2020-06-10

Strengthening Couple's Relationships with Nature Recreation

Brock W. Sumner
Brigham Young University

Follow this and additional works at: https://scholarsarchive.byu.edu/etd

Part of the Family, Life Course, and Society Commons

BYU ScholarsArchive Citation
https://scholarsarchive.byu.edu/etd/9141

This Dissertation is brought to you for free and open access by BYU ScholarsArchive. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of BYU ScholarsArchive. For more information, please contact ellen_amatangelo@byu.edu.
Strengthening Couples’ Relationships

with Nature Recreation

Brock W. Sumner

A dissertation submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

Shayne R. Anderson, Chair
Jeremy Yorgason
Lee N. Johnson
Roy Bean

School of Family Life
Brigham Young University

Copyright © 2020 Brock W. Sumner
All Rights Reserved
ABSTRACT

Strengthening Couples’ Relationships with Nature Recreation

Brock W. Sumner
School of Family Life, BYU
Doctor of Philosophy

Nature has been shown to be beneficial for numerous individual outcomes and this article investigates the link between of individual’s nature recreation and couples’ relationship satisfaction. First, we outline the theoretical underpinnings of nature recreation and couples’ relationship satisfaction. Then we examine the following hypotheses: (1) nature recreation has a positive direct effect on relationship satisfaction, (2) there is a positive indirect effect of nature recreation on relationship satisfaction through the environmental effects, and (3) the relationship between nature recreation and relationship satisfaction will be moderated by the recreational factors. These were examined using data obtained from a cross sectional MTurk survey from a diverse group of 520 participants. Structural Equation Modeling was used to analyze the hypotheses. The results showed that the hypotheses 2 and 3 were non-significant but that the indirect effect was significant. These findings were explored, possible explanations for these findings discussed, and future implications were outlined.

Keywords: nature, recreation and leisure, relationship satisfaction
# TABLE OF CONTENTS

ABSTRACT .......................................................................................................................................................... ii

LIST OF TABLES ........................................................................................................................................ v

LIST OF FIGURES .......................................................................................................................................... vi

Strengthening Couples’ Relationships with Nature Recreation................................................................. 1

Literature Review ........................................................................................................................................... 3

  Couples’ Recreation and Relationship Satisfaction .............................................................................. 4

  Nature as Mediator of the Relationship Between Recreation and Relationship Satisfaction .... 6

  *Natures Impact on Individual Functioning* ....................................................................................... 7

  *Effects of Cognitive Restoration and Small Self on Individuals* ...................................................... 9

  *Characteristics of the Natural Environment Necessary to Achieve Benefits* .......................... 10

  *Connection Between Individual Effects and Relationship Satisfaction* ................................... 12

Recreational Factors as Moderators of the Relationship Between Recreation and Relationship Satisfaction .......................................................... 14

  *Challenge, Novelty, and Arousal* ......................................................................................................... 14

Current Study ............................................................................................................................................... 15

  *Hypotheses* ........................................................................................................................................... 16

Methods ....................................................................................................................................................... 16

  Participants .............................................................................................................................................. 16

  Procedures ............................................................................................................................................ 17

  Measures ................................................................................................................................................ 18

    *Nature Recreation* .............................................................................................................................. 18

    *Environmental Effects* ...................................................................................................................... 19

    *Recreational Factors* ......................................................................................................................... 20

    *Control Variables* ............................................................................................................................. 20

    *Relationship Satisfaction* .................................................................................................................. 21

Analysis ...................................................................................................................................................... 23

Results ......................................................................................................................................................... 26

  Preliminary Analyses ............................................................................................................................. 26

  Measurement Model ............................................................................................................................... 27

  Primary Hypotheses ............................................................................................................................... 29

    *Mediation Analyses (Hypotheses 1 and 2)* ...................................................................................... 29

    *Moderation Analyses (Hypothesis 3)* ............................................................................................. 32

Discussion .................................................................................................................................................... 35
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesis 1</td>
<td>35</td>
</tr>
<tr>
<td>Hypothesis 2</td>
<td>36</td>
</tr>
<tr>
<td>Hypothesis 3</td>
<td>41</td>
</tr>
<tr>
<td>Limitations</td>
<td>48</td>
</tr>
<tr>
<td>Conclusion</td>
<td>50</td>
</tr>
<tr>
<td>References</td>
<td>52</td>
</tr>
<tr>
<td>Appendix</td>
<td>63</td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table 1. Nature Recreation, Environmental Effects, Recreational Factors, Control Variables and Relationship Satisfaction: Descriptive Statistics (N = 520) .......................................................... 22
Table 2. Nature Recreation, Environmental Effects, Recreational Factors, Control Variables and Relationship Satisfaction: Correlation Table (N = 520) ............................................................... 23
Table 3. Goodness of Fit Statistics of Latent Constructs Before and After Modification Indices 28
Table 4. Unstandardized, Standardized, and Significance Levels for Mediation Models (Standard Errors in Parentheses; N = 520) .................................................................................................... 31
Table 5. Unstandardized, Standardized, and Significance Levels for Moderation Models (Standard Errors in Parentheses; N = 520) ............................................................................................................ 34
LIST OF FIGURES

Figure 1. Conceptual model. ..................................................................................................................................... 4
Figure 2. Mediation Model ..................................................................................................................................... 24
Figure 3. Moderation Model with Recreation Satisfaction as a Control. ........................................................... 26
Strengthening Couples’ Relationships with Nature Recreation

Relationship satisfaction is a central construct in many fields, often serving as an indicator of success for couples’ relationships as well as being associated with individual and family well-being (Bradbury et al., 2000; Funk & Rogge, 2007). Yet at any given time in the United States, nearly one third (31%) of couples are classified as being distressed (Bradbury et al., 2000; Whisman et al., 2009). The cost of relationship dissatisfaction is high and closely connected with poor physical, mental, and emotional health for partners and their children (Booth & Amato, 2001; Johnson et al., 2006; Robles et al., 2014; South & Krueger, 2013). Consequently, it is essential to understand the predictors of couples’ satisfaction to identify potential targets of intervention. Many factors contribute to a satisfying relationship such as the quality of interpersonal interactions, children, individual self-esteem, employment, income, economic factors, life stresses, and interpersonal violence (Bartle-Haring & Lal, 2010; Bradbury et al., 2000; Belsky, 1990; Christensen et al., 2010; Cordova et al., 1993; Erol & Orth, 2017; Greenstein, 1990; Stack & Eshleman, 1998; Whisman et al., 2009). However, there is still much to be known about what makes a relationship satisfying (Sharaievska et al., 2013). The purpose of this study is to examine how recreating in nature may impact couples’ relationship satisfaction.

Recreation is one factor that plays an important role in relationship satisfaction (Crawford et al., 2002; Johnson et al., 2006; Sharaievska et al., 2013; Ward et al., 2014; Zabriskie & McCormick, 2001). With the average American having approximately 3.25 hours per day of recreation time, this represents a major proportion of individuals’ lives (American Time Use Survey, 2018). Furthermore, couples consider spending this recreation time together an important relationship maintenance strategy (Baxter & Dindia, 1990). Recreation can promote
communication between partners and improve couples’ ability to adapt to stressful situations. However, these outcomes are dependent on how couples recreate and what activities they choose to participate in (Johnson et al., 2006; Ward et al., 2014). This has prompted an empirical call to increase the amount of time that couples spend recreating to improve their relationship satisfaction (Crawford et al., 2002; Reissman et al., 1993). However, the complexities remain unknown between recreation and couples’ relationships, including how the recreational environment may contribute to relational benefits. The current study focuses on how the recreational environment, specifically recreation in nature, may positively contribute to relationship satisfaction for individuals.

Spending time in nature has widespread benefits both cognitively and emotionally for individuals (Berman et al., 2008; Bowler et al., 2010; Hartig et al., 2014; McMahan & Estes, 2015). These benefits are so robust that nature has been likened to a therapy with no known side effects, which is available to everyone at zero cost (Berman et al., 2008). While there is an abundance of empirical support detailing the individual benefits of nature, there is virtually no research on the impact that recreating in nature may have on couple relationships (Flett et al., 2010). This study will begin to remedy this by examining individual’s nature recreation and its association with their relationship satisfaction.

This study will examine the link between nature recreation and couples’ relationship satisfaction. First, to provide necessary theoretical structure for the study (Flett et al., 2010) I will review the literature from diverse domains such as environmental psychology, marriage and family therapy, family studies, and recreation and leisure. This will ground my hypotheses detailing how nature recreation may improve a couple’s relationship satisfaction. I then analyze the recreation habits of individuals’ in committed relationships and their reported relationship satisfaction.
satisfaction to test the hypotheses. Currently, there has been no examination of nature recreation and relationship satisfaction, and this study will provide novel insights for several domains and provide future directions for researchers. It is my hope that by understanding the role that recreation plays in creating satisfying relationships that overall quality of relationships may improve through more deliberate recreation.

**Literature Review**

Figure 1 depicts the conceptual model guiding this study. The model posits that a portion of the relationship between nature recreation and relationship satisfaction is mediated by the effects of the environment in which the individual is recreating. The model also predicts that the relationship between nature recreation and relationship satisfaction is moderated by factors such as how challenging, novel, and physiologically arousing the activity is. In the remainder of this literature review, I will discuss each of the links described in this conceptual model.
Couples’ Recreation and Relationship Satisfaction

How individuals choose to spend their recreation time impacts their relationship satisfaction (Holman & Jacquart, 1988). The connection between couple recreation and relationship satisfaction is first evident in research conducted by Orthner (1975), where three categories of couple recreation were delineated: individual (involving just one partner), parallel (couples performing activities side by side) or joint recreation (couples mutually interacting). These different types of recreation are associated with different outcomes for couples’ relationship satisfaction. Independent recreation is consistently an indicator of marital distress and lack of marital satisfaction (Baldwin et al., 1999; Holman & Jacquart, 1988; Orthner & Mancini, 1991). Parallel couple recreation has a mixed effect with studies showing moderate to no improvements on marital satisfaction (Holman & Jacquart, 1988; Orthner, 1975; Palisi, 1984). Joint couple recreation is consistently associated with higher levels of marital satisfaction
(Holman & Jacquart, 1988; Orthner, 1975; Orthner & Mancini, 1991), and this effect has been generalized across cultures (Palisi, 1984). Empirical interest in Orthner’s early work in couple recreation dissipated, but after a decade-long hiatus research in couple recreation, literature remerged at the turn of the 21st century.

Investigators at the turn of the century began analyzing this relationship more closely. One longitudinal study concluded that the more satisfied couples were the more time they spent recreating together (Shebilske, 2000). However, more recent investigations have concluded that recreation does, in fact, lead to relationship satisfaction (Herridge et al., 2003; Johnson et al., 2006; Ward et al., 2014). Researchers also began exploring other potential causal mechanisms underlying the relationship between couples’ recreation and relationship satisfaction. This research concluded that the more satisfaction the couples report in their recreation activities, the higher the relationship satisfaction the couples also reported. This association was stronger than the overall amount of time the couples spent recreating together (Johnson et al., 2006; Ward et al., 2014). This has led researchers to postulate that the couple’s personal satisfaction with recreation activities may be more important than overall recreation time or the level of interaction during recreation for relationship satisfaction.

One explanation for why recreation is positively associated with relationship satisfaction comes from the core and balance model which suggests that it fulfills the needs for stability, familiarity, structure, novelty, change, variety and challenge and leads to increased cohesion and adaptability for the couple (Ward et al., 2014). Other researchers have found that couples recreation improves relationship satisfaction by improving couples’ communication, bonding, and intimacy (Herridge et al., 2003).
We know there is a relationship between couple recreation and relationship satisfaction but more research is necessary. At this point the primary explanation is how much interaction an activity entails (e.g. joint recreation) and how satisfied the couple is in their recreation activities. The previous paragraphs discuss the extent of the knowledge we have about recreation, and relationship satisfaction and Ward et al. (2014) have called for more research to understand this relationship better. Potential directions for research include understanding whether certain types of recreation are more beneficial to couples than others, and if so, why is this the case? This study aims to address this, specifically focusing on how the recreational environment impacts the association between nature recreation and relationship satisfaction. I hypothesize that natural environments yield unique benefits for individuals that may contribute to increased relationship satisfaction. To better understand the potential impact of nature recreation, the environmental effects and corresponding individual effects are outlined below.

**Nature as Mediator of the Relationship Between Recreation and Relationship Satisfaction**

Recreating in nature may be a particularly salient form of recreation. Sumner and Anderson (under review) proposed that recreation in nature exposes individuals to environmental factors that, in turn, lead to cognitive restoration (a positive cognitive state) and the small self (feelings of awe). These beneficial cognitive and affective states lead to a host of positive individual effects. The current study investigates this by examining whether the beneficial cognitive and affective states brought on by nature recreation extend to relationship satisfaction (Figure 1). This model and the literature supporting the various facets of the model are summarized below.
Natures Impact on Individual Functioning

Nature recreation impacts individuals through the environmental effects. The environmental effects originate from two domains, the cognitive and the affective. The Attention Restoration Theory (ART; Kaplan & Kaplan, 1989; Kaplan, 1995) serves as the basis for the cognitive impacts, and research regarding the feeling of Awe serves as a foundation for the affective impacts of nature. These theories propose different causal mechanisms for their impacts on individuals, with the ART functioning through cognitive restoration and the research on Awe noting a phenomenon called the small self (detailed below).

**Cognitive Restoration.** The ART originates from the field of environmental psychology and is the premier theory, guiding and organizing the cognitive benefits of nature for individuals (Berman et al., 2008). The ART is a robust conceptualizing framework that explains how natural environments benefit individuals, and cognitive restoration is the central construct in this process (Berman et al., 2008; Kaplan & Kaplan, 1989; Kaplan, 1995). Cognitive restoration is a positive mental state where an individual’s cognitive abilities are replenished (Kaplan & Kaplan, 1989; Kaplan, 1995). Cognitive restoration is a necessary process as individuals are inherently prone to mental fatigue. Mental fatigue comes as individuals block out distractions and competing thoughts to center their attention on tasks that do not innately hold their attention. This is a voluntary, top-down process where attention is intentionally managed (Berman et al., 2008; Izenstark & Ebata, 2016; Kaplan, 1995; Kaplan & Kaplan, 1989). One’s capacity for this attention is limited and diminishes over time, leading to fatigue, which is the feeling of exhaustion after mentally struggling to focus on a task (Berman et al., 2008; Kaplan, 1995). Any prolonged mental effort will inevitably lead to this cognitive fatigue (Kaplan, 1995; Kaplan & Kaplan, 1989). Modern life requires massive amounts of focused attention with the barrage of
tasks and the virtually endless amount of distractions that fill the average person’s days.

Cognitive restoration restores an individual’s cognitive abilities and ability to focus (Kaplan & Kaplan, 1989; Kaplan, 1995) and occurs when individuals can give their focused attention a break (Kaplan, 1995). This is evident through involuntary attention when innately intriguing stimuli capture attention and sustain it without cognitive effort (Berman et al., 2008; Kaplan, 1995).

There are two types of involuntary attention soft and hard (Berman et al., 2008; Kaplan, 1995). Soft involuntary attention comes from stimuli that capture attention in a gentle bottom-up fashion and often occur outside of awareness (Kaplan, 1995). For instance, think of a night sky or watching the passing clouds on a sunny day; these occupy one’s attention and hold it gently. Soft attention is restorative in that it serves as an opportunity for the individual’s attention mechanisms to take a break (Berman et al., 2008; Izenstark & Ebata, 2016; Kaplan, 1995). The premier example of a stimulus that elicits soft involuntary attention is the natural environment (Izenstark & Ebata, 2016). Alternatively, hard involuntary attention is occupied when stimuli capture attention in a sudden and abrupt way (Kaplan, 1995). While this does occur in a bottom-up fashion, it is often dramatic, fully confining attention and not allowing one’s attention mechanisms to replenish (Kaplan, 1995). For instance, think of watching an event or performance, while these do inherently capture attention, this attention is intense, and one is unlikely to think of anything beyond the present stimulus. Whereas soft involuntary attention allows cognitive mechanisms an opportunity to recover, hard involuntary attention does not, and there are no associated cognitive benefit (Berman et al., 2008; Izenstark & Ebata, 2016; Kaplan, 1995).
**Small Self.** From the field of personality and emotion, there are substantial empirical findings detailing individuals’ affective responses to nature. A common emotional reaction to natural phenomena is the feeling of awe. Awe is an emotional response to perceptually vast stimuli that overwhelm the existing mental structures yet facilitate attempts to make sense of the stimuli (Shiota et al., 2007) and the prototypical awe elicitor is natural phenomenon (Piff et al., 2015).

Awe operates by changing individuals’ perceptions of themselves. After individuals encounter awe inspiring stimuli and experience awe, they experience a process called cognitive accommodation. Cognitive accommodation is the change in schemas to accommodate the awe-inspiring stimuli. Typically, this leads individuals to a state termed the small self in which individuals experience diminished salience of the self (Ballew & Omoto, 2018; Joye & Bolderdijk, 2015; Piff et al., 2015; Shiota et al., 2007). As individuals experience small self, they described making new meaning about themselves and their world (Campos et al., 2013; Joye & Bolderdijk, 2015) and feeling less concerned about day to day worries (Piff, et al., 2015; Shiota et al., 2007). Researchers describe the small self as the causal mechanism linking individuals’ feelings of awe to cognitive and behavioral change (see individual effects Figure 1.) (Shiota et al., 2007).

**Effects of Cognitive Restoration and Small Self on Individuals**

Researchers examining the outcomes of cognitive restoration and small self have identified many beneficial individual effects (see Figure 1).

Cognitive restoration has been shown to improve individuals’ working memory, executive functioning, and directed attention capabilities (Berman et al., 2008; Berto, 2005; Berto, 2014; Bratman et al., 2012; Diamond et al., 2007; Hartig et al., 2014; Jonides et al., 2008).
Beyond cognitive benefits, individuals are likely to experience increased self-confidence, self-esteem, and subjective well-being (Barton & Pretty, 2010; Hartig et al., 2014; Keniger et al., 2013; McMahan & Estes, 2015). These benefits also expected after brief exposure to nature (McMahan & Estes, 2015). Furthermore, individuals are likely to experience a decrease in stress levels, an increase in positive affect, and decreased negative affect (Berman et al., 2008; Bowler et al., 2010; Capaldi et al., 2014; Hartig et al., 2014). On the whole, cognitive restoration plays a key role in successful psychological functioning and mental health (Berman et al., 2008; Brymer, et al., 2010).

The small self increases prosocial behavior through feelings of awe (Campos et al., 2013; Piff et al., 2015; Shiota et al., 2007). The prosocial benefits extend from a reduction in fears, desires, and self-interests (Ballew & Omoto, 2018; Prade & Saroglou, 2016) as individuals report feeling less concerned about day-to-day worries (Piff et al., 2015; Shiota et al., 2007). This allows individuals to behave in ways that are selfless, such as more helping behaviors (Piff et al., 2015), cooperativeness (Zelenski et al., 2015), and generosity (Prade & Saroglou, 2016). Furthermore, individuals who experienced the awe and the small self-reported an increased desire to connect more with others, increased the desire to create intimacy, and wanting to grow more as a person (Weinstein et al., 2009). In sum, awe and the small self’s link to increasing prosocial behavior is replicated and well established (Prade & Saroglou, 2016).

**Characteristics of the Natural Environment Necessary to Achieve Benefits**

Depending on the factors of the environment, nature is associated with diverse individual effects. These environmental factors predispose individuals to the cognitive (cognitive restoration) and affective (awe and the small self) responses that generate the individual effects (see Figure 1).
**Cognitive Restoration.** There are four distinct characteristics that must be present for an environment to be cognitively restorative (see Figure 1). These include *fascination*, *being away*, *extent*, and *compatibility* (Kaplan & Kaplan 1989; Kaplan, 1995). Below, each component will be briefly defined and examined.

The first characteristic of a restorative environment is *soft fascination* (Bratman et al., 2012; Kaplan, 1995), which is the gentle occupation of one’s attention. This allows the individual’s mind to freely wander and not be drawn to one stimulus setting the stage for cognitive restoration to occur (Berman et al., 2008; Kaplan & Kaplan, 1989). Soft fascination is the engagement of soft involuntary attention, and this must be present for any restoration to take place. The second characteristic is *being away* or being at a distance from stress-inducing cognitive tasks (Kaplan, 1995). Mental distance (e.g., looking out one’s window) can also achieve these benefits but, increased physical distance from a stressor will bolster the benefits (Kaplan, 1995; Kaplan & Kaplan, 1989). The third characteristic necessary for a restorative environment is *extent* or an environment that is coherent and rich in detail. Kaplan (1995) suggested that there must be enough extent to constitute “a whole other world” to occupy one’s attention for long enough to receive the benefits (Berman et al., 2008). The final characteristic is *compatibility*. This refers to compatibility between the environment and the individual’s inclinations (Kaplan, 1995). When an individual seeks an environment to fit their desires and the environment fails to meet their expectations, the environment cannot be restorative (e.g., an individual visiting a local pond to relax only to find it overcrowded). Environments that do not meet this last criterion may be taxing (Kaplan, 1995).

**Small Self.** Two criteria precipitate feelings of awe and the small self. These are; the environment must be perceived to be vast, beyond the individual’s ability to comprehend, and
the environment must require cognitive accommodation or foster new meaning making (Shiota et al., 2007). These criteria represent the environmental factors (see Figure 1.) that must be present for an individual to experience awe, the small self, and experience their individual effects. Nature consistently meets these criteria, elicit awe, and the small self (Ballew & Omoto, 2018; Joye & Bolderdijk, 2015; Piff et al., 2015; Prade & Saroglou, 2016; Shiota et al., 2007; Zhang et al., 2014).

The amount of awe one experiences and the likelihood of experiencing the small self is contingent on the environment itself. The more grand or all-encompassing the natural stimuli, the more awe the stimuli elicits (Ballew & Omoto, 2018; Zhang et al., 2014). Moreover, nature rated as more “beautiful” or “extraordinary” elicits more awe than scenes rated less “beautiful” or “extraordinary” (Joye & Bolderdijk, 2015; Zhang et al., 2014). However, “mundane” nature, such as a city park or garden also elicits awe (Joye & Bolderdijk, 2015). Awe can is elicited by different degrees depending on the environmental factors, but the more grand an environment is, the more it meets the criteria for awe and the more awe it elicits (Kjellgren & Burkhall, 2010; Shiota et al., 2007). Feelings of awe are what prompt the small self, and the more intense the feeling of awe, more intense the experience of the small self will be. Therefore, the more vast and the more cognitive accommodation an environment inspires, the greater the awe and the experience of the small self will be.

**Connection Between Individual Effects and Relationship Satisfaction**

This is the pivotal link connecting nature recreation to relationship satisfaction through the individuals’ effects from the environmental factors (see Figure 1). Succinctly, the individual effects are wide-ranging including cognitive improvement, (Berman, et al., 2008; Berto, 2005; Berto, 2014; Bratman et al., 2012; Diamond et al., 2007; Hartig et al., 2014; Jonides et al., 2008),
self-appraisal and well-being benefits, (Barton & Pretty, 2010; Hartig et al., 2014; Keniger et al., 2013; McMahan & Estes, 2015) and decreased stress/elevated mood (Berman et al., 2008; Bowler et al., 2010; Capaldi et al., 2014; Hartig et al., 2014). Moreover, individual effects include greater prosocial behaviors (helpfulness, generosity, and cooperation; Piff, et al., 2015; Prade & Saraglou, 2016; Zelenski et al., 2015; and increased desire to relate positively to others (increased desire to connect with others and intimacy; Weinstein et al., 2009). Collectively, these individual effects provide distinctive advantages for strengthening relationships. The current study explores the extension of these individual effects to individuals’ relationships, whereby the individual effects of nature recreation produce increased relationship satisfaction.

Individuals’ stress decreases relationship satisfaction and increase couples’ stress (Bradbury et al., 2000; Randall & Bodenmann, 2017), therefore, with a reduction of stress from cognitive restoration it is plausible to see a corresponding rise in relationship satisfaction. Similarly, individual's well-being and self-appraisals are positively associated with relationship satisfaction (Proulx et al., 2007; van Scheppingen et al., 2018) when individual well-being improves so does relationship satisfaction and vice versa. As a result, improving individual well-being through nature recreation may also improve relationship satisfaction. Additionally, mood has been positively linked with relationship (Conway & Hassebrauck, 1997) where improvements in mood are correlated with an increase in relationship satisfaction. Again, through nature recreation, individuals may experience improved mood and may experience improved relationship satisfaction as a result. Lastly, nature is associated with an increase in prosocial behaviors (Campos et al., 2013; Piff et al., 2015) such as selfless acts, more helping behaviors (Piff et al., 2015), increase cooperativeness (Zelenski et al., 2015), and increased generosity (Prade & Saraglou, 2016) through awe and the small self. Furthermore, this is
associated with reported increases in an individual’s desire to connect with others and increased the desire to create intimacy (Weinstein et al., 2009). All of these outcomes connect the individual effects of nature recreation to improved relationship satisfaction.

**Recreational Factors as Moderators of the Relationship Between Recreation and Relationship Satisfaction**

While the environment has a distinct ability to restore us psychologically and to inspire prosocial behavior, the specific recreational factors inherent in recreation activities predispose individuals for beneficial relational outcomes. The previous research regarding challenge, novelty, and arousal will detail how recreational factors influence what relational effects an individual will experience through recreation (see Figure 1).

**Challenge, Novelty, and Arousal**

The amount of relational benefit an individual is likely to experience from a given activity is contingent on several recreational factors of the activity itself. The main factor is the amount of challenge, novelty, and physiological arousal elicited by that activity. Examples include completing a difficult task, participating in a new pursuit, or exercising. All of these operate on the process of misattribution (Lewandowski & Aron, 2004; Schacter & Singer, 1962). When couples participate in such activities, they experience a physiological escalation, and this escalation is misattributed to one’s partner and not the activity itself (Schacter & Singer, 1962). Essentially, this means that the intrapsychic changes one feels during a challenging, novel, or arousing activity is misattributed as attraction to one’s significant other. This is termed the arousal-attraction effect (Dutton & Aron, 1974; Lewandowski & Aron, 2004). For instance, when a couple takes a walk together, they may experience, physiological arousal (increased heart rate) and encounter novel stimuli and, as a result, may experience an increase in their perceived
relational quality. Furthermore, the more challenging, novel, and physiologically arousing an activity is, the greater the relational effect (Aron et al., 2000; Lewandowski & Aron, 2004). This can is represented in the conceptual model by referring to Figure 1, where recreational factors such as the degree to which an activity is challenging, novel, and physiologically arousing the more likely those individuals are to experience the relational effects.

When individuals participate in activities that meet the recreational factors of being challenging, novel, and/or physiologically arousing, individuals are likely to experience a variety of effects. These types of activities have been found to enhance relationship quality and lead to greater feelings of love, (Aron et al., 2000; Lewandowski & Aron, 2004; Reissman et al., 1993). Moreover, after participating in such activities, individuals feel more attracted to their partner and report more positive feelings about their partner (Aron et al., 2000; Lewandowski & Aron, 2004). Overall, activities that are challenging, novel, and/or physiologically arousing provide a context for improved relationship quality. The current study investigates the specific recreational factors and their contribution to relationship satisfaction and will be the first to examine the link between recreational factors of nature recreation and relationship satisfaction (see Figure 1).

**Current Study**

While previous findings show there is an association between couple’s recreation and relationship satisfaction (Johnson et al., 2006; Ward et al., 2014) there has been no investigation of nature recreation’s association with relationship satisfaction despite a call to investigate (Flett et al., 2010). The purpose of this study is to fulfill this need and investigate whether nature recreation is associated with improved relationship satisfaction. This will be accomplished by examining some key aspects of the conceptual model (Figure 1). Specifically, examining the
mediation effects of the environmental effects (composed of the environmental effects, cognitive restoration and feelings awe/small self) between nature recreation and relationship satisfaction. Additionally, this study will examine the moderation effects of the recreational factors between nature recreation and relationship satisfaction. The most notable difference in the conceptual model and the current study is that the individual effects of nature will not be examined here.

**Hypotheses**

The current study investigates three hypotheses. (1) There will be a direct, positive relationship between nature recreation and relationship satisfaction. (2) The relationship between nature recreation and relationship satisfaction will be mediated by the environmental effects (cognitive restoration and awe). (3) The relationship between nature recreation and relationship satisfaction will be moderated by recreational factors such as challenge, novelty, and arousal. See Figures 2 and 3 for a graphic representation of the hypotheses.

**Methods**

**Participants**

Participants for this study came from a cross-sectional Mechanical Turk (MTurk) survey, following typically-utilized MTurk surveying techniques (Buhrmester et al., 2011; Goodman et al., 2013). Five hundred sixty-five respondents met the inclusion criteria of the study: In a committed relationship for at least one year, at least 18 years old, living in the U.S., and not a member of a vulnerable population (e.g. pregnant, in prison/jail, economically disadvantaged, mentally disabled [unable to provide consent], or educationally disabled). Nineteen were excluded due to unfinished surveys or extreme outliers in recreation information (e.g. reporting 200 hours of nature recreation per week) and 26 were excluded due to failing the attention check.
question (a question that filter careless respondents) from the survey, leaving 520 respondents in the sample.

Respondents had a mean age of 32.47 years old ($SD = 9.91$) and 45.83% reported their sex as male (46.64% reported their gender as male) and 52.69% reported their sex as female (52.98% reported their gender as female) with 0.37% opting not to disclose their sex (0.19% opting not to disclose their gender) and 0.19% reported their gender as non-binary. Relating to race/ethnicity 49.72% of the respondents reported being European American, 8.72% African American, 20.41% Asian American, 4.82% Latino/a, 6.49% Native American or Alaskan Native, 0.37% Native Hawaiian or Pacific Islander, and 4.82% did not report their race/ethnicity. The mean duration of the respondents’ relationship was 8.10 years ($SD = 9.28$) with the majority reporting being married (57.70%), followed by dating (26.16%), engaged (10.76%), and other (5.01%). With these respondents 43.41% reported no children, 23.38% reported one child, 22.82% reported two children, and 10.39 reporting three or more children. In terms of education, 4.08% had a high school degree, 15.96% had some college, 59.93% had a college degree, 16.14% had a graduate or professional degree, and 3.53% reported an alternate education level.

**Procedures**

After receiving IRB approval for the project, participants were recruited using MTurk, an internet-based survey tool available through Amazon, where workers complete paid tasks. For this study, a task was posted describing “Strengthening Relationships with Nature”. Once individuals opted to participate in the study, they were given informed consent. 1195 individuals began the survey. After they consented they had to meet the following inclusion criteria before being eligible to participate in the study; participants must currently be in a committed relationship that has lasted for at least one year, they must be at least 18 years old, they must not
be a member of a vulnerable population, and they must be a resident of the United States. 402 respondents did not meet these criteria. The survey was administered to the 793 individuals who met the inclusion criteria. A copy of the survey is provided in Appendix 1. 228 individuals did not complete the survey, a completion rate of 71.2%. Upon the completion of the survey the respondents received a completion code, which they then reported to receive compensation. 565 respondents completed the survey and reported their code. These respondents were compensated $0.50 through MTurk.

The data was then inspected to ensure its quality. First, respondents were excluded if they did not correctly answer the attention check item included in the survey. Next, I inspected the data visually for any patterns or abnormal responses but none were detected and respondents with outliers for key constructs (i.e. reporting 200 hours of nature recreation per week) were dropped from the study.

Measures

The measures below are organized by the constructs they represent in the study. All descriptive statistics for measures are presented in Table 1 and a correlation table is presented in Table 2.

Nature Recreation

Participants were asked to provide information regarding their recreational patterns. This included the amount of recreation time they have, how much of that time they spend outdoors by themselves and how much of that time they spend outdoors with their partner. These were measured numerically in hours per week as consistent with prior research (Ward et al., 2014). In an effort to isolate nature recreation compared to recreation in general, the total amount of nature recreation (both nature recreation with their partner and by themselves) was divided by the total
amount of recreation. This created a single indicator that was a percentage of individuals recreation that was nature recreation. Higher scores indicated more nature recreation. This was the primary indicator variable used in the study. The face validity is sound but no validity or reliability information could be obtained.

Environmental Effects

This is a key latent construct in the current study used in the mediation analyses and it is composed of the Perceived Restorativeness Scale (Pasini et al., 2014) which is designed to measure the cognitive restorativeness of environments and awe which is designed to measure feelings of awe.

Perceived Restorativeness Scale. The restorativeness of the natural environment where the respondents report spending the most time in was measured using the Perceived Restorativeness Scale (PRS-11 Pasini et al., 2014). This is a revised version of the previously used 26 item version of the PRS (Hartig et al., 1996). The PRS has been one of the most widely used measures and is reported to be the most sensitive and generalizable measure of environmental restorativeness. The PRS was created to reflect the properties of the ART and consistent with Kaplan’s 1995 concepts of fascination, being away and extent (Pasini et al., 2014). The scale has good face validity, it’s convergent validity is reported greater than or equal to .62, it’s discriminant validity is reported between .84 and .63, and it’s Cronbach’s alpha is reported between .70 and .98 showing adequate to high reliability (Han, 2018). Additionally, this scale has been used in diverse populations to test reliability across cultures (Han, 2018). This scale uses 11 Likert type questions on a 10-point scale where higher scores indicate more restoration. Cronbach’s alpha in the current study was .88.
Awe. Respondent’s feelings of awe were assessed with one seven-point Likert item of self-reported affect, “during this activity I feel awe” (1 = Not at all to 7 = A great deal). This is consistent with the current assessment procedures for awe (Ballew & Omoto, 2018; Piff et al., 2015). Cronbach’s alpha for the combined measure of environmental effects (PRS-11 and Awe) for the current sample is .89.

Recreational Factors

This is a key latent construct in the current study used in the moderation analyses and is composed of items measuring novelty, challenge, and arousal.

Challenge, Novelty, and Arousal. The challenge, novelty, and arousal of the activity that the respondents reported spending the most time doing was measured using self-report on four 10-point Likert type questions. These questions have been used previously, most notably by Lewandowski and Aron (2004). Two of the questions assess the novelty of the activity where respondents report on how “fun” and “exciting” the activity is. The other two questions assess the challenge and physiological arousal of the activity where respondents report on how much “exertion” the activity requires and how much the activity “raises one’s heart rate” (1 = Not at all to 10 = Very much). The face validity is sound and Cronbach’s alpha was reported to be .87 (Lewandowski & Aron, 2004). Cronbach’s alpha in the current study was .74.

Control Variables

These were the primary controls to rule out potentially confounding effects. These range from basic socio-demographic variables to recreation specific variables.

Socio-Demographics. Demographic information such as age, sex, gender, race/ethnicity, relationship duration, and education, was obtained. Age was reported in years, sex and gender
was measured in four categories: male, female, non-binary, prefer not to respond. Race/ethnicity was measured in seven categories: European American, African American, Asian American, Latino/a, Native American, Pacific Islanders, and “not listed above”. Relationship duration was measured in years. Education was measured in five categories: less than high school, high school degree, some college, college degree, and post-college degree.

Recreational Satisfaction. Respondents’ satisfaction with their recreational activities was assessed using one seven-point Likert items of self-reported satisfaction, “I am satisfied with our participation in this activity” (1 = Not at all to 7 = Very much). While the face validity is sound the measure lacks reliability and further validity information.

Joint Recreation. Respondents’ joint recreation was measured by asking participants how much recreation time they have with their partners, assessing both indoor and outdoor recreation. Individuals’ recreation with their partner, both indoor and outdoor, were added together to create a joint recreation variable that represents the amount of recreation per week individuals spent recreating with their partner.

Relationship Satisfaction

Relationship satisfaction was measured as the outcome of this study. It was measured using the Couple Satisfaction Index CSI (Funk & Rogge, 2007). The CSI uses 16 items to assess couple satisfaction using Likert scales. Items are summed to yield a global assessment of relationship satisfaction and higher scores indicate greater satisfaction (Khaddouma et al., 2015). Here the items were combined to create a latent construct of relationship satisfaction this was done to put the participants responses on a meaningful scale. The CSI-16 has solid psychometrics with good test-retest reliability, a Cronbach’s Alpha of .98, and strong convergent validity (Funk & Rogge, 2007). This is the premier assessment of relationship satisfaction
especially with unmarried partners (Graham et al., 2011). Cronbach’s Alpha for the current sample was .94.

Table 1. Nature Recreation, Environmental Effects, Recreational Factors, Control Variables and Relationship Satisfaction: Descriptive Statistics (N = 520)

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Percent Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature Recreation</td>
<td>0.47</td>
<td>0.15</td>
<td>0 – 0.94</td>
<td>3.53</td>
</tr>
<tr>
<td>Environmental Effects (PRS-11 and Awe)</td>
<td>6.77</td>
<td>2.28</td>
<td>1 – 10</td>
<td>1.21</td>
</tr>
<tr>
<td>Recreational Factors</td>
<td>7.09</td>
<td>2.42</td>
<td>1 – 10</td>
<td>0.88</td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreation Satisfaction</td>
<td>5.45</td>
<td>1.40</td>
<td>1 – 7</td>
<td>1.86</td>
</tr>
<tr>
<td>Joint Recreation</td>
<td>13.81</td>
<td>14.51</td>
<td>0 – 96</td>
<td>2.23</td>
</tr>
<tr>
<td>Relationship Satisfaction (CSI-16)</td>
<td>4.60</td>
<td>1.31</td>
<td>1 – 7</td>
<td>0.75</td>
</tr>
</tbody>
</table>
Table 2. Nature Recreation, Environmental Effects, Recreational Factors, Control Variables and Relationship Satisfaction: Correlation Table (N = 520)

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nature Recreation</td>
<td>−</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Environmental Effects (PRS-11 and Awe)</td>
<td>0.16***</td>
<td>−</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Recreational Factors</td>
<td>0.04</td>
<td>0.60***</td>
<td>−</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Recreation Satisfaction</td>
<td>-0.07</td>
<td>0.43***</td>
<td>0.49***</td>
<td>−</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Joint Recreation</td>
<td>0.09*</td>
<td>0.11**</td>
<td>-0.02</td>
<td>-0.03</td>
<td>−</td>
<td></td>
</tr>
<tr>
<td>6. Relationship Satisfaction (CSI-16)</td>
<td>-0.12**</td>
<td>0.17***</td>
<td>0.21***</td>
<td>0.40***</td>
<td>-0.03</td>
<td>−</td>
</tr>
</tbody>
</table>

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

**Analysis**

To test the first two hypotheses, (1) that there is a direct relationship between nature recreation and relationship satisfaction, and (2) that this relationship is mediated by the environmental effects, I used the segmentation approach of mediation proposed by Rungtusanatham et al. (2014) combined with bias corrected bootstrapping techniques (Preacher & Hayes, 2008) to examine the significance of indirect effects. The segmentation approach of mediation is the most current and robust method of analyzing mediation and directly accounts for many of the inherent limitations of the Baron and Kenny (1986) approach for mediation. The segmentation approach states that mediation is a relationship between two variables X and Y and is mediated by a third variable M. In the segmentation approach the effect of X on M is first examined, then the effect on M on Y is examined before examining the mediation effect where X
has an indirect effect on Y through M (Rungtusanatham et al., 2014). These effects were examined with the final model testing mediation using bias corrected bootstrapping at 5000 draws (Kline, 2016; Memon et al., 2018; Preacher & Hayes, 2008; Rungtusanatham et al., 2014). Bootstrapping allows the estimation of adjusted standard errors and confidence intervals for indirect effects, thus providing appropriate tests of significance (Kline, 2016; Memon et al., 2018). Control variables that were not significant were removed from the model. Only the results of the final, most parsimonious model, are reported (see Figure 2).

Figure 2. Mediation Model

Note: Recreation satisfaction, joint recreation, age, sex, gender, race/ethnicity, relationship duration, and education were controlled for but not included here.

To test the final hypothesis, (3) that the impact of nature recreation on relationship satisfaction is moderated by recreational factors of challenge, arousal, and novelty, I used the
latent variable interaction approach described by Maslowsky et al. (2015), and the results were analyzed by the Johnson Neyman technique of plotting and examining simple slopes (Carden et al., 2017). The Maslowsky et al. (2015) approach for examining latent variable interaction is a two-step estimation procedure that uses the XWITH command in Mplus (Muthén & Muthén, 1998-2014) and allows a sample estimates to be obtained. In this study the latent variable interaction approach was used despite the nature recreation being an observed variable. The latent variable of recreational factors was interacted with the observed variable nature recreation. Then the Johnson Neyman technique is used to plot the sample estimates for the continuous values of the interaction to obtain a rich picture of the moderation effects. All predictor variables were mean centered to avoid collinearity in the model with the main effects. The latent variable interaction approach (Maslowsky et al., 2015) first requires the model to be estimated without the interaction term to establish model fit and then the model is estimated with the interaction term to test for significance (Maslowsky et al., 2015). Then the Johnson Neyman technique of examining simple slopes required the standardized coefficients to be graphed (Carden et al., 2017). The model was first estimated with all control variables. Control variables that were not significant were removed from the model. Only the results of the final, most parsimonious model, are reported (see Figure 3). Since the models reported in figures 2 and 3 were constructed according to existing theory and with specific forethought, no alternative models were examined (MacKinnon et al., 2012).
Figure 3. *Moderation Model with Recreation Satisfaction as a Control.*

Note: Joint recreation, age, sex, gender, race/ethnicity, relationship duration, and education were controlled for but not included here.

**Results**

**Preliminary Analyses**

The respondents of the survey reported 13.26 hours per week of nature recreation (SD = 15.46) and 28.27 hours per week of recreation in general (SD = 26.39). These were combined to create the variable nature recreation, which is the percent of recreation that took place in nature. The mean of nature recreation was 0.46 (SD = 0.15) or about 46% percent of recreation took place in nature on average. The data was analyzed for outliers, multicollinearity, heteroskedasticity, skewness, kurtosis, and missing data patterns. Very little missing data in the current sample (see Table 1); results of Little’s MCAR test indicate that the data is not MCAR (0.82). However, due to the small percent of missing data, no further examination of
missingness was deemed necessary (Schafer, 1999). Cook’s D was used to assess the data for outliers and no outliers were observed (Hidekazu, 1991).

**Measurement Model**

The latent construct of environmental effects was created by combining the PRS-11 and awe question, creating a 12-indicator latent construct. The latent construct recreational factors, was created by combining the four items for challenge, novelty, and arousal creating a four indicator latent construct representing the recreational factors. The latent construct of relationships satisfaction was created by using the items from the CSI-16, creating a 16 indicator construct representing relationship satisfaction.

The factor structure of each latent variable was investigated using a one factor CFA model. Because a small percentage of the participants’ data was missing (mean data per item = 0.96%) I used the maximum likelihood estimation approach to account for missing data (Enders, 2001). The fit was evaluated considering the Chi-square, root-mean-square-error or approximation (RMSEA), the Comparative Fit Index (CFI), and the Standard Root Mean Square Residual (SRMR) as operationalized in Stata15 (StataCorp, 2017). The model fit indices can be seen in Table 3.
Table 3. Goodness of Fit Statistics of Latent Constructs Before and After Modification Indices

<table>
<thead>
<tr>
<th>Model</th>
<th>X2</th>
<th>df</th>
<th>CFI</th>
<th>SRMR</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before Modification Indices</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental effects</td>
<td>593.94***</td>
<td>54</td>
<td>0.80</td>
<td>0.089</td>
<td>0.14</td>
</tr>
<tr>
<td>Recreational factors</td>
<td>182.44***</td>
<td>2</td>
<td>0.74</td>
<td>0.12</td>
<td>0.41</td>
</tr>
<tr>
<td>Relationship satisfaction</td>
<td>1486.25***</td>
<td>104</td>
<td>0.77</td>
<td>0.10</td>
<td>0.16</td>
</tr>
<tr>
<td><strong>After Modification Indices</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental effects</td>
<td>168.99***</td>
<td>50</td>
<td>0.96</td>
<td>0.04</td>
<td>0.07</td>
</tr>
<tr>
<td>Recreational factors</td>
<td>8.38**</td>
<td>1</td>
<td>0.99</td>
<td>0.03</td>
<td>0.12</td>
</tr>
<tr>
<td>Relationship satisfaction</td>
<td>501.00***</td>
<td>89</td>
<td>0.93</td>
<td>0.08</td>
<td>0.09</td>
</tr>
</tbody>
</table>

***p < .001, **p < .01.

Analyses were conducted in three steps. First, I conducted preliminary analyses to assess for outliers using Cook’s D, multicollinearity, heteroskedasticity, skewness, kurtosis and missing data patterns. These analyses were conducted using Stata15 (StataCorp, 2017). Following these preliminary analyses, the measurement portion of each model was examined, including the factor loadings, Cronbach’s alphas, and goodness-of-fit for the environmental effects, recreational factors, and relationship satisfaction. In the final step I used structural equation modeling (SEM) in MPlus version 8 (Muthén, & Muthén, 1998-2014) to test the three primary hypotheses. SEM was selected as it accounts for measurement error, which reduces bias in coefficients and simultaneously estimating both direct and indirect paths (Kline, 2016), and SEM allowed for the most concise testing of the hypotheses. I opted to use Mplus as it adequately allows for testing
interaction effects of latent variables and it can generate bootstrapped standard errors and
certainty intervals (Kline, 2016) both of which are essential in testing the hypotheses.

Modification indices were used to establish model fit for each latent construct, with
environmental effects requiring four modifications (Correlating items: 8 and 9, 7 and 9, 7 and 8,
1 and awe), recreational factors requiring one modification (Correlating items: outact_fun and
outact_excit), and relationship satisfaction requiring 15 modifications (Correlating items: 13 and
11, 16 and 14, 13 and 12, 16 and 2, 14 and 2, 7 and 3, 3 and 1, 16 and 10, 15 and 12, 7 and 1, 16
and 9, 4 and 3, 6 and 8, 16 and 11, 16 and 13). These results can be observed in Table 1 and
collectively the model fit indices were observed to be in the acceptable (Hu & Bentler, 1999).
While the RMSEA for recreational factors was beyond the suggested cut off the collective fit of
the final model was acceptable (Hu & Bentler, 1999). The factor structure of each latent variable
showed all indicators loaded on single factor and no loadings were less than 0.4. Cronbach’s
alphas for environmental effects, recreational factors, and relationship satisfaction were all
acceptable (environmental effects = 0.89, recreational factors = 0.74, and relationship
satisfaction = 0.94).

Primary Hypotheses

Mediation Analyses (Hypotheses 1 and 2)

In accordance with the segmentation approach of mediation proposed by
Rungtusanatham et al. (2014) the first step examined the association between nature recreation
and environmental effects, and there was a significant direct association ($\beta = 0.158$, $p < .01$).
The second step examined the association between environmental effects and relationship
satisfaction, and there was a significant direct association ($\beta = 0.315$, $p < .001$). The final step
examined the indirect association of nature recreation with relationship satisfaction through
environmental effects. A significant direct association was found between nature recreation and environmental effects ($\beta = 0.158$, $p < .01$), as well as between environmental effects and relationship satisfaction ($\beta = 0.329$, $p < .001$). Also, significant direct association was found between nature recreation and relationship satisfaction ($\beta = -0.107$, $p < .05$). Last, a significant indirect association was found between nature recreation and relationship satisfaction through environmental effects ($\beta = 0.052$, $p < .01$). These findings supports my second hypothesis of a positive indirect effect between nature recreation and relationship satisfaction through environmental effects but do not support my first hypothesis about a positive direct effect between nature recreation and relationship satisfaction. These results can be seen in Table 4. Model fit was acceptable CFI (0.92), RMSEA (0.06), and SRMR (0.07). Controls were investigated but did not alter the results. Therefore, only the results of the most parsimonious model are presented.
Table 4. *Unstandardized, Standardized, and Significance Levels for Mediation Models (Standard Errors in Parentheses; N = 520)*

<table>
<thead>
<tr>
<th>Step</th>
<th>Specification</th>
<th>Unstandardized</th>
<th>Standardized</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nature Recreation → Environmental Effects</td>
<td>1.85 (.55)</td>
<td>0.16</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Environmental Effects → Relationship</td>
<td>0.15 (.02)</td>
<td>0.32</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Nature Recreation → Relationship</td>
<td>-0.60 (.29)</td>
<td>-0.11</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>Environmental Effects → Environmental Effects</td>
<td>1.85 (.57)</td>
<td>0.16</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Indirect Effect Nature Recreation on Relationship Satisfaction</td>
<td>0.29 (.11)</td>
<td>0.05</td>
<td>0.01</td>
</tr>
</tbody>
</table>

As a follow up, analyses were conducted to better investigate the findings regarding my first hypothesis. This entailed estimating correlations to examine how other known recreational factors related to the summed relationship satisfaction score. The sum of the relationship
A series of Pearson’s R correlations were conducted. Total recreation was not significantly correlated with relationship satisfaction $r (518) = 0.0043, p = 0.3278$. Joint recreation was not significantly correlated with relationship satisfaction $r (518) = 0.0042, p = 0.9236$. These correlations give more context to the significant direct association that was found between nature recreation and relationship satisfaction in that above analyses.

**Moderation Analyses (Hypothesis 3)**

The first model examined the relationship between the exogenous variables (nature recreation and recreational factors) and outcome variable (relationship satisfaction) to establish model fit. Model fit was acceptable (CFI=.92), RMSEA (.08), and SRMR (0.08; Hu & Bentler, 1999). Nature recreation was negatively associated with relationship satisfaction though this was not statistically different from zero ($\beta = -0.377, p = 0.132$), and positively associated with recreational factors though this was not statistically different from zero ($\beta = 0.447, p = 0.132$). Recreational factors were positively associated with relationship satisfaction and this relationship was significantly different from zero ($\beta = 0.149, p < .001$).

The second model added the latent variable interactions between the exogenous variables nature recreation and recreational factors, and examined their association with relationship satisfaction. Each of the control variables (recreation satisfaction, joint recreation, age, sex, gender, race/ethnicity, relationship duration, and education) were systematically added to this model as well. The control variable recreation satisfaction was found to have a significant impact on the model while all other control variables were found to not have any significant impact. The main effects were similar to the previous model. Nature recreation was still slightly negatively associated with relationship satisfaction though this was not significant ($\beta = -0.025, p$
= 0.622) and still positively associated with recreational factors though this was not significant ($\beta = 0.058$, $p = 0.247$). Recreational factors were positively associated with relationship satisfaction but this was not significant ($\beta = 0.070$, $p = 0.206$). And, recreation satisfaction was positively associated with relationship satisfaction and this effect was significant ($\beta = 0.378$, $p < 0.000$). The interaction between nature recreation and recreational factors was not significant when including the control variable relationship satisfaction ($\beta = 0.094$, $p = 0.115$). This indicates that the third hypothesis was not supported. Results are presented in Table 5.
Table 5. Unstandardized, Standardized, and Significance Levels for Moderation Models (Standard Errors in Parentheses; N = 520)

<table>
<thead>
<tr>
<th>Parameter Estimate</th>
<th>Unstandardized</th>
<th>Standardized</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Moderation Model</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational Factors → Relationship Satisfaction</td>
<td>0.20 (.03)</td>
<td>0.42</td>
<td>0.00</td>
</tr>
<tr>
<td>Nature Recreation → Relationship Satisfaction</td>
<td>-0.35 (.24)</td>
<td>-0.06</td>
<td>0.15</td>
</tr>
<tr>
<td>Nature Recreation → Recreational Factors</td>
<td>0.19 (.65)</td>
<td>0.02</td>
<td>0.77</td>
</tr>
<tr>
<td>Second Moderation Model (with controls)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational Factors → Relationship Satisfaction</td>
<td>0.05 (.20)</td>
<td>0.07</td>
<td>0.21</td>
</tr>
<tr>
<td>Nature Recreation → Relationship Satisfaction</td>
<td>-0.14 (.62)</td>
<td>-0.03</td>
<td>0.62</td>
</tr>
<tr>
<td>Nature Recreation → Recreational Factors</td>
<td>0.01 (.25)</td>
<td>0.06</td>
<td>0.25</td>
</tr>
<tr>
<td>Recreation Satisfaction → Relationship Satisfaction</td>
<td>0.23 (.00)</td>
<td>0.38</td>
<td>0.00</td>
</tr>
<tr>
<td>Interaction between Nature Recreation and Recreational Factors with Relationship Satisfaction</td>
<td>0.48 (.12)</td>
<td>0.09</td>
<td>0.12</td>
</tr>
</tbody>
</table>
Discussion

The purpose of this study was to investigate the association between recreation and relationship satisfaction by exploring the role of the recreational environment. Furthermore, this research was meant to generalize the effects from individual nature recreation and apply them to couples and explore what factors of recreation may account for improved relationship satisfaction (Johnson et al., 2006; Izenstark & Ebata, 2016; Sharaievksa et al., 2013; Ward et al., 2014). This study helps to answer previous calls for research by examining the effects of nature recreation on relationship satisfaction (Flett et al., 2010; Sharaievksa et al., 2013).

The study’s aim was met by examining three hypotheses. The first hypothesis was nature recreation has a positive direct effect on relationship satisfaction. However, this hypothesis was not supported. The second hypothesis was nature recreation has a positive indirect effect on relationship satisfaction through environmental effects and this hypothesis was supported. The third hypothesis was the more recreational factors reported in the nature recreation (i.e., challenge novelty, and arousal), the greater the impact recreation would have on relationship satisfaction. This hypothesis was not supported. A graphic representation of these hypotheses is present in Figures 2 and 3.

Hypothesis 1

*There will be a direct, positive relationship between nature recreation and relationship satisfaction.*

This hypothesis was not supported. Individuals who reported higher proportions of nature recreation reported lower relationship satisfaction. This finding is challenging to integrate into previous research because it stands in contrast to previous findings indicating that recreation is positively associated with relationship satisfaction (Crawford et al., 2002; Holman & Jacquart,
It is difficult to explain why the proportion of nature recreation would have a negative effect on relationship satisfaction. One potential explanation is that relationally distressed individuals may recreate in their own as a way to avoid their partner. Another alternative explanation is that the proportion of nature recreation may simply not contribute as a predictor of relationship satisfaction. While this may be the case, it is interesting that other recreation factors that have been previously established as correlates of relationship satisfaction were also not related to relationship satisfaction in this sample. For example, in previous work total recreation and joint recreation both predicted relationship satisfaction (Holman & Jacquart, 1988; Orthner, 1975; Orthner & Mancini, 1991; Ward et al., 2014) but in this study these factors were unrelated to relationship satisfaction. These findings stand in stark contrast to previous research and an explanation may be that the data gathered here was anomalous. Alternatively, it may be that the self-reported measurement of nature recreation may not be as valid or reliable as other means of measurement such as an actometer or daily diary. Another explanation may be that this finding may highlight the intricacies of the relationship between nature recreation and relationship satisfaction.

**Hypothesis 2**

The relationship between nature recreation and relationship satisfaction will be mediated by the environmental effects (cognitive restoration and awe).

There was a positive indirect effect between nature recreation and relationship satisfaction through the environmental effects. Additionally, several significant direct effects were found between nature recreation and environmental effects as well as between the environmental effects and relationship satisfaction seen in Figure 2.
There is a positive direct effect between nature recreation and environmental effects. This indicates when individuals spend a higher proportion of their leisure time in nature, they are also more likely to report that their most frequent recreation activity leads to cognitive restoration and awe (Kaplan & Kaplan 1989; Kaplan, 1995; Shiota et al., 2007). This provides support for the theories ART and awe (Kaplan & Kaplan 1989; Kaplan, 1995; Shiota et al., 2007). Furthermore, this finding supports that the individuals in this study experienced the outcomes of cognitive restoration and awe. Both cognitive restoration and awe are states that are highly advantageous for individuals because these states are associated with a host of benefits such as cognitive improvement, decreased stress, feeling better about oneself, and increased prosocial behavior (Capaldi et al., 2014; Hartig et al., 2014; McMahan & Estes, 2015; Prade & Saraglou, 2016). As individuals experience these environmental effects and the resulting cognitive and emotional benefits, it may prime them for improved relationship satisfaction. This direct effect between nature recreation and the environmental effects is also critical in that it increases the generalizability of the theories ART and awe (Kaplan & Kaplan 1989; Kaplan, 1995; Shiota et al., 2007). The current study examined both individual and dyadic nature recreation where previous empirical work has focused exclusively on individual recreation (Berman et al., 2008). This is important because it supports that dyadic recreation may function similarly to individual nature recreation and thus would have similar benefits, such as cognitive improvement, decreased stress, feeling better about oneself, and increased prosocial behavior (Capaldi et al., 2014; Hartig et al., 2014; McMahan & Estes, 2015; Prade & Saraglou, 2016).

Next, there is another positive direct effect between environmental effects and relationship satisfaction, where those who experience higher environmental effects from their most frequent recreation environment also report greater relationship satisfaction. This is a novel
finding and contributes to the field as a whole. The most substantial ramification is that it supports a new link between the environmental effects of cognitive restoration and awe with improved relationship satisfaction. This is critical as it illuminates a potential new benefit of environmental effects, improved relationship satisfaction. As discussed, there is already a wide range of benefits that are associated with natural environments (Capaldi et al., 2014; Hartig et al., 2014; McMahan & Estes, 2015; Prade & Saraglou, 2016). This study is the first to show that individuals who experience these environmental effects from their most frequent recreation activity also have higher rates of relationship satisfaction. This extends the benefits of nature recreation, cognitive restoration, and awe that were previously discussed (Capaldi et al., 2014; Hartig et al., 2014; McMahan & Estes, 2015; Prade & Saraglou, 2016) and shows that they may have real-world implications for individual’s relationships with others. This direct effect met the aims of the study by identifying a link between the environmental effects and the relational effects of nature recreation (Flett et al., 2010).

Furthermore, as hypothesized, there was a positive indirect effect where the proportion of the nature recreation had a positive effect on relationship satisfaction through the environmental effects of the most frequent environment used for recreation. This was strong support for the second hypothesis. The largest contributions, relating to this finding, is that the environment where individuals spend the most time recreating contributes to their relationship satisfaction if it adequately meets the environmental criteria. This serves as a new explanation underlying the positive relationship observed regarding recreation and couple’s relationship satisfaction (Crawford et al., 2002; Johnson et al., 2006; Sharaievska et al., 2013; Ward et al., 2014; Zabriskie & McCormick, 2001). Researchers have identified several key mechanisms that explain this positive relationship, including the amount of interaction between partners during
recreation, each partners’ satisfaction with the recreational activity, and the amount of novelty, challenge, and arousal inherent in the recreational activity (Aron et al., 2000; Baldwin et al., 1999; Johnson et al., 2006; Lewandowski & Aron, 2004; Orthner & Mancini, 1991; Palisi, 1984; Ward et al., 2014). This study suggests another mechanism, the natural environment, which may account for the positive association between recreation and relationship satisfaction.

Specifically, the findings of this study support that recreation where individuals experience the environmental effects of cognitive restoration and awe benefit relationship satisfaction. This requires that specific criteria are met which include fascination, being away, extent, compatibility, and awe (Kaplan & Kaplan 1989; Kaplan, 1995; Shiota et al., 2007). These criteria promote positive cognitive and emotional states, which may improve relationship satisfaction. This is an important finding that extends the benefits of the natural environment to individuals relationships, supports that both dyadic and individual recreation may elicit these benefits and can serve as the base for future investigation (Berman et al., 2008; Capaldi et al., 2014; Hartig et al., 2014; McMahan & Estes, 2015; Prade & Saraglou, 2016).

Pairing the findings from the first and second hypotheses may illustrate the nuanced role of the environmental effect between nature recreation and relationship satisfaction. First, it underscores the importance of the factors of the environment, as well as demonstrating the individual perception of these environmental factors for producing cognitive restoration and awe (Kaplan, 1995; Shiota et al., 2007). While the environmental effects have been demonstrated for both extraordinary (e.g., national park) and mundane (e.g., city park) nature, there is a critical connection between the individual and the environment (Joye & Bolderdijk, 2015). The individual needs to feel that the aspects of fascination, being away, extent, compatibility, and awe are present in the environment for any benefits to occur (Kaplan & Kaplan 1989; Kaplan,
This is evident in the current study where the proportion of nature recreation, in and of itself, was not found to be beneficial for relationship satisfaction, but when accounting for the environmental effects of the most frequent recreation activity there is a positive effect on relationship satisfaction. Parallel to this, previous research has found that some individuals are predisposed to experiencing environmental effects to a greater degree than others (Zhang & Keltner, 2016). This may indicate that those who are prone to cognitive restoration and awe are more likely to reap the cognitive, emotional, and relational benefits of nature recreation. It may be that the effect of nature is not universal in its outcomes but requires individual predisposition. Combining these findings demonstrates the importance of the individual’s perceptions and the environment itself. This is important as it underscores the power of perception needed to experience the benefits of nature (Capaldi et al., 2014; Hartig et al., 2014; McMahan & Estes, 2015; Prade & Saraglou, 2016). There may be a critical process between nature recreation, the environment, and the individual, where the individuals most frequent nature recreation must take place in an environment that elicits the environmental effects of cognitive restoration and awe for individuals for there to be a positive effect on relationship satisfaction. As individuals spend more time in environments where they experience the environmental effects of cognitive restoration and awe, they are more likely to experience increased relationship satisfaction. This is similar to previous research where individuals must experience the environmental effects of cognitive restoration and awe before the individual will experience any individual effects (Capaldi et al., 2014; Hartig et al., 2014; McMahan & Estes, 2015; Prade & Saraglou, 2016).
**Hypothesis 3**

*The relationship between nature recreation and relationship satisfaction will be moderated by recreational factors such as challenge, novelty, and arousal.*

There was no significant moderation of the relationship between nature recreation and relationship satisfaction when examining the role of recreational factors and when including the control variable recreation satisfaction. This control between recreation satisfaction and relationship satisfaction was the only significant relationship.

These findings appear to counter the existing literature on recreational factors whereby the factors of challenge, novelty, and arousal positively relate to relationship satisfaction (Aron et al., 2000; Lewandowski & Aron, 2004). However, this study did not observe this moderation effect between nature recreation and relationship satisfaction. Previous literature suggests that when individuals participate in activities that are challenging, novel, and physiologically arousing, they experience a misattribution effect, where feelings are cognitively mislabeled as positive feelings for one’s partner. The current findings did not support this as it relates to relationship satisfaction. This may be because the existing literature about challenge, novelty, and arousal, has always examined recreational activities that were known to meet these standards of challenge, novelty, and arousal (Aron et al., 2000; Lewandowski & Aron, 2004). Another possible explanation for these results is that by examining the recreational habits of people in their daily lives and only examining the most frequent activity, I may have obtained an overwhelming number of activities that were low on challenge, novelty, or arousal while outdoors. This could result from a sample of individuals whose most frequent nature recreation includes picnicking at a park, gardening, or just generally relaxing while outside. The sample obtained may not have included enough representation from those who actively exert themselves
while outdoors. The effect of challenge, novelty, and arousal does likely positively moderate recreation and relationship satisfaction, but it was not observed here in the daily recreation habits of individuals. Without a sample that exclusively focuses on the criteria of challenge, novelty, and arousal, it may be difficult to replicate the effects of previous studies. Furthermore, this result may be due to the lack of reliability in the indicator nature recreation. It may be that this measure was less reliable and when interacting nature recreation with the recreational factors the reliability was below acceptable standards. This is particularly compelling since the reliability for the recreational factors was just above the acceptable cut off so if the reliability for the nature recreation variable was also moderate to acceptable the resultant reliability of the interaction term may be poor.

However, the inclusion of recreation satisfaction as a control had a significant association with relationship satisfaction. This supports previous research that has concluded that an individual’s satisfaction with the recreational activities is associated with overall relationship satisfaction. In previous research this effect was more powerful in predicting relationship satisfaction than the amount of time the couple’s spent participating in recreational activities (Johnson, et al., 2006; Ward et al., 2014). The current findings support the importance of recreation satisfaction. Also, this effect is important in that it increases the generalizability of the finding. The current study examined both individual and dyadic nature recreation. Previous empirical work focused exclusively on dyadic recreation (Johnson et al., 2006; Ward et al., 2014). This is important because it supports that individual recreation satisfaction may function similarly to dyadic recreation satisfaction and may similarly improve relationship satisfaction. However, this effect was not the focus of this study.
Implications and Future Research

There are several implications of this research that impact theory and future research. A major contribution of this study is the positive impact environmental effects have on relationship satisfaction. This is important for the current conceptual model, Figure 1 (Sumner & Anderson, under review), as well as several theories and domains of study. First, for recreation and leisure this finding represents a novel mechanism that accounts for the positive association between recreation and relationship satisfaction (Crawford et al., 2002; Johnson et al., 2006; Sharaievska et al., 2013; Ward et al., 2014; Zabriskie & McCormick, 2001). Additionally, this finding is important for ecological psychology. The current study identified another benefit of the ART and awe (Kaplan, 1995; Shiota et al., 2007). This is a critical finding because it is one of the first to show the outcomes of cognitive restoration and awe on relationships and in interactions with others. Also, this finding is critical to the research about relationship satisfaction because it answers the call to understand better what makes a satisfying relationship and illuminates the potential role of the environment for couples’ and their relationship satisfaction (Crawford et al., 2002; Reissman et al., 1993; Sharaievska et al., 2013). This study helps to unifying these domains by examining their intersection. Importantly, the study supports the conceptual model (Figure 1) and the integration of the above theories and domains to explain how the role of the environment may impact recreation and relationship satisfaction (Sumner & Anderson, under review).

The findings of this study highlight the importance of integration between the fields of environmental psychology, marriage and family therapy, family studies, and recreation and leisure, and I feel compelled to repeat the call for continued research by Flett et al. (2010). These findings serve as a foundation for continued research investigating the conceptual model
(Figure 1) and the role of the environment in relationship satisfaction (Sumner & Anderson, under review). Future studies may benefit by focusing specifically on the environment of the recreation and exploring the environmental factors of the ART and awe for couples’ recreation (Kaplan, 1995; Shiota et al., 2007). This could be accomplished by using an experiment to investigate the effects of different environments on relationship satisfaction. A pre-post test design would help to establish causality in the indirect effect noted here. Researchers may have individuals and couples recreate in natural environments, and man-made environments and examine their feelings of closeness and relationship satisfaction before and after the recreation. A study of this nature would help to generalize the key environmental factors of the ART and awe to relationship satisfaction and help to establish casualty in the relationships observed in this study. Studies of this type are common in the field and have been used to identify other outcomes of cognitive restoration and awe (Berman et al., 2008; Kaplan, 1995; Shiota et al., 2007).

Furthermore, future studies may examine the effects of dyadic recreation compared to individual recreation by exploring the impacts of couples recreating together in nature. At present, no research that validates that dyads can achieve cognitive restoration or awe. Any future study investigating how these effects differ for couples compared to individuals would be valuable and help to extend the implications and benefits of the ART and awe. As previously discussed, there are a wide range of benefits associated with individual cognitive restoration and awe (Capaldi et al., 2014; Hartig et al., 2014; McMahan & Estes, 2015; Prade & Saraglou, 2016) and if these effects can be generalized to dyadic recreation that would serve as a ground for developing prevention and interventions to improving relationship satisfaction for couples. Previous research notes how dyadic recreation may improve communication and help couples
adapt to stressful situations (Johnson et al., 2006; Ward et al., 2014). Having couples recreating together in nature and having them experiencing cognitive restoration and awe together may promote improved communication and adaptation during recreation. Future studies could investigate this by having couples recreate in environments that have been previously shown to elicit cognitive restoration and awe for individual and investigating whether similar effects exist when couples recreate together. Again, following the existing protocols for research and using dyads as the subjects instead of individuals would allow the outcomes of the ART and awe to be generalized to couples (Berman et al., 2008).

Similarly, future investigations may investigate the difference between couple and family nature recreation in regards to its impact on relationship satisfaction and its outcomes of cognitive restoration and awe. Researchers have theorized that family based nature recreation likely utilizes cognitive restoration to improve family relationships (Izenstark & Ebata, 2016). However, this association may be different for couples’ relationship satisfaction. It may be that recreating with children present may reduce the link between couples nature recreation and their relationship satisfaction. Future studies may investigate this by examining individuals, couples, and families recreation and assessing for relationships satisfaction.

Another key area of future investigation is to examine whether the effects of ART and Awe may occur simultaneously. These concepts were combined in the present study as a single construct, environmental effects. However, more research is needed to understand the practical unification of these two theories. Both ART and Awe operate using distinct psychological processes, and it is unknown if these processes occur in tandem. Research examining whether or not individuals can experience awe while also experiencing cognitive restoration is necessary within the field as a whole, as well as for the current purpose of nature recreation. Also, while
the environmental factors of ART and awe are on their face similar (Natural environments elicit both), further research about the required factors could promote consolidation between these theories. Research focused on the similarities and differences of these theories would be desirable in several domains such as cognitive psychology (what are the differences between the cognitive and affective impacts), environmental psychology (how the environment impacts human cognitively and affectively), and recreation and leisure (what are the benefits of nature recreation). A future investigation of this nature would have individuals experience stimuli that are hypothesized to elicit cognitive restoration and awe as well as measure both constructs as outcomes. This could link these two constructs and their many positive outcomes (Capaldi et al., 2014; Hartig et al., 2014; McMahan & Estes, 2015; Prade & Saroglou, 2016).

Additionally, the current study was unable to support previous literature regarding challenge, novelty, and arousal’s positive effect on relationship satisfaction (Dutton & Aron, 1974; Lewandowski & Aron, 2004). Challenge, novelty, and arousal was a moderator that was non-significant when controlling for recreation satisfaction. This is likely attributable to the current study’s examination of the daily recreation habits, and previous studies established these effects by examining activities that were specifically selected for their challenge, novelty, and arousal and not general recreation practices. The inability of the current study to validate the previous empirical findings shows that more research is needed to explore when this theory is applicable, and the benefits may be expected. Future investigations that detail the conditions necessary to elicit challenge, novelty, and arousal would help know what activities may benefit couples’ relationship satisfaction. This could be accomplished by having individuals participate in three different activities at different levels of challenge, novelty, and arousal to investigate the effects on relationship satisfaction for each level. This would contribute more understanding
about the degree of challenge, novelty, and arousal required to experience the benefit to relationship satisfaction. Alternatively, a future study that examined individuals’ daily recreation practice and gathered information about challenge, novelty, and arousal for each of the reported activities would help establish what daily recreation activities fulfill these criteria. This would help in the future to develop prevention and intervention strategies to use with couples to improve relationship satisfaction.

The findings of this study suggest that there is more to understand about nature recreation and relationship satisfaction in general. While the current study observed a positive indirect effect of the proportion of nature recreation on relationship satisfaction through the environmental effects from their most frequent recreation activity, the study also noted a negative direct effect between the proportion of nature recreation and relationship satisfaction. This is in contrast to the trends of the field and my hypotheses and requires more study to be fully understood. The negative relationship between nature recreation and relationship satisfaction the current study observed prompts several questions that need future investigation. Are there critical environmental factors that were not met in the sample here? Are there individual characteristics that may predispose some individuals to more benefits than others? Is the proportion of nature recreation not associated with relationship satisfaction? The observed negative relationship between nature recreation and relationship satisfaction underscores the need for all of the previously mentioned research because the effects of general nature recreation may be negative for many couples. Understanding this would increase how this information could be implemented to help couples maximize their recreation to improve their relationship satisfaction. There is much more to understand about this intersection of environmental psychology, marriage and family therapy, family studies, and recreation and leisure. The current
study provides promising findings that may serve as a foundation for future research, provides a theoretical framework for future research, and highlights several specific areas in need of investigation.

Lastly, future studies may benefit by investigating individuals’ and couples’ motivations for recreation in general. This study observed a negative direct effect between nature recreation and relationship satisfaction. One explanation of this may be that individuals in distressed relationships are more likely to recreate away from their partner as a way of avoiding the relational distress. This trend has been noted before in the literature when exploring couples exercise and marital benefits (Yorgason et al., 2018). Exploring individuals motivations for recreation or nature recreation may clarify this relationship and benefit future research by providing context for couples’ recreation in general.

**Limitations**

There are several limitations of this study. First, and foremost the constructs of environmental effects and recreational factors were each limited in their scope. Each of these constructs only obtained data from participants’ most frequent outdoor recreation activity. This limits the generalizability of the current study and may confound the results of the study. It is possible that these most frequent recreation activities do not adequately represent individuals’ general nature recreation. The current study defined these constructs in this manner to use the most validated measures for each of the constructs, particularly measuring environmental restoration with the PRS-11 (Pasini et al., 2014). The PRS-11 is the field standard for examining the restorativeness of a given environment. This allowed a field accepted measure of these constructs to be obtained and compared to relationship satisfaction, albeit for only the most frequent recreational activity. This acts as a pilot study for future investigations.
Another limitation of this study is that this research is cross-sectional, making causality impossible to infer. While the theories and existing literature hypothesize the directionality of the observed associations, it may be that these effects are reversed or merely spurious. Longitudinal or experimental methodology is needed for a complete picture and to make statements about casualty and predictions.

Furthermore, it is a limitation that we did not gather information about the participants regional location or their income. After further consideration these may have been variables that are connected with individuals ability to recreate. Without gathering this information there was no way of controlling for these variables. Future studies may benefit from obtaining such information.

The next limitation stems from the nascency of the field. This study represents the first analysis of nature recreation and couples’ relationships, and as such, there are certain limitations. The limited research on this topic makes it more difficult to generalize the results or integrate them into the literature. I have tried to limit the extrapolation of these results and limited their potential for application outside of theory and future study. Furthermore, the central theories used in this study (ART and awe) have historically focused on individuals, and these theories describe the underlying cognitive and emotional mechanisms on an individual level (Berman et al., 2008; Kaplan, 1995; Shiota et al., 2007). This creates some challenges for the study, which analyzed both individual recreation as well as couple recreation. It was accepted here that the underlying mechanisms of cognitive and emotional mechanisms would function the same for both individual and couple recreation. Caution may be needed when interpreting these outcomes for dyads, as this requires validation.
Additionally, the contradictory finding that constructs such as joint recreation and total recreation were not correlated to relationship satisfaction raises some concerns about the data. These constructs have previously been identified as playing a role explaining the link between recreation and relationship satisfaction (Holman & Jacquart, 1988; Orthner, 1975; Orthner & Mancini, 1991; Ward et al., 2014). While MTurk has previously been shown to be psychometrically similar to assessments given through other mediums (Buhrmester et al., 2011) it may be that sampling and gathering the data through MTurk may lead to a skewed sample when analyzing outdoor recreation habits. This may be the source of the anomalous data that did not replicate previous findings about recreation and relationship satisfaction.

The final limitation is that the measures used for nature recreation, awe, as well as challenge, novelty, and arousal were the standards measures of the field but they are not empirically validated and lack robust psychometrics (Ballew & Omoto, 2018; Lewandowski & Aron, 2004; Piff et al., 2015). This makes the study of these constructs more challenging. At a minimum, it makes these constructs harder to research consistently across studies, and validation of measures would be quite helpful. This study followed the protocol set for by other studies, and this limitation is more of a reflection of the emerging nature of the field. However, there is a need for validated measures about the constructs nature recreation, awe, as well as challenge, novelty, and arousal for future studies.

**Conclusion**

Relationship satisfaction is a core construct for many areas of study and is associated with critical outcomes for couples and individuals alike (Bradbury et al., 2000; Funk & Rogge, 2007). This study explored the role of the recreation and the environment on relationship satisfaction with the hope of highlighting the mechanisms by which recreation contributes to
relationship satisfaction. I hoped to extend the theories present for individual recreation and apply them to couples nature recreation. This was supported, and there was an indirect effect whereby the environment effects were associated with improved relationship satisfaction. This study is the first analysis of recreation, which investigates the effect of the environment on couples and serves as an important validation for continuing to generalize the research for nature recreation to couples.
References


doi:10.1111/jftr.12138


StataCorp (2017). *Stata statistical software: Release 15*. College Station, TX: StataCorp LLC.


Appendix.

Strengthening Relationships with Nature: Nature recreation and relational outcomes

Survey Flow

Standard: Introduction (5 Questions)

Branch: New Branch

If

If Are you at least 18 years old? No Is Selected

EndSurvey:

Branch: New Branch

If

If Are you currently a resident of the United States? No Is Selected

EndSurvey:

Branch: New Branch

If

If Are you currently in a romantic relationship that has lasted longer than one year? No Is Selected

EndSurvey:

Branch: New Branch

If

If Do any of the following terms describe you: pregnant, in prison/jail, economically disadvantaged,... Yes, one or more of those terms describe me. Is Selected

EndSurvey:
Block: Default Question Block (61 Questions)

EmbeddedData

Completion Code = ${rand://int/1000:9999}

Block: End: Assign Codes (1 Question)

Page Break
Q1 My name is Brock Sumner, I am a Doctoral student at Brigham Young University and I am conducting this research under the supervision of Dr. Anderson, from the School of Family Life. You are being invited to participate in this research study of Nature and Relationships. I am interested in finding out about how time in nature impacts romantic relationships. Your participation in this study will require the completion of the following questionnaires. This should take approximately 30 minutes of your time. Your participation will be anonymous and you will not be contacted again in the future. You will be paid for your participation following the questionnaires completion. This survey involves minimal risk to you and the benefits may impact society by helping increase knowledge about how romantic relationships function.

You do not have to be in this study if you do not want to be. You do not have to answer any question that you do not want to answer for any reason. We will be happy to answer any questions you have about this study. If you have further questions about this project or if you have a research-related problem you may contact me, Brock Sumner at bsumner1816@gmail.com or my advisor, Dr. Shayne Anderson at Shayne_anderson@byu.edu.

If you have any questions about your rights as a research participant you may contact the IRB Administrator at A-285 ASB, Brigham Young University, Provo, UT 84602; irb@byu.edu; (801) 422-1461. The IRB is a group of people who review research studies to protect the rights and welfare of research participants.

The completion of this survey implies your consent to participate. If you choose to participate, please complete the following questionnaires. Thank you!
Q2 Are you at least 18 years old?
Yes (1)
No (2)

Q3 Are you currently a resident of the United States?
Yes (1)
No (2)

Q4 Are you currently in a romantic relationship that has lasted longer than one year?
Yes (1)
No (2)

Q5 Do any of the following terms describe you: pregnant, in prison/jail, economically disadvantaged, mentally disabled (unable to provide consent), or educationally disabled.
Yes, one or more of those terms describe me. (1)

No (2)

End of Block: Introduction

Start of Block: Default Question Block

Q6 The following section will have you answer how often you participated in different recreation activities. "Recreation activities" are defined as freely chosen activities such as a hobby, activities for leisure, or activities for relaxation. These recreation activities are participated in by choice and are separate from work or daily life tasks.

Q7 How often in the previous year have you participated in the following recreational activities?
<table>
<thead>
<tr>
<th>Activity</th>
<th>Never (1)</th>
<th>Several times per year (2)</th>
<th>Once per month (3)</th>
<th>2 or 3 times per month (4)</th>
<th>Once per week (5)</th>
<th>2 or 3 times per week (6)</th>
<th>Daily (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Play competitive sports (basketball, tennis, golf, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Play other sports (skateboarding, longboarding, BMX, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight lift (strength training, calisthenics, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participate in aerobics (cardio, fitness, workout, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexibility train (stretching, yoga, tai chi)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Walk (around the block or in lieu of driving) (6)

Participate in boating activities (sailing, boating, canoeing, paddle boarding, etc.) (7)

Participate in water activities (swimming, scuba diving, snorkeling, etc.) (8)

Hike or trail run (9)

Rock climb (10)

Participate in winter sports (skiing, snowboarding, etc.) (11)

Mountain bike (12)

Backpack (13)
Exercise (other forms) (14)

Fish (15)

Hunt (16)

Camp (17)

Horseback ride (18)

Bird watch (19)

Use Off Highway Vehicles (snowmobile, dirt bike, 4-wheeler, etc.) (20)

Star gazing or participating in astronomy (21)

Watch plants and animals (22)

Relax outside (23)

Repair mechanical devices (24)
Do house work
(cleaning, repairs, improvements, etc.)
(25)

Do woodwork/carpentry (26)

Play games (word, board, knowledge, card, video, puzzles etc.) (27)

Watch TV (28)

Engage in social activities (go out with friends, visit relatives, attend parties, eat dinner, etc.): (29)

Eat out at restaurants (30)

Attend club meetings and/or social events (31)
Volunteer (32)

Attend church service/synagogue (33)

Engage in prayer or mediation (34)

Travel (out of town, abroad, etc.) (35)

Participate in business not related to job (hobby or crafting for compensation) (36)

Collect (stamps, coins, etc.) (37)

Read (for leisure, newspaper etc.) (38)

Garden (39)

Write (letters, creative writing, etc.) (40)
Sew (knit, needlework etc.) (41)

Attend lectures (42)

Go to library (43)

Study foreign language (44)

Go to the movies (45)

Use technology (46)

Engage in photography (47)

Play an instrument (48)
Carry Forward Unselected Choices from "How often in the previous year have you participated in the following recreational activities?"

Q67 Below is a list of activities you said you did for recreation.

We are interested in knowing whether you do them with your significant other or not.

Please drag each activity into the box which best represents the proportion of time you do the activity with your significant other.

<table>
<thead>
<tr>
<th>Usually with my significant other</th>
<th>Occasionally with my significant other</th>
<th>Rarely with my significant other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Play competitive sports (basketball, tennis, golf, etc.) (x1)</td>
<td>Play competitive sports (basketball, tennis, golf, etc.) (x1)</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------------------------------------</td>
<td>------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Play other sports (skateboarding, long boarding, BMX, etc.) (x2)</td>
<td>Play other sports (skateboarding, long boarding, BMX, etc.) (x2)</td>
</tr>
<tr>
<td></td>
<td>Weight lift (strength training, calisthenics, etc.) (x3)</td>
<td>Weight lift (strength training, calisthenics, etc.) (x3)</td>
</tr>
<tr>
<td></td>
<td>Participate in aerobics (cardio, fitness, workout, etc.) (x4)</td>
<td>Participate in aerobics (cardio, fitness, workout, etc.) (x4)</td>
</tr>
<tr>
<td></td>
<td>Flexibility train (stretching, yoga, tai chi) (x5)</td>
<td>Flexibility train (stretching, yoga, tai chi) (x5)</td>
</tr>
<tr>
<td></td>
<td>Walk (around the block or in lieu of driving) (x6)</td>
<td>Walk (around the block or in lieu of driving) (x6)</td>
</tr>
<tr>
<td></td>
<td>Participate in boating activities (sailing, boating, canoeing, paddle boarding, etc.) (x7)</td>
<td>Participate in boating activities (sailing, boating, canoeing, paddle boarding, etc.) (x7)</td>
</tr>
<tr>
<td>Activity</td>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>Participate in water activities (swimming, scuba diving, snorkeling, etc.)</td>
<td>x8</td>
<td></td>
</tr>
<tr>
<td>Hike or trail run</td>
<td>x9</td>
<td></td>
</tr>
<tr>
<td>Rock climb</td>
<td>x10</td>
<td></td>
</tr>
<tr>
<td>Participate in winter sports (skiing, snowboarding, etc.)</td>
<td>x11</td>
<td></td>
</tr>
<tr>
<td>Mountain bike</td>
<td>x12</td>
<td></td>
</tr>
<tr>
<td>Backpack</td>
<td>x13</td>
<td></td>
</tr>
<tr>
<td>Exercise (other forms)</td>
<td>x14</td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td>x15</td>
<td></td>
</tr>
<tr>
<td>Hunt</td>
<td>x16</td>
<td></td>
</tr>
<tr>
<td>Camp</td>
<td>x17</td>
<td></td>
</tr>
<tr>
<td>Horseback ride</td>
<td>x18</td>
<td></td>
</tr>
<tr>
<td>Bird watch</td>
<td>x19</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>Use Off Highway Vehicles (snowmobile, dirt bike, 4-wheeler, etc.)</td>
<td>(x20)</td>
<td></td>
</tr>
<tr>
<td>Use Off Highway Vehicles (snowmobile, dirt bike, 4-wheeler, etc.)</td>
<td>(x20)</td>
<td></td>
</tr>
<tr>
<td>Use Off Highway Vehicles (snowmobile, dirt bike, 4-wheeler, etc.)</td>
<td>(x20)</td>
<td></td>
</tr>
<tr>
<td>Star gazing or participating in astronomy</td>
<td>(x21)</td>
<td></td>
</tr>
<tr>
<td>Star gazing or participating in astronomy</td>
<td>(x21)</td>
<td></td>
</tr>
<tr>
<td>Star gazing or participating in astronomy</td>
<td>(x21)</td>
<td></td>
</tr>
<tr>
<td>Watch plants and animals</td>
<td>(x22)</td>
<td></td>
</tr>
<tr>
<td>Watch plants and animals</td>
<td>(x22)</td>
<td></td>
</tr>
<tr>
<td>Watch plants and animals</td>
<td>(x22)</td>
<td></td>
</tr>
<tr>
<td>Relax outside</td>
<td>(x23)</td>
<td></td>
</tr>
<tr>
<td>Relax outside</td>
<td>(x23)</td>
<td></td>
</tr>
<tr>
<td>Relax outside</td>
<td>(x23)</td>
<td></td>
</tr>
<tr>
<td>Repair mechanical devices</td>
<td>(x24)</td>
<td></td>
</tr>
<tr>
<td>Repair mechanical devices</td>
<td>(x24)</td>
<td></td>
</tr>
<tr>
<td>Repair mechanical devices</td>
<td>(x24)</td>
<td></td>
</tr>
<tr>
<td>Do house work (cleaning, repairs, improvements, etc.)</td>
<td>(x25)</td>
<td></td>
</tr>
<tr>
<td>Do house work (cleaning, repairs, improvements, etc.)</td>
<td>(x25)</td>
<td></td>
</tr>
<tr>
<td>Do house work (cleaning, repairs, improvements, etc.)</td>
<td>(x25)</td>
<td></td>
</tr>
<tr>
<td>Do woodwork/carpentry</td>
<td>(x26)</td>
<td></td>
</tr>
<tr>
<td>Do woodwork/carpentry</td>
<td>(x26)</td>
<td></td>
</tr>
<tr>
<td>Do woodwork/carpentry</td>
<td>(x26)</td>
<td></td>
</tr>
<tr>
<td>Play games (word, board, knowledge, card, video, puzzles etc.)</td>
<td>(x27)</td>
<td></td>
</tr>
<tr>
<td>Play games (word, board, knowledge, card, video, puzzles etc.)</td>
<td>(x27)</td>
<td></td>
</tr>
<tr>
<td>Play games (word, board, knowledge, card, video, puzzles etc.)</td>
<td>(x27)</td>
<td></td>
</tr>
<tr>
<td>Watch TV</td>
<td>(x28)</td>
<td></td>
</tr>
<tr>
<td>Watch TV</td>
<td>(x28)</td>
<td></td>
</tr>
<tr>
<td>Watch TV</td>
<td>(x28)</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Count</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>Engage in social activities (go out with friends, visit relatives, attend parties, eat dinner, etc.)</td>
<td>(x29)</td>
<td></td>
</tr>
<tr>
<td>Eat out at restaurants</td>
<td>(x30)</td>
<td></td>
</tr>
<tr>
<td>Attend club meetings and/or social events</td>
<td>(x31)</td>
<td></td>
</tr>
<tr>
<td>Volunteer</td>
<td>(x32)</td>
<td></td>
</tr>
<tr>
<td>Attend church service/synagogue</td>
<td>(x33)</td>
<td></td>
</tr>
<tr>
<td>Engage in prayer or mediation</td>
<td>(x34)</td>
<td></td>
</tr>
<tr>
<td>Travel (out of town, abroad, etc.)</td>
<td>(x35)</td>
<td></td>
</tr>
<tr>
<td>Participate in business not related to job (hobby or crafting for compensation)</td>
<td>(x36)</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Count</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>Collect (stamps, coins, etc.)</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Read (for leisure, newspaper etc.)</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Garden</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Write (letters, creative writing, etc.)</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Sew (knit, needlework etc.)</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Attend lectures</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Go to library</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Study foreign language</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Go to the movies</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Use technology</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>Engage in photography</td>
<td>47</td>
<td></td>
</tr>
</tbody>
</table>
_____ Play an instrument  |  _____ Play an instrument  |  _____ Play an instrument
(x48)                          |  (x48)                          |  (x48)                          

Page Break
Q9 Which of the following activities do you do the most for recreation (leisure, relaxation, etc.) while outdoors?

(select 1 activity)

Play competitive sports (basketball, tennis, golf, etc.) (1)

Play other sports (skateboarding, long boarding, BMX, etc.) (2)

Weight lift (strength training, calisthenics, etc.) (3)

Participate in aerobics (cardio, fitness, workout, etc.) (4)

Flexibility train (stretching, yoga, tai chi) (5)

Walk (around the block or in lieu of driving) (6)

Participate in boating activities (sailing, boating, canoeing, paddle boarding, etc.) (7)

Participate in water activities (swimming, scuba diving, snorkeling, etc.) (8)
Hike or trail run (9)

Rock climb (10)

Participate in winter sports (skiing, snowboarding, etc.) (11)

Mountain bike (12)

Backpack (13)

Exercise (other forms) (14)

Fish (15)

Hunt (16)

Camp (17)

Horseback ride (18)

Bird watch (19)

Use Off Highway Vehicles (snowmobile, dirt bike, 4-wheeler, etc.) (20)

Star gazing or participating in astronomy (21)

Watch plants and animals (22)

Relax outside (23)

Repair mechanical devices (24)

Do house work (cleaning, repairs, improvements, etc.) (25)

Do woodwork/carpentry (26)

Play games (word, board, knowledge, card, video, puzzles etc.) (27)

Watch TV (28)

Engage in social activities (go out with friends, visit relatives, attend parties, eat dinner, etc.):

(29)

Eat out at restaurants (30)
Attend club meetings and/or social events (31)

Volunteer (32)

Attend church service/synagogue (33)

Engage in prayer or mediation (34)

Travel (out of town, abroad, etc.) (35)

Participate in business not related to job (hobby or crafting for compensation) (36)

Collect (stamps, coins, etc.) (37)

Read (for leisure, newspaper etc.) (38)

Garden (39)

Write (letters, creative writing, etc.) (40)

Sew (knit, needlework etc.) (41)

Attend lectures (42)

Go to library (43)

Study foreign language (44)

Go to the movies (45)

Use technology (46)

Engage in photography (47)

Play an instrument (48)

Q10 How much time per week do you get to participate in the above activity you selected by yourself?
Q1.10 How much time per week do you get to participate in the above activity you selected with your significant other?

(in hours)

Q12 After you participate in this activity by yourself how close do you feel with your significant other after participating in the above activity?

Much closer than average (1)
Closer than average (2)
A little closer than average (3)
Average (4)
A little more distant than average (5)
More distant than average (6)
Much more distant than average (7)
Q77 After you participate in this activity with your significant other how close do you feel with your significant other after participating in the above activity?

Much closer than average  (1)
Closer than average  (2)
A little closer than average  (3)
Average  (4)
A little more distant than average  (5)
More distant than average  (6)
Much more distant than average  (7)
Q13 Which of the following activities do you do the most for recreation (leisure, relaxation, etc.) while indoors?

(select 1 activity)

Play competitive sports (basketball, tennis, golf, etc.) (1)

Play other sports (skateboarding, long boarding, BMX, etc.) (2)

Weight lift (strength training, calisthenics, etc.) (3)

Participate in aerobics (cardio, fitness, workout, etc.) (4)

Flexibility train (stretching, yoga, tai chi) (5)

Walk (around the block or in lieu of driving) (6)

Participate in boating activities (sailing, boating, canoeing, paddle boarding, etc.) (7)

Participate in water activities (swimming, scuba diving, snorkeling, etc.) (8)
Hike or trail run (9)
Rock climb (10)
Participate in winter sports (skiing, snowboarding, etc.) (11)
Mountain bike (12)
Backpack (13)
Exercise (other forms) (14)
Fish (15)
Hunt (16)
Camp (17)
Horseback ride (18)
Bird watch (19)
Use Off Highway Vehicles (snowmobile, dirt bike, 4-wheeler, etc.) (20)
Star gazing or participating in astronomy (21)
Watch plants and animals (22)
Relax outside (23)
Repair mechanical devices (24)
Do house work (cleaning, repairs, improvements, etc.) (25)
Do woodwork/carpentry (26)
Play games (word, board, knowledge, card, video, puzzles etc.) (27)
Watch TV (28)
Engage in social activities (go out with friends, visit relatives, attend parties, eat dinner, etc.):
(29)
Eat out at restaurants (30)
Attend club meetings and/or social events (31)
Volunteer (32)
Attend church service/synagogue (33)
Engage in prayer or mediation (34)
Travel (out of town, abroad, etc.) (35)
Participate in business not related to job (hobby or crafting for compensation) (36)
Collect (stamps, coins, etc.) (37)
Read (for leisure, newspaper etc.) (38)
Garden (39)
Write (letters, creative writing, etc.) (40)
Sew (knit, needlework etc.) (41)
Attend lectures (42)
Go to library (43)
Study foreign language (44)
Go to the movies (45)
Use technology (46)
Engage in photography (47)
Play an instrument (48)

Q14 How much time per week do you get to participate in the above activity you selected by yourself?
Q15 How much time per week do you get to participate in the above activity you selected with your significant other?

(in hours)

Q16 After you participate in this activity by yourself how close do you feel with your significant other after participating in the above activity?

Much closer than average (1)
Closer than average (2)
A little closer than average (3)
Average closeness (4)
A little more distant than average (5)
More distant than average (6)
Much more distant than average (7)
Q76 After you participate in this activity with your significant other how close do you feel with your significant other after participating in the above activity?

Much closer than average  (1)
Closer than average  (2)
A little closer than average  (3)
Average closeness  (4)
A little more distant than average  (5)
More distant than average  (6)
Much more distant than average  (7)
Q83 The following section will have you answer questions about your recreation habits. "Recreation activities" are defined as freely chosen activities such as a hobby, activities for leisure, or activities for relaxation. These recreation activities are participated in by choice and are separate from work or daily life tasks.

Q17 How much total time per week do you typically get for recreation (leisure, relaxation, etc.)?

(in hours)

________________________________________________________________

Q18 How much time per week do you get for outdoor recreation (leisure, relaxation, etc.) by yourself?

(in hours)

________________________________________________________________
Q19 How much time per week do you get for outdoor recreation (leisure, relaxation, etc.) with your significant other?

(in hours)

______________________________

Q20 How much time per week do you get for indoor recreation (leisure, relaxation, etc.) by yourself?

(in hours)

______________________________

Q21 How much time per week do you get for indoor recreation (leisure, relaxation, etc.) with your significant other?
Carry Forward Selected Choices from "Which of the following activities do you do the most for recreation (leisure, relaxation, etc.) while outdoors? (select 1 activity)"

Q22

You told us that the recreation activity you did the most outdoors is:

- Play competitive sports (basketball, tennis, golf, etc.) (1)
- Play other sports (skateboarding, long boarding, BMX, etc.) (2)
- Weight lift (strength training, calisthenics, etc.) (3)
- Participate in aerobics (cardio, fitness, workout, etc.) (4)
- Flexibility train (stretching, yoga, tai chi) (5)
- Walk (around the block or in lieu of driving) (6)
- Participate in boating activities (sailing, boating, canoeing, paddle boarding, etc.) (7)
- Participate in water activities (swimming, scuba diving, snorkeling, etc.) (8)
- Hike or trail run (9)
Rock climb (10)
Participate in winter sports (skiing, snowboarding, etc.) (11)
Mountain bike (12)
Backpack (13)
Exercise (other forms) (14)
Fish (15)
Hunt (16)
Camp (17)
Horseback ride (18)
Bird watch (19)
Use Off Highway Vehicles (snowmobile, dirt bike, 4-wheeler, etc.) (20)
Star gazing or participating in astronomy (21)
Watch plants and animals (22)
Relax outside (23)
Repair mechanical devices (24)
Do house work (cleaning, repairs, improvements, etc.) (25)
Do woodwork/carpentry (26)
Play games (word, board, knowledge, card, video, puzzles etc.) (27)
Watch TV (28)
Engage in social activities (go out with friends, visit relatives, attend parties, eat dinner, etc.): (29)
Eat out at restaurants (30)
Attend club meetings and/or social events (31)
Q23 In each of the following questions replace the blank with your activity.

Volunteer (32)

Attend church service/synagogue (33)

Engage in prayer or mediation (34)

Travel (out of town, abroad, etc.) (35)

Participate in business not related to job (hobby or crafting for compensation) (36)

Collect (stamps, coins, etc.) (37)

Read (for leisure, newspaper etc.) (38)

Garden (39)

Write (letters, creative writing, etc.) (40)

Sew (knit, needlework etc.) (41)

Attend lectures (42)

Go to library (43)

Study foreign language (44)

Go to the movies (45)

Use technology (46)

Engage in photography (47)

Play an instrument (48)
<table>
<thead>
<tr>
<th>Not at all</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>Completely</th>
</tr>
</thead>
</table>

Places where I __________ are fascinating. (1)

In places where I __________ my attention is drawn to many interesting things. (2)

In places where I __________ it is hard to be bored. (3)

Places where I __________ are a refuge from nuisances. (4)
To get away from things that usually demand my attention I like to go places where I __________.
(5)

To stop thinking about the things that I must get done I like to go to places where I __________.
(6)

There is a clear order in the physical arrangement of places where I
In places where I

__________ it is easy to see how things are organized. (8)

In places where I __________
everything seems to have its proper place. (9)

Where I __________
is large enough to allow exploration in many directions. (10)
In places where I ____________ there are few boundaries to limit my possibility for moving about. (11)
Carry Forward Selected Choices from "Which of the following activities do you do the most for recreation (leisure, relaxation, etc.) while outdoors? (select 1 activity)"

Q24 You told us that the recreation activity you did the most outdoors is:

Play competitive sports (basketball, tennis, golf, etc.) (1)
Play other sports (skateboarding, long boarding, BMX, etc.) (2)
Weight lift (strength training, calisthenics, etc.) (3)
Participate in aerobics (cardio, fitness, workout, etc.) (4)
Flexibility train (stretching, yoga, tai chi) (5)
Walk (around the block or in lieu of driving) (6)
Participate in boating activities (sailing, boating, canoeing, paddle boarding, etc.) (7)
Participate in water activities (swimming, scuba diving, snorkeling, etc.) (8)
Hike or trail run (9)
Rock climb (10)
Participate in winter sports (skiing, snowboarding, etc.) (11)
Mountain bike (12)
Backpack (13)
Exercise (other forms) (14)
Fish (15)
Hunt (16)
Camp (17)
Horseback ride (18)
Bird watch (19)
Use Off Highway Vehicles (snowmobile, dirt bike, 4-wheeler, etc.) (20)
Star gazing or participating in astronomy (21)
Watch plants and animals (22)
Relax outside (23)
Repair mechanical devices (24)
Do house work (cleaning, repairs, improvements, etc.) (25)
Do woodwork/carpentry (26)
Play games (word, board, knowledge, card, video, puzzles etc.) (27)
Watch TV (28)
Engage in social activities (go out with friends, visit relatives, attend parties, eat dinner, etc.): (29)
Eat out at restaurants (30)
Attend club meetings and/or social events (31)
Volunteer (32)
Attend church service/synagogue (33)
Engage in prayer or mediation (34)
Travel (out of town, abroad, etc.) (35)

Participate in business not related to job (hobby or crafting for compensation) (36)

Collect (stamps, coins, etc.) (37)

Read (for leisure, newspaper etc.) (38)

Garden (39)

Write (letters, creative writing, etc.) (40)

Sew (knit, needlework etc.) (41)

Attend lectures (42)

Go to library (43)

Study foreign language (44)

Go to the movies (45)

Use technology (46)

Engage in photography (47)

Play an instrument (48)

Q25 In each of the following questions replace the blank with your activity.

<table>
<thead>
<tr>
<th>Not at all (1)</th>
<th>Very much (10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) . (3) . (4) . (5) . (6) . (7) . (8) . (9)</td>
<td></td>
</tr>
<tr>
<td>When I</td>
<td>it is fun. (1)</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
</tr>
<tr>
<td>When I</td>
<td>it is exciting. (2)</td>
</tr>
<tr>
<td>When I</td>
<td>it requires physical exertion. (3)</td>
</tr>
<tr>
<td>When I</td>
<td>it raises my heart rate. (4)</td>
</tr>
</tbody>
</table>
Q75 Please choose the last option (Choice number 3) to show you are paying attention.

Choice number 1  (1)
Choice number 2  (2)
Choice number 3  (3)

Q26 In each of the following questions replace the blank with your activity.

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>. (2)</th>
<th>. (3)</th>
<th>. (4)</th>
<th>. (5)</th>
<th>. (6)</th>
<th>A great deal (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>When I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I feel awe. (1)
Q27 In each of the following questions replace the blank with your activity.

<table>
<thead>
<tr>
<th>Completely agree (7)</th>
<th>Disagree (1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel satisfied when I ______________. (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Given a choice this is an activity I would choose to participate in. (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Carry Forward Selected Choices from "Which of the following activities do you do the most for recreation (leisure, relaxation, etc.) while indoors? (select 1 activity)"

Q28

You told us that the recreation activity you did the most indoors is:

Play competitive sports (basketball, tennis, golf, etc.) (1)

Play other sports (skateboarding, long boarding, BMX, etc.) (2)

Weight lift (strength training, calisthenics, etc.) (3)

Participate in aerobics (cardio, fitness, workout, etc.) (4)

Flexibility train (stretching, yoga, tai chi) (5)

Walk (around the block or in lieu of driving) (6)

Participate in boating activities (sailing, boating, canoeing, paddle boarding, etc.) (7)

Participate in water activities (swimming, scuba diving, snorkeling, etc.) (8)

Hike or trail run (9)

Rock climb (10)

Participate in winter sports (skiing, snowboarding, etc.) (11)
Mountain bike (12)
Backpack (13)
Exercise (other forms) (14)
Fish (15)
Hunt (16)
Camp (17)
Horseback ride (18)
Bird watch (19)
Use Off Highway Vehicles (snowmobile, dirt bike, 4-wheeler, etc.) (20)
Star gazing or participating in astronomy (21)
Watch plants and animals (22)
Relax outside (23)
Repair mechanical devices (24)
Do house work (cleaning, repairs, improvements, etc.) (25)
Do woodwork/carpentry (26)
Play games (word, board, knowledge, card, video, puzzles etc.) (27)
Watch TV (28)
Engage in social activities (go out with friends, visit relatives, attend parties, eat dinner, etc.): (29)
Eat out at restaurants (30)
Attend club meetings and/or social events (31)
Volunteer (32)
Attend church service/synagogue (33)
Engage in prayer or mediation (34)
Travel (out of town, abroad, etc.) (35)
Participate in business not related to job (hobby or crafting for compensation) (36)
Collect (stamps, coins, etc.) (37)
Read (for leisure, newspaper etc.) (38)
Garden (39)
Write (letters, creative writing, etc.) (40)
Sew (knit, needlework etc.) (41)
Attend lectures (42)
Go to library (43)
Study foreign language (44)
Go to the movies (45)
Use technology (46)
Engage in photography (47)
Play an instrument (48)

Q29 In each of the following questions replace the blank with your activity.

<table>
<thead>
<tr>
<th>Not at all</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>Completely (10)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Places where I __________</th>
</tr>
</thead>
<tbody>
<tr>
<td>are fascinating.</td>
</tr>
</tbody>
</table>

(1)

<table>
<thead>
<tr>
<th>In places where I __________</th>
</tr>
</thead>
<tbody>
<tr>
<td>my attention my attention is</td>
</tr>
<tr>
<td>drawn to many interesting</td>
</tr>
<tr>
<td>things.</td>
</tr>
</tbody>
</table>

(2)

<table>
<thead>
<tr>
<th>In places where I __________</th>
</tr>
</thead>
<tbody>
<tr>
<td>it is hard to be bored.</td>
</tr>
</tbody>
</table>

(3)

<table>
<thead>
<tr>
<th>Places where I __________</th>
</tr>
</thead>
<tbody>
<tr>
<td>are a refuge from nuisances.</td>
</tr>
</tbody>
</table>

(4)
To get away from things that usually demand my attention I like to go places where I __________.

(5)

To stop thinking about the things that I must get done I like to go to places where I __________.

(6)

There is a clear order in the physical arrangement of places where I
In places where I
it is easy to see how things are organized. (8)
In places where I
everything seems to have its proper place. (9)
Where I
is large enough to allow exploration in many directions. (10)
In places where I ____________
there are few boundaries to limit my possibility for moving about. (11)
Q30 You told us that the recreation activity you did the most indoors is:

1. Play competitive sports (basketball, tennis, golf, etc.)
2. Play other sports (skateboarding, long boarding, BMX, etc.)
3. Weight lift (strength training, calisthenics, etc.)
4. Participate in aerobics (cardio, fitness, workout, etc.)
5. Flexibility train (stretching, yoga, tai chi)
6. Walk (around the block or in lieu of driving)
7. Participate in boating activities (sailing, boating, canoeing, paddle boarding, etc.)
8. Participate in water activities (swimming, scuba diving, snorkeling, etc.)
9. Hike or trail run
10. Rock climb
11. Participate in winter sports (skiing, snowboarding, etc.)
12. Mountain bike
Backpack (13)
Exercise (other forms) (14)
Fish (15)
Hunt (16)
Camp (17)
Horseback ride (18)
Bird watch (19)
Use Off Highway Vehicles (snowmobile, dirt bike, 4-wheeler, etc.) (20)
Star gazing or participating in astronomy (21)
Watch plants and animals (22)
Relax outside (23)
Repair mechanical devices (24)
Do house work (cleaning, repairs, improvements, etc.) (25)
Do woodwork/carpentry (26)
Play games (word, board, knowledge, card, video, puzzles etc.) (27)
Watch TV (28)
Engage in social activities (go out with friends, visit relatives, attend parties, eat dinner, etc.): (29)
Eat out at restaurants (30)
Attend club meetings and/or social events (31)
Volunteer (32)
Attend church service/synagogue (33)
Engage in prayer or mediation (34)
Travel (out of town, abroad, etc.) (35)

Participate in business not related to job (hobby or crafting for compensation) (36)

Collect (stamps, coins, etc.) (37)

Read (for leisure, newspaper etc.) (38)

Garden (39)

Write (letters, creative writing, etc.) (40)

Sew (knit, needlework etc.) (41)

Attend lectures (42)

Go to library (43)

Study foreign language (44)

Go to the movies (45)

Use technology (46)

Engage in photography (47)

Play an instrument (48)

Q31 In each of the following questions replace the blank with your activity.

<table>
<thead>
<tr>
<th>Not at all (1)</th>
<th>Very much (10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2)</td>
<td>(2)</td>
</tr>
<tr>
<td>(3)</td>
<td>(3)</td>
</tr>
<tr>
<td>(4)</td>
<td>(4)</td>
</tr>
<tr>
<td>(5)</td>
<td>(5)</td>
</tr>
<tr>
<td>(6)</td>
<td>(6)</td>
</tr>
<tr>
<td>(7)</td>
<td>(7)</td>
</tr>
<tr>
<td>(8)</td>
<td>(8)</td>
</tr>
<tr>
<td>(9)</td>
<td>(9)</td>
</tr>
</tbody>
</table>
When I ____________________
it is fun. (1)

When I ____________________
it is exciting.
(2)

When I ____________________
it requires physical exertion. (3)

When I ____________________
it raises my heart rate. (4)
Q32 In each of the following questions replace the blank with your activity.

<table>
<thead>
<tr>
<th>Not at all</th>
<th>. (2)</th>
<th>. (3)</th>
<th>. (4)</th>
<th>. (5)</th>
<th>. (6)</th>
<th>A great deal (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When I

__________

I feel awe. (1)

Q33 In each of the following questions replace the blank with your activity.
<table>
<thead>
<tr>
<th>Completely</th>
<th>Disagree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>. (2)</td>
<td>. (3)</td>
</tr>
<tr>
<td>(1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I feel satisfied when I

__________.

(1)

Given a choice this is an activity I would choose to participate in. (2)
Q73 Answer how often you participate in the following activities with your partner.

Q55 How many hours per week do you spend exercising with your partner?

(in hours)

Q56 How many hours per week do you spend participating in religious activities with your partner?

(in hours)
Q57 How many hours per week do you spend participating in service to others with your partner?

(in hours)

________________________________________________________________

Q58 How many hours per week do you spend socializing with others with your partner?

(in hours)

________________________________________________________________
Q34 The following section will ask you questions about your relationship satisfaction.

Q35 Answer the questions in terms of how you feel about your partner.

<table>
<thead>
<tr>
<th>Extremely unhappy</th>
<th>Fairly unhappy</th>
<th>A little unhappy</th>
<th>Happy</th>
<th>Very happy</th>
<th>Extremely happy</th>
<th>Perfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td></td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(7)</td>
</tr>
</tbody>
</table>

Please indicate the degree of happiness, all things considered, of your relationship. (1)
Q36 Answer the questions in terms of how you feel about your partner.

<table>
<thead>
<tr>
<th>All the time (1)</th>
<th>Most of the time (2)</th>
<th>More often than not (3)</th>
<th>Occasionally (4)</th>
<th>Rarely (5)</th>
<th>Never (6)</th>
</tr>
</thead>
</table>

In general, how often do you think that things between you and your partner are going well? (1)
Q37 Answer the questions in terms of how you feel about your partner.

<table>
<thead>
<tr>
<th></th>
<th>Not at all true (1)</th>
<th>A little true (2)</th>
<th>Somewhat true (3)</th>
<th>Mostly true (4)</th>
<th>Almost completely true (5)</th>
<th>Completely true (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our relationship is strong.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My relationship with my partner makes me happy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I have a warm and comfortable relationship with my partner. (3)

I really feel like part of a team with my partner. (4)

Q38 Answer the questions in terms of how you feel about your partner.
<table>
<thead>
<tr>
<th>How rewarding is your relationship with your partner? (1)</th>
<th>Not at all (1)</th>
<th>A little (2)</th>
<th>Somewhat (3)</th>
<th>Mostly (4)</th>
<th>Almost completely (5)</th>
<th>Completely (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How well does your partner meet your needs? (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To what extent has your relationship met your original expectations? (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In general, how satisfied are you with your relationship? (4)

Q39 For the following item, select the answer that best describes how you feel about your relationship. Base your responses on your first impressions and immediate feelings about the item.

<table>
<thead>
<tr>
<th>Interesting</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>Boring (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our relation-ship is...</td>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q40 For the following item, select the answer that best describes how you feel about your relationship. Base your responses on your first impressions and immediate feelings about the item.

<table>
<thead>
<tr>
<th>Bad (1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>Good (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our relationship is...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q41 For the following item, select the answer that best describes how you feel about your relationship. Base your responses on your first impressions and immediate feelings about the item.

<table>
<thead>
<tr>
<th>Full (1)</th>
<th>. (2)</th>
<th>. (3)</th>
<th>. (4)</th>
<th>. (5)</th>
<th>Empty (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our relationship is...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q42 For the following item, select the answer that best describes how you feel about your relationship. Base your responses on your first impressions and immediate feelings about the item.

<table>
<thead>
<tr>
<th>Sturdy (1)</th>
<th>. (2)</th>
<th>. (3)</th>
<th>. (4)</th>
<th>. (5)</th>
<th>Fragile (6)</th>
</tr>
</thead>
</table>
Q43 For the following item, select the answer that best describes how you feel about your relationship. Base your responses on your first impressions and immediate feelings about the item.

<table>
<thead>
<tr>
<th>Discouraging</th>
<th>. (2)</th>
<th>. (3)</th>
<th>. (4)</th>
<th>. (5)</th>
<th>Hopeful (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our relationship is...</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

Q44 For the following item, select the answer that best describes how you feel about your relationship. Base your responses on your first impressions and immediate feelings about the item.

<table>
<thead>
<tr>
<th>Enjoyable</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>Miserable</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(6)</td>
</tr>
</tbody>
</table>

Our relationship is...

(1)
Q45 The following section will ask you questions about your relationship.

Q46 Answer the questions in terms of how you feel about your partner.

<table>
<thead>
<tr>
<th></th>
<th>Never true (1)</th>
<th>Rarely true (2)</th>
<th>Sometimes true (3)</th>
<th>Usually true (4)</th>
<th>Always true (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am rarely available to my partner.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is hard for my partner to get my attention.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I listen when my partner shares her/his</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I am confident I reach out to my partner.

It is hard for me to confide in my partner.

I struggle to feel close and engaged in our relationship.

My partner is rarely available to me.

It is hard for me to get my deepest feelings.
partner's attention. (8)

My partner listens when I share my deepest feelings. (9)

I am confident my partner reaches out to me. (10)

It is hard for my partner to confide in me. (11)

My partner struggles to feel close and engaged in our relationship. (12)
Q47 Answer the questions in terms of how you feel about your partner.

<table>
<thead>
<tr>
<th>I’m afraid that</th>
<th>Strongly disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat disagree (3)</th>
<th>Neither agree nor disagree (4)</th>
<th>Somewhat agree (5)</th>
<th>Agree (6)</th>
<th>Strongly agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will lose my partners love. (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I prefer not to show my partner how I feel deep down. (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I often worry that my partner will not want to stay with me. (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I feel comfortable sharing my private thoughts and feelings with my partner. (4)

I often worry that my partner doesn’t really love me. (5)

I find it difficult to allow myself to depend on my partner. (6)

I worry that my partner won’t care about me as much as I care.
about them.
(7)

I am very comfortable being close to my partner. (8)

I often wish that my partner's feelings for me were as strong as my feelings for them. (9)

I don't feel comfortable opening up to my partner. (10)
I worry a lot about my relationship. (11)

I prefer not to be too close to my partner. (12)

When my partner is out of sight, I worry that they might become interested in someone else (and leave/exclude me). (13)

I get uncomfortable when my partner wants to be very close. (14)
When I show my feelings for my partner, I’m afraid they will not feel the same about me. (15)

I find it relatively easy to get close to my partner. (16)

I rarely worry about my partner leaving me. (17)

It’s not difficult for me to get close to my partner. (18)

My partner makes me
I usually discuss my problems and concerns with my partner. (20)

I do not often worry about being abandoned. (21)

It helps to turn to my partner in times of need. (22)

I find that my partner doesn't want to get as close as I would like. (23)
I tell my partner just about everything. (24)

Sometimes my partner changes their feelings about me for no apparent reason. (25)

I talk things over with my partner. (26)

My desire to be very close sometimes scares my partner away. (27)
I am nervous when my partner gets too close to me.

(28)

I'm afraid that once my partner gets to know me, they won't like who I really am.

(29)

I feel comfortable depending on my partner.

(30)

It makes me mad that I don't get the affection and support I need.
from my partner. (31)

I find it easy to depend on my partner. (32)

I worry that I won't measure up to other people. (33)

It's easy for me to be affectionate with my partner. (34)

My partner only seems to notice me when I'm angry. (35)
My partner really understands me and my needs. (36)
Q48 The final section will ask about your demographics.

Q49 How old are you?

(in years)

Q50 What is your sex?

Male (1)
Female (2)
Prefer not to respond (3)

Q51 What is your gender?

Male (1)
Female (2)
Non-binary (3)
Prefer not to respond (4)

Q52 What is your race/ethnicity?

(Check all that apply)
European American (1)
Black or African American (2)
Asian American (3)
Latino/a (4)
Native American or Alaskan Native (5)
Native Hawaiian or other Pacific Islander (6)
Not listed above (7)

Q53 How long has your relationship lasted with your significant other?
Q68 What best describes is your relationship with your significant other?

Married (1)
Dating (2)
Engaged (3)
Other (4)

Q69 How many children do you have?

0 (1)
1 (2)
2 (3)
3 (4)
4 (5)
5 (6)
More than 5 (7)
Q54 What most accurately reflects your education level?

Less Than High School (1)

High School Degree (2)

Some College (3)

Trade School Degree (4)

College Degree (5)

Graduate or Professional Degree (6)
Q59 Thank you for your response! Your participation will help us better understand the role recreating in nature impacts couple relationships. If any of the questions led you to feel distressed about yourself or your relationship, please use the following links to find a professional in your area who can help.

https://www.therapistlocator.net/

OR

https://www.psychologytoday.com/us/therapists/

End of Block: Default Question Block

Start of Block: End: Assign Codes

Q60 This is your completion code.$\{e://Field/Completion%20Code\}$

End of Block: End: Assign Codes