attainment of various benefits.

The design, construction, and maintenance of structures, signs, and parking lots play an important role in influencing visitors' experience within a park or protected area. Facilities are often the first recreation setting components visitors encounter. A poorly designed sign or limited parking can decrease the quality of a visitor's experience and inhibit the attainment of benefits or attachment to the place (Fletcher & Fletcher, 2003; Tonge et al., 2011). While this thesis broadly engaged visitors about their compatibility with the CEF facilities, CEF managers could further assess the state of facilities throughout the forest with an IPA or eliciting visitors to indicate the addition or removal of specific facilities. This inventory would alert managers to poor signage and the absence of desired facilities.

Monitoring can also alert managers to successful components of the recreation setting. The CEF supports a variety of outdoor recreation activities, as well as classroom demonstrations which enhances R-E fit. Therefore, CEF managers, through monitoring efforts, should identify aspects of the forest that specifically enable certain activities and work towards preserving or maintaining that function. One monitoring tool that can be used to emphasize positive aspects of the recreation setting is the IPA and RE-Fit. By identifying these successful components, managers can learn from their successes.

Managers can replicate these identified ‘successes’ to improve poorly designed and ineffective facilities.

Following these monitoring recommendations, managers of the CEF will be able to determine if R-E fit levels decline, what recreation setting features are underperforming, and adapt to changing visitor expectations or needs. Management actions should be taken if monitoring efforts indicate low or declining R-E fit and if IPA results underscore problem areas.

Communication

Out of the six R-E fit factors, ‘Management/Operations’ received the lowest average scores from study participants. ‘Management/Operations’ reflects the compatibility between recreationists and the managers/management actions at a park or protected area. The low score does not indicate a disapproval with CEF management but rather a lack of understanding behind management decisions. Improving manager-visitor relations can elicit a trickle-down effect where visitors become more likely to support future management decisions because they have a connection to the managing organization and can even offer support in terms of volunteerism. Outreach is an important solution to improve manager-visitor relations because it presents reasoning behind management actions and provide visitors with a direct channel to funnel concerns. Outreach is one form of communication with the ability to enhance R-E fit. Aside from manager-visitor relations, improvements in communication have implications to enhance other aspects of the recreation setting.

Communication can also be used to prepare recreationists before their visit and in turn, enhance the 'Activity, Knowledge, and Skills' factor of R-E fit. This R-E fit factor assesses the alignment between the demands of the recreation setting and visitors' previous experiences. While this factor is reliant on visitors to arrive with specific equipment, knowledge, and skills that will allow them to participate in an activity, managers can enhance R-E fit by diversifying the recreation setting so that a range of visitors, regardless of skill level, may enjoy the setting. In the CEF, difficulty predominately lies within the type of activity instead of the recreation setting. A horseback rider will require more knowledge and skill than a hiker. However, not all hikers understand the proper etiquette when approaching a horseback rider on the trail. CEF managers can increase visitor knowledge of trail etiquette, hazards present in the forest, and the physical demands of trails through effective signage and online communication. Moreover, the CEF can advertise classes that teach skills beneficial to recreationists on bulletin boards near trailheads. Communicating important information to visitors will improve visitors' activity knowledge and skill level and increase visitor levels of R-E fit.

Just as managers should be able to reach visitors, visitors should be able to reach managers. Visitors ought to express their concerns or give praise to park and protected area managers in an uncomplicated manner. To aid in the monitoring of recreation resources, CEF managers could develop a system where trail users may report heavily eroded trail segments and fallen trees. Establishing this communication pathway will improve the manager-visitor relationship as well as visitors' perception of the area's

natural resources. Lastly, studying the communication among visitors whether it's on Facebook, Instagram, or AllTrails, can inform managers on the conditions of different resources and visitors' overall satisfaction with the park or protected area.

Interpersonal Opportunities

The findings indicated a mediational effect of socialization benefits on the relationship between R-E fit and place social bonding. In other words, the interpersonal opportunities present in the CEF facilitated the social attachment to the forest through the attainment of socialization benefits. While individuals have varying social preferences, our findings indicate the importance of managing recreation settings that promote social cohesion and other socialization benefits. 'Interpersonal Opportunities' are components of the recreation setting that allows visitors to recreate with family members, meet new people, and get together with members of a club or social organization. A way for the CEF to promote interpersonal opportunities and, quite literally, bring people together is coordinate with the town of Clemson to establish a bus route that connects the forest to Clemson University's campus. Not only would this bus route provide university students with opportunities to recreate with friends and attain socialization benefits, but it would enable students to attain physical health and mental health benefits highly valued by sample participants. Continuous monitoring will also benefit interpersonal opportunities in determining if high socialization results continue and if this increased use would displace visitors. To further promote interpersonal opportunities, the CEF should compile a list of events occurring within the forest and advertise them on various social media platforms, an example of communication to support socialization in the forest. This

recommendation would require establishing vital connections with stakeholders to enhance the attainment of beneficial outcomes within the CEF.

Conclusion

R-E fit provides park and protected managers with a measurement tool that reflects visitors' perception of the recreation setting. Since R-E fit measures broad aspects of the recreation setting (natural resources, interpersonal opportunities, environmental functions, activity knowledge/skills, facilities, and operation/management), it should be paired with an IPA or questions that require respondents to select specific features in need of improvements. Effective monitoring of visitor-use and recreation resources will determine levels of R-E fit among visitors and positive/negative aspects of the recreation setting, leading managers to take the necessary steps to improve the visitor experience. If monitoring indicates a need for management action, improving communication between managers and visitors through outreach, signage, and other channels is one area that can enhance visitors' R-E fit. Additionally, providing interpersonal opportunities will ensure visitors possess R-E fit with the recreation setting. With R-E fit predicting the attainment of beneficial outdoor recreation outcomes, park and protected areas managers should incorporate R-E fit in future visitor-use studies.

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