Research Article

# A cognitive appraisal approach to understanding mountain bikers' post-trip trails recommendation intent

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A B S T R A C T

This paper presents findings from a study that examined how well mountain bikers' cognitive processes predicted their recommendation intent—the intention to share their recreation experience with others. Specifically, we examined relationships between different mountain biking recreation goal appraisals, emotions, and mountain bikers' intentions to suggest mountain biking destinations to others. We tested hypothesized relationships using a structural equation modeling approach. Our results show that goal congruence and interest are the primary appraisal factors predicting recommendation intent among mountain bikers. While satisfaction and affective emotions are distinct factors that affect post-trip recommendation behavior, our results suggest that satisfaction emotions are significant secondary predictors of recommendation intent and have a stronger relationship with post-trip recommendation intentions than affective emotions. These study outcomes may be used to inform and develop effective management strategies for mountain biking destinations by designing based on user experiences.

*Study implications for management:* The study underscores the crucial need to tailor mountain biking trails to align with bikers' recreational aspirations and abilities, emphasizing the importance of offering diverse experiences suited to different skill levels. Instead of the typical strategy to grow biking destinations by expanding trail networks, managers should prioritize aligning trail experiences with bikers' expectations and desires to boost competitiveness. Strategic investments in trail infrastructure and services, coupled with feedback systems to gauge changing needs and satisfaction levels, are critical. Collaborating with local biking groups can enhance understanding and adaptability to evolving preferences. Continuous efforts to personalize trail experiences based on bikers' preferences are essential for garnering positive feedback, ensuring enduring enjoyment, and sustaining the appeal and growth of mountain biking destinations.

## 1. Introduction

The surge in popularity of mountain biking as an outdoor recreation activity is evident both in the United States and globally, as highlighted by recent studies (Buning & Lamont, 2021; Buning & Lamont, 2021; Hill & Gomez, 2020; Newsome et al., 2016; Pucher et al., 2011). Notably, participation in mountain biking in the US has grown substantially in recent years, from 6.8 million participants in 2007 to 9 million participants in 2020, marking a remarkable 30% rise (Outdoor Foundation,

2022). This surge in interest has prompted public land managers at federal, state, and local levels to respond by developing and expanding mountain bike trails to accommodate growing demand (Buning & Lamont, 2021; Pucher et al., 2011). The economic significance of mountain biking also is gaining recognition, particularly in rural areas where it often serves as a catalyst for community revitalization (Burgin & Hardiman, 2014). In Oregon, for example, mountain biking has emerged as a notable economic activity contributing to rejuvenating communities whose economies once relied on resource extraction from

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public lands (Meltzer, 2014; Munanura et al., 2022). A compelling example is Coos County, where the mountain biking industry and other tourism initiatives have contributed to substantial economic gains. According to the Oregon Business Development Department (2021), Coos Country's tourism earnings and tax revenue are experiencing an annual growth rate of 6.6% and 2.6%, respectively.

Mountain biking is a specialized recreational activity with high equipment costs and a need for suitable trail networks and these factors influence the degree to which it can positively impact local economies. For this reason, it is imperative to understand the decision-making processes of the individuals who participate in thistight-knit community. Mountain bikers, bound by a sense of camaraderie, actively seek and endorse trails based on their own personal experiences (Symmonds et al., 2000). Consequently, trails providing exceptional biking experiences are more likely to garner positive word-of-mouth referrals and higher visitation rates. However, a significant gap exists as managers of mountain biking destinations lack insights into the factors and cognitive processes shaping bikers' post-trip recommendations, hindering effective management of trails (Buning & Lamont, 2021; Taylor, 2010). Existing research has focused on pre-trip predictors of cyclists' decisions, such as preferences and motivations (Symmonds et al., 2000; Taylor, 2010). In contrast, the decision to recommend mountain biking trails is largely informed by the emotions generated during the biking experience, aligning with cognitive appraisal theory (Smith & Lazarus, 1993). Positive post-biking emotions are thought to induce adaptive behaviors, with recommending highly-rated trails being one such behavior (Ma et al., 2017).

Surprisingly, studies examining the cognitive factors influencing post-trip recommendations among mountain bikers are scarce. This study was intended to bridge this knowledge gap by examining the mental evaluative processes that potentially influence bikers' behavioral intent to promote mountain biking trails. The Whiskey Run Trail System (WRTS) near Bandon, Oregon, served as a case study to address two important questions: 1) Is the cognitive appraisal of recreation goals significantly associated with mountain bikers' post-trip positive emotions? 2) Does a significant relationship exist between post-trip positive emotions and post-trip behavioral intentions to recommend mountain biking trails? In this paper, we offer theoretical and methodological orientations to address these questions and present findings and their implications for research and management.

## 2. Theoretical orientation

### 2.1. Word-of-mouth recommendation behavior in customer studies

The extensive literature on word-of-mouth recommendation behavior within customer studies has predominantly explored the intricate connection between an individual's behavioral intent to recommend and the satisfaction and positive emotions the individual derived from product or service experiences (Anderson, 1998; Wen et al., 2018). Despite the established conceptual distinction between satisfaction and emotions, recent research, notably by Ma et al. (2017), argues for their consideration as separate yet interrelated emotional outcomes, particularly in the context of post-trip experiences (Bigné et al., 2005; Finn, 2005). The existing literature supports the proposition that post-trip satisfaction is an emotional outcome, as evidenced by studies such as Baker and Crompton (2000), Ma et al. (2017), and Westbrook and Oliver (1991). Acknowledging these foundations, we delineate positive affective emotions and satisfaction experience as distinct yet closely related emotion variables that potentially influence the likelihood of mountain bikers recommending a particular biking destination post-trip. Empirical evidence indicates a robust correlation between an individual's post-trip behavior and their emotional state (Cai et al., 2018; Jiang, 2020; Ma et al., 2017). Accordingly, a satisfied individual is more inclined to voluntarily recommend the experienced product or service to others (Jiang, 2020; Wen et al., 2018).

Ma et al. (2017) emphasize the influential role of positive emotional experiences, such as happiness, in the likelihood of a mountain biker recommending a specific trail to fellow enthusiasts. This underscores the crucial role of emotions, particularly positive affective states, in shaping word-of-mouth behavior within the mountain biking community. Seminal work by Chung and Darke (2006) and Anderson (1998) introduced the "word-of-mouth" concept, asserting that individuals' decisions to recommend a product or service are grounded in their emotional reactions—positive, neutral, or adverse—to the consumption experience. Positive word-of-mouth behavior is intricately linked to affective positive reactions and satisfaction with consumption experiences, emphasizing the pivotal role of emotions in the recommendation process (Anderson, 1998). Numerous studies have corroborated this linkage, demonstrating that positive emotions and satisfaction are reliable predictors of word-of-mouth recommendations (Jiang, 2019; Ma et al., 2017; Wen et al., 2018). While existing research linking emotions to word-of-mouth recommendations as adaptive behavior provides valuable insights, there is a notable gap in accounting for factors that elicit critical emotions conducive to word-of-mouth recommendations. To address this, our study draws from Cognitive Appraisal Theory (CAT), offering a comprehensive theoretical lens to understand the relationship between appraisals of trip costs and benefits, resulting emotions, and post-trip recommendations. This theoretical foundation positions post-trip recommendations as a later stage of the post-consumption judgment experience (Lazarus, 1991). According to CAT, emotional reactions originate from an individual's initial impression of how well their well-being goals are met, presenting an opportunity to predict the recommendation behavior of outdoor recreationists, including mountain bikers.

### 2.2. Cognitive appraisal theory perspective

Lazarus and Folkman (1984) propose that CAT involves a mental evaluation process where individuals assess the importance of an event, such as mountain biking recreation, to their own individual well-being. Conceptually, this suggests that individuals' behavior and actions, particularly post-trip recommendations of trails, are intricately linked to their emotional responses and experiences (Lazarus, 1991; Watson & Spence, 2007). The core premise posits emotional experiences as outcomes and predictor variables in the cognitive process that predicts post-trip recommendations, providing a valuable lens for understanding the role of emotions in outdoor recreation experiences. Emotional experience, according to CAT, is a state of mind caused by evaluating the relevance of an experience (Lazarus, 1991). For example, an individual's emotional response to mountain biking results from their decision about whether it harms or helps their health. Emotions play a pivotal role in explaining why people act the way they do, with positive emotions reinforcing specific actions, as highlighted by Choi and Choi (2019) and Watson and Spence (2007). This aligns with research emphasizing the role of emotions in shaping recreational behaviors, such as the impact of passion on environmental behaviors (Junot et al., 2017) and emotion-focused coping responses to stress in wilderness settings (Schuster & Hammitt, 2003). However, a more nuanced exploration of the diverse emotional responses within the mountain biking community could enhance the applicability of these theories.

#### 2.2.1. Primary appraisals and emotional outcomes

CAT introduces a dual-level cognitive appraisal process comprising primary and secondary appraisal (Lazarus & Folkman, 1984). Primary appraisal involves evaluating the essentiality of an experience, such as mountain biking on trails, to wellbeing, influencing emotional outcomes. Appraisal outcomes are either positive (e.g., joy) or negative (e.g., sadness) (Watson & Spence, 2007). Primary appraisals comprise goal relevance, interest, novelty, and congruence, associated with emotional experiences (Ellsworth & Smith, 1988; Smith & Lazarus, 1990; Lazarus, 2001). Goal congruence appraisals (i.e., whether mountain biking

experiences meet one's expectations) are associated with the valence of emotions (Ellsworth & Smith, 1988). Goal relevance appraisals (i.e., whether mountain biking is important), goal interest appraisals (i.e., whether mountain biking is of interest), and goal novelty appraisals (i.e., whether mountain biking is a new experience) are associated with the intensity of emotions (Ellsworth & Smith, 1988; Lazarus, 2001). Therefore, according to CAT, mountain biking recreation goal relevance, interest, importance, and novelty are components of primary appraisal potentially predicting the emotional experiences of mountain bikers. The CAT conceptualization of the link between appraisals and appraisal outcome emotions leads to four hypotheses:

**Hypothesis 1**. Affective emotions (H1a) and satisfaction emotions (H1b) are positively associated with relevance to mountain biking recreation goals.

**Hypothesis 2**. Affective emotions (H2a) and satisfaction emotions (H2b) are positively associated with congruence to mountain biking recreation goals.

**Hypothesis 3**. Affective emotions (H3a) and satisfaction emotions (H3b) are positively associated with interest in mountain biking recreation goals.

**Hypothesis 4**. Affective emotions (H4a) and satisfaction emotions (H4b) are positively associated with the novelty of a mountain biking recreation goal.

### 2.2.2. Secondary appraisal and adaptive behavior

Primary appraisals of mountain biking recreational goals lead to secondary appraisals (Smith & Lazarus, 1990). Secondary appraisal, triggered by activated emotions, induces individuals to behave in ways that match the emotion, forming an adaptive response to retain positive effects and overcome harm. This adaptive behavior is framed as a response to securing well-being benefits (Lazarus, 2001). A positive emotional response makes an individual act in a way that helps them secure and retain the positive effects of an experience on their well-being (Watson & Spence, 2007). Thus, a secondary appraisal is an adaptive behavior response aimed at both retaining the benefits of well-being and overcoming harm to well-being (Watson & Spence, 2007). Studies applying CAT in tourism and hospitality studies indicate that emotions influence post-visit behaviors or actions (Cai et al., 2018; Choi & Choi, 2019; Jiang, 2020; Ma et al., 2017). While the application of CAT in tourism and hospitality is promising, its direct transferability to the mountain biking context requires careful consideration of the unique factors that shape emotional experiences in this specific recreational setting. Therefore, as illustrated, CAT provides a robust foundation for unraveling the interplay between cognitive processes, emotions, and behaviors in mountain biking recreation. However, a more nuanced exploration of emotional experiences, encompassing a broader spectrum of emotions and diverse contextual factors, would enrich the applicability and depth of CAT in understanding the intricacies of the mountain biking community. Integrating these insights as research progresses could contribute to a more comprehensive understanding of the emotional dynamics inherent in outdoor recreational activities, such as mountain biking. Building on this discussion, our study formulates the final hypothesis:

**Hypothesis 5**. The intent to recommend a biking destination after a mountain biking trip is linked to emotions, specifically affective emotions (H5a) and satisfaction emotions (H5b)

### 2.2.3. CAT research model

Fig. 1 illustrates the five research hypotheses based on Cognitive Appraisal Theory (Lazarus, 1991; Lazarus & Folkman, 1984; Watson & Spence, 2007). Testing four hypotheses about how individual characteristics and biking recreation sites influence emotional experiences (hypotheses 1a–4b) follows the reasoning for primary appraisal as a
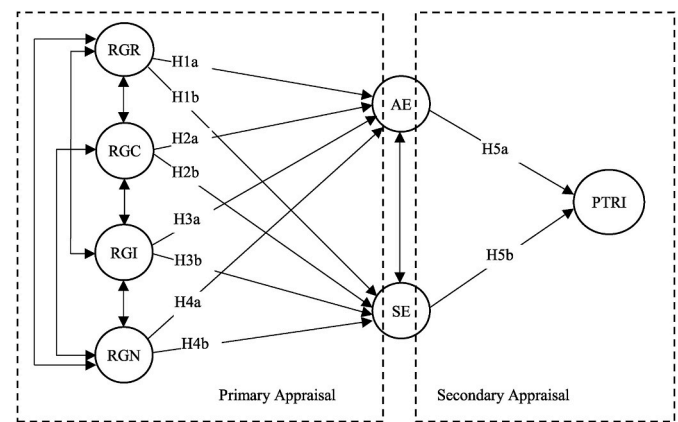


**Fig. 1.** A cognitive appraisal theory research model
Notes: RGR = Recreation goal relevance appraisal, RGC = Recreation goal congruence, RGI = Recreation goal interest, RGN = Recreation goal novelty, AE = Affective emotions, SE = Satisfaction emotions, PTRI = Post-trip recommendation intent, H1a = Hypothesis 1a.

cause of emotions. Additionally, testing one hypothesis suggesting that emotions are strongly associated with the post-trip recommendation intent of mountain bikers (hypotheses 5a and 5b) aligns with the rationale for a secondary appraisal.

## 3. Methods

### 3.1. Whiskey Run Trail System (WRTS), Coos County, Oregon

We collected survey data at the Whiskey Run Trail System (WRTS) in the fall of 2021. The WRTS is located within the Coos County Forest in Coos County, Oregon, and includes a captivating network of mountain biking trails creatively designed to cater to mountain bikers of varying experience levels. Spanning over 30 miles, this trail system weaves through the heart of the Coos County forest, presenting riders with an array of single-track and multi-use trails that include a range of jump lines, technical challenges, and breathtaking scenic views. The diversity of trail offerings makes the WRTS a sought-after destination, consistently attracting mountain biking enthusiasts from as far as California and Washington (Munanura et al., 2022).

Recognized as a premier mountain biking location in Oregon, the WRTS has emerged as a significant contributor to the local economy (Munanura et al., 2022). Paired with the renowned Bandon Dunes Golf Resort, celebrated globally as a top-tier golfing destination, Coos County is rapidly establishing itself as one of the most appealing destinations on Oregon's south coast and the broader Pacific Northwest (Oregon Business Development Department, 2021).

### 3.2. Data collection and measures

Our survey data comprised responses from a convenience sample of 409 mountain bikers, after excluding 24 incomplete surveys. These participants were categorized into two distinct groups: 257 individuals who had engaged in recreation at WRTS, and 152 respondents who, although not having visited WRTS, were active members of 29 mountain biking organizations across Oregon, California, Washington, and Idaho (e.g., Wild Rivers Coast Mountain Biking Association, Whatcom Mountain Bike Coalition). During September and October 2021, we employed on-site and online survey administration methods. We approached on-site respondents as they completed their trail experiences, allowing them to fill out the survey immediately or later at home, with the option to mail it in. Utilizing QR codes and paper copies, on-site respondents could conveniently complete the survey online. To reach respondents from mountain biking organizations, we initiated contact by emailing

leaders of 29 active groups, who then circulated an invitation to their members using QR codes to access the survey. Both on-site and online respondents were presented with a similar survey instrument, with slight modifications for those who have not visited WRTS.

Measures of appraisal constructs, including goal relevance, goal congruence, goal interest, and goal novelty, were adapted from Hosany (2012) and Ma et al. (2013; 2017). These constructs were assessed on a seven-point scale. For example, goal relevance evaluated the perceived essentiality of mountain biking to individuals, with five corresponding items in the questionnaire. Emotion constructs, encompassing positive emotion and satisfaction, were adapted from Finn (2012) and Ma et al. (2017). Positive emotion measures assessed the enjoyment of biking experiences, with five items rated on a five-point scale. Satisfaction, evaluating the overall contentment with the biking experience, comprised seven items rated on a five-point scale. Lastly, measures of the behavioral intent to recommend construct were adapted from Ma et al. (2017). This construct assessed respondents' inclination to recommend the mountain biking destination post-experience, with three items rated on a five-point scale. Table 2 provides a comprehensive list of items used to measure the appraisal, emotion, and behavioral intent to recommend constructs.

### 3.3. Data analysis

We initiated a Confirmatory Factor Analysis (CFA) to ensure the reliability and validity of our construct measures. Our assessment adhered to benchmark model fit indices recommended by existing literature (Schreiber et al., 2006). Our criteria for model acceptability included an insignificant chi-square exact-fit test at $p < .05$ and a chi-square to degrees of freedom ratio equal to or less than 3 (Schreiber et al., 2006). It's important to acknowledge that the sample size can influence the statistical significance of the chi-square exact-fit test (Barrett, 2007). To further assess the measurement model, we considered additional approximate fit indices: a Comparative Fit Index (CFI) equal to or above 0.95 and a Root Mean Square Error of Approximation (RMSEA) below 0.06 or 0.08 (Hu & Bentler, 1999; Schreiber et al., 2006). Following the CFA, we employed Structural Equation Modeling (SEM) to test our hypotheses and evaluate the effectiveness of Cognitive Appraisal Theory in explaining mountain bikers' post-recreation emotions and behavioral intent to recommend biking trails. Model-fit indices consistent with those outlined for CFA were applied (e.g., CFI >0.95 and RMSEA <0.06). To handle missing data, we used expectation-maximization (EM) methods recommended by Little and Rubin (1989). Preliminary CFA model evaluation identified a Mardia's coefficient greater than 5, indicating non-normal distribution of multivariate data (Byrne, 2013). Consequently, we based both the CFA and SEM model estimations on robust statistics, specifically the Satorra-Bentler scaled statistics, denoted as $S–B\chi^2$, as per Byrne's (2013) recommendations. This approach corrects for the non-normal distribution of data, ensuring the robustness of our analyses.

## 4. Results

### 4.1. Sample profile

Table 1 summarizes respondents' vital demographic characteristics (i.e., gender, race, income, and education). Most respondents were male (74.2%), white (86%), highly educated (69% have a four-year college degree or advanced graduate degree), and affluent (53% earned $100,000 or more per year). Comparing respondents who have been to WRTS with respondents who have not, our results suggest no statistically significant differences in gender ($\chi2 = 8.50$, $p < 0.05$, with a modest effect size of 0.2 indicating a typical difference), race ($\chi^2 = 8.519, p > 0.05$), education ($\chi^2 = 7.37$, $p > 0.05$), and income ($\chi^2 = 7.45$, $p > 0.05$). These results suggest that a typical mountain biker in our sample is more likely to be male, white, highly educated, and affluent.

**Table 1**
Demographic information of survey respondents.

| Demographic Information of Respondents | Frequency | Valid Percent |
|---|---|---|
| **Gender** (n = 264) | | |
| Male | 194 | 74.2% |
| Female | 67 | 25.4 |
| Non-binary | 1 | 0.4 |
| **Race** (n = 264) | | |
| White (Caucasian) | 228 | 86.4 |
| Hispanic or Latino | 15 | 5.7 |
| Asian | 1 | 0.4 |
| Other race | 11 | 4.2 |
| Native American or Alaskan native | 5 | 1.9 |
| Native Hawaiian or Pacific Islander | 4 | 1.5 |
| **Income** (n = 250) | | |
| Under $25,000 | 7 | 2.8 |
| $25,000 to $49,999 | 26 | 10.4 |
| $50,000 to $74,999 | 44 | 17.5 |
| $75,000 to $99,999 | 40 | 15.9 |
| $100,000 to $149,999 | 57 | 22.7 |
| $150,000 to $199,999 | 42 | 16.7 |
| $200,000 to $249,999 | 15 | 6 |
| $250,000 or more | 20 | 8 |
| **Education** (n = 259) | | |
| Less than a high school diploma | 1 | 0.4 |
| 9th to 12th grade, but no diploma received | 1 | 0.4 |
| High school diploma or GED | 11 | 4.2 |
| Some college, but no degree received | 40 | 15.4 |
| Associate degree or 2-year technical school | 27 | 10.4 |
| 4-year college degree (e.g., a bachelor's degree) | 94 | 36.2 |
| Graduate degree beyond 4-year college degree (e.g., master's degree) | 86 | 33.1 |

### 4.2. Measurement validation results

Our CFA results suggest that the appraisal CFA model fits our sample data very well, according to Byrne (2013), as evidenced by the following primary appraisal model fit indices: $S-B\chi^2$ (degrees of freedom = 96) = 118.97, $\chi^2/df = 1.24$, $p > 0.05$, CFI = 0.96, RAMSEA = 0.04, with a 90% CI of [0.00 - 0.06] (Table 2). Similarly, the fit indices for the secondary appraisal model revealed an acceptable model: $S-B\chi^2$ (df = 72) = 111.41, $\chi^2/df = 1.55$, $p < 0.001$, CFI = 0.93, RMSEA = 0.06 (0.04 - 0.07), considering the sample size effect on chi-square and CFI results (Barrett, 2007; Schreiber et al., 2006) (Table 3). The standardized factor loadings for all measures were above 0.6 and statistically significant at $p < 0.05$, suggesting measurement reliability, according to Hair et al. (2016). As indicated in Tables 2 and 3, the standardized loadings for items measuring the appraisal constructs ranged between 0.68 and 0.93. Standardized loadings for items measuring positive emotions ranged between 0.76 and 0.84. In contrast, loadings for items measuring satisfaction emotions ranged from 0.69 to 0.91. Finally, the standardized loadings for items measuring behavioral intent of recommendation ranged between 0.88 and 0.94. These results, suggest that the measures we used are reliable, according to Hair et al. (2016). Furthermore, composite reliability (CR) values ranging from 0.79 to 0.95, as well as average extracted variance (AVE) values greater than 0.5, which, according to Hair et al. (2016), indicate evidence of composite reliability and convergent validity of measures, respectively Tables 2 and 3). None of the correlations between the independent latent constructs exceeded the associated square root of the average variance extracted values, confirming the discriminant validity of the measures (Hair et al., 2016) (Table 4).

## 5. Hypothesis testing results

Our structural model goodness-of-fit indices suggest that the structural model adequately fits the data [($S-B\chi^2 = 512.38$, df = 386, $\chi^2/df = 1.33$, $p > 0.05$, CFI = 0.90, RMSEA = 0.05 (0.04 - 0.06)] (e.g., Byrne, 2013; Hu & Bentler, 1999). Hypothesis 1, which suggests that emotions

**Table 2**

Convergent validity of the primary appraisal model constructs.

| Constructs and measurement items | Mean | SD | λ | Critical Ratio | CR | AVE |
|---|---|---|---|---|---|---|
| *Recreation goal relevance appraisal* | | | | | 0.94 | 0.76 |
| I believe biking on nature trails similar to trails at Whiskey Run … | | | | | | |
| is important | 6.51 | 0.86 | 0.89 | N/A | | |
| is relevant | 6.30 | 1.17 | 0.89 | 11.95 | | |
| means a lot to me | 6.39 | 1.12 | 0.86 | 13.57 | | |
| matters to me | 6.40 | 1.15 | 0.90 | 11.64 | | |
| is of concern to me | 6.14 | 1.34 | 0.82 | 12.16 | | |
| *Recreation goal congruence appraisal* | | | | | 0.90 | 0.75 |
| My overall experience was very much consistent with what I wanted to achieve during this visit | 6.21 | 0.91 | 0.92 | N/A | | |
| My overall experience was very much consistent with what I desired from this visit | 6.02 | 1.05 | 0.90 | 14.97 | | |
| Overall my experience during this visit is important to achieving my recreation goals, needs and desires | 6.10 | 1.03 | 0.78 | 11.15 | | |
| *Recreation goal interest appraisal* | | | | | 0.95 | 0.78 |
| My biking experience here was … | | | | | | |
| interesting | 6.16 | 1.00 | 0.92 | N/A | | |
| fun | 6.45 | 0.86 | 0.87 | 13.18 | | |
| appealing | 6.33 | 0.99 | 0.93 | 21.24 | | |
| stimulating | 6.30 | 1.03 | 0.91 | 23.83 | | |
| exciting | 6.18 | 1.16 | 0.79 | 17.60 | | |
| *Recreation goal novelty appraisal* | | | | | 0.79 | 0.55 |
| Overall, my experience during this visit was expected | 5.53 | 1.44 | 0.68 | N/A | | |
| Overall, my experience during this visit was usual | 5.18 | 1.45 | 0.81 | 7.32 | | |
| Overall, my experience during this visit was familiar | 5.52 | 1.26 | 0.73 | 6.86 | | |

**Note**: SD = standard deviation, λ = standardized loadings, AVE = average variance extracted, CR = composite reliability, items were measured on a 7-point scale. Goodness-fit results: S-Bχ² (df = 96) = 118.97, χ2/df = 1.24 P > 0.05, CFI = 0.96, RMSEA = 0.04 (0.00-0.06).

are linked to the importance of a recreation goal, was not supported (Fig. 2). Affective emotions (H1a: = 0.01, p > 0.05) and satisfaction emotions (H1b: = 0.09, p > 0.05) were not strongly associated with the importance of the recreation goal (i.e., goal relevance). Hypothesis 2, indicating that recreation goal congruence is associated with emotions, was partially supported. Recreation goal congruence was associated with satisfaction emotions (H2b = 0.41, p < 0.001) but not with affective emotions (H2a = 0.15, p > 0.05). Our third hypothesis, indicating that recreation goal interest is related to emotions, was supported. We found recreation goal interest to be associated with affective emotions (H3a: β = 0.65, p < 0.001) and satisfaction emotions (H3b: β = 0.44, p < 0.01). Hypothesis 4, indicating that novelty in recreation goals is associated with emotions, was not supported. We found recreation goal novelty to be unrelated to affective (H4a: = 0.01, p > 0.05) or satisfaction (H4b: = 0.05, p > 0.05) emotions. Finally, hypothesis 5 was partially supported, indicating that emotions are associated with the intent to recommend a mountain biking destination. Satisfaction emotions are strongly related to recommendation intent (H5b: = 0.50, p < 0.01), whereas affective emotions are not (H5a: = 0.13, p > 0.05).

Our results suggest that goal congruence and goal interest are critical primary appraisal factors, and satisfaction emotions are critical

**Table 3**

Convergent validity of the secondary model constructs.

| Constructs and measurement items | Mean | SD | λ | Critical Ratio | CR | AVE |
|---|---|---|---|---|---|---|
| *Post-trip satisfaction feelings* | | | | | 0.91 | 0.67 |
| Overall, … | | | | | | |
| the biking experience here was satisfying to me | 4.66 | 0.59 | 0.91 | N/A | | |
| the general recreation experience here was satisfying to me | 4.54 | 0.62 | 0.83 | 15.52 | | |
| I am happy with the experience I had here | 4.62 | 0.60 | 0.89 | 14.67 | | |
| the experience I had here was as good as I expected | 4.50 | 0.69 | 0.69 | 8.27 | | |
| I felt comfortable with the experience I had here | 4.60 | 0.51 | 0.74 | 7.24 | | |
| *Post-trip positive emotions* | | | | | 0.91 | 0.66 |
| Overall, during my visit I felt … | | | | | | |
| excited | 4.04 | 0.69 | 0.76 | N/A | | |
| elated | 3.75 | 0.90 | 0.82 | 12.80 | | |
| enthusiastic | 4.29 | 0.70 | 0.81 | 10.99 | | |
| delighted | 4.20 | 0.74 | 0.84 | 12.27 | | |
| gleeful | 3.97 | 0.88 | 0.84 | 9.61 | | |
| *Intention to recommend a mountain biking destination* | | | | | 0.91 | 0.77 |
| I would recommend biking at Whiskey Run biking trails to someone else | 4.64 | 0.80 | 0.88 | N/A | | |
| I'm likely to talk to others about how happy the biking experience at Whiskey Run biking trails was | 4.57 | 0.83 | 0.94 | 3.52 | | |
| I would mention Whiskey Run biking trails if someone else wanted a biking recreation experience | 4.65 | 0.78 | 0.82 | 3.49 | | |

**Note:** *SD = standard deviation, λ = standardized loadings, AVE = average variance extracted, CR = composite reliability, items were measured on a 5-point scale. Goodness of fit results: S-Bχ² (df = 72) = 111.41, χ2/df = 1.55, p < 0.001, CFI = .93, RMSEA = .06 (.04-.07).*

**Table 4**

Test for discriminant and convergent validity.

| | Indipendent constructs (Appraisal factors) | CR | AVE | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|
| 1 | Recreation goal relevance appraisal | 0.94 | 0.76 | **0.87** | | | |
| 2 | Recreation goal congruence appraisal | 0.90 | 0.75 | 0.40 | **0.87** | | |
| 3 | Recreation goal interest appraisal | 0.95 | 0.78 | 0.42 | 0.80 | **0.88** | |
| 4 | Recreation goal novelty appraisal | 0.75 | 0.55 | 0.12 | 0.42 | 0.38 | **0.74** |
| | Dependent constructs (Emotion and recommendation factors) | | | | | | |
| 1 | Post-trip satisfaction feelings | 0.91 | 0.67 | **0.81** | | | |
| 2 | Post-trip positive emotions | 0.91 | 0.66 | 0.54 | **0.81** | | |
| 3 | Post-trip intention to recommend a mountain biking site | 0.91 | 0.77 | 0.53 | 0.41 | **0.84** | |

**Note:** CR = composite reliability, AVE = average variance extracted, diagonal values in bold are the square root of average variance extracted.

secondary appraisal factors in the cognitive process predating trail or destination recommendation intent among mountain bikers. The primary cognitive appraisal factors, including goal relevance, goal
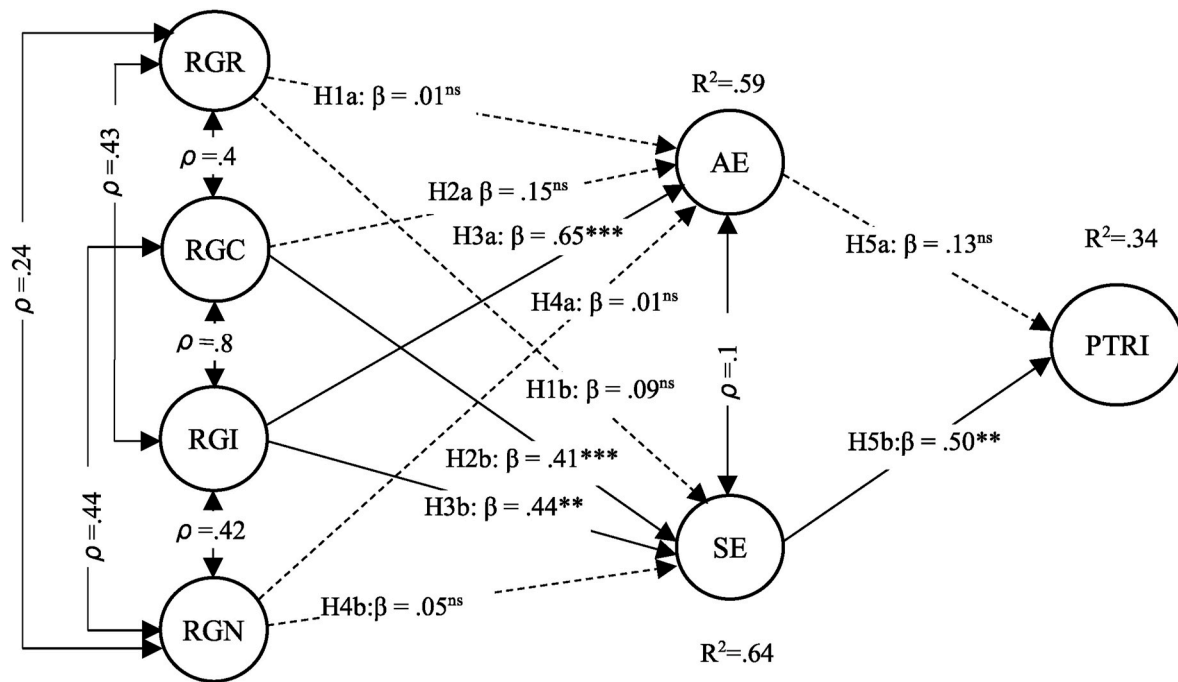
**Fig. 2.** Structural model evaluation

**Note:** *** = p < 0.001, ** = p < 0.01, ns = relationship is not statistically significant, structural model goodness-of-fit information: S-B$\chi^2$ = 512.38, df = 386, $\chi^2$/df = 1.33, p > 0.05, CFI = 0.90, RMSEA = 0.05 (0.04 - 0.06). Straight lines = statistically significant relationship, dotted lines = non-statistically significant relationship, RGR = Recreation goal relevance appraisal, RGC = Recreation goal congruence, RGI = Recreation goal interest, RGN = Recreation goal novelty, AE = Affective emotions, SE = Satisfaction emotions, PRERI = Post-trip recommendation intent.

congruence, goal interest, and goal novelty, explained 59% of the variance in affective emotions and 64% in satisfaction emotions. Secondary appraisal emotions, including affective and satisfaction, accounted for 34% of the variance in recommendation behavior.

## 6. Discussion

This study aimed to understand what influences mountain bikers to recommend biking trails following their mountain biking trips. We found that offering trails designed to meet the recreation goals of mountain bikers (i.e., goal congruence), diverse recreation interests (i. e., goal interest), and satisfying their recreation needs (i.e., satisfaction emotions) likely determine whether a mountain biking trail or destination will be recommended following a mountain biking trip. We found that goal relevance and novelty did not predict bikers' post-trip recommendation behavior. Emotions explain 34% of post-trip recommendation behavior, while primary appraisal factors explain 64% of satisfaction and 59% of affective emotions. These findings support earlier research indicating that primary appraisal factors predict emotional reactivity (Lazarus, 1991; Ma et al., 2017; Nyer, 1997; Ouyang et al., 2017). These results warrant some comment. First, our results suggest that the cognitive appraisal model theoretically predicts mountain bikers' post-trip recommendation behavior. Second, our results suggest that when mountain biking recreation goals and interests match offered biking recreation experiences, people are more satisfied and likely to promote trails to others.

### 6.1. Recreation goal interest and congruence are strong predictors of post-trip emotions

One of our primary goals with this study was to examine the appraisal process preceding emotions that likely shape post-trip intention among mountain bikers to recommend a recreational biking trail. Our results indicate that trails that meet mountain bikers' recreation goals are likely to be strongly associated with satisfaction emotions but

not with affective emotions, providing insight into the complex relationship between recreational goals and emotions. These findings are consistent with previous research (Cai et al., 2018; Jiang, 2020; Kreibig et al., 2012; Ma et al., 2017; Martin et al., 2008; Nyer, 1997). For example, Ma et al. (2017) found that satisfaction is elicited when experiences are congruent with one's goals. In contrast to the findings of Ma and colleagues (2013; 2017), our study found no statistically significant relationship between recreation goal congruence and affective emotion. The lack of association between goal congruence and affective emotions is somewhat surprising, given previous research linking goal congruence to positive emotion (Ma et al., 2017; Nyer, 1997).

In contrast to Jiang's (2020) findings of a strong relationship between affective emotions and recommendation behavior, our findings show a weak relationship. Our findings, however, are consistent with those of Ma et al. (2017), who found that post-visit recommendation behavior is strongly associated with satisfaction but not with affective emotions. According to Martin et al. (2008), a strong relationship exists between satisfaction emotions and behavior. Similarly, our results support previous research (e.g., Jiang, 2020; Ma et al., 2013; 2017), indicating that recreation goal interest is strongly associated with emotions (e.g., happiness).

Our results also suggest that interest in a mountain biking recreation goal is substantially associated with affective and satisfaction emotions. Previous research has also revealed similar results (e.g., Ma et al., 2013; 2017). According to research, goal setting and motivation help achieve favorable emotional results (Deci & Ryan, 2000). People who do things that match their interests and aspirations feel happier and more satisfied (Chen et al., 2011; Kreibig et al., 2012; Sheldon & Elliot, 1999). Hunter and Csikszentmihalyi (2003) showed that goal interest increases intrinsic motivation and good feelings. So, people who are more interested in their recreation goals feel excellent and satisfied while doing them. These findings suggest that mountain biking destinations should tailor their trails, guest support facilities, and services to guests' needs and interests. Mountain bikers' enjoyment goals may be tied to their perceived competence; therefore, destinations may keep in mind who

the mountain bikers are most likely to ride on their trails and focus on trails that cater to them (e.g., trails that appropriately challenge these bikers).

The findings of this study, supported by previous research, provide evidence of a strong relationship between recreation goal congruence and interest, emotions, and post-recreation trip recommendation intent. Elster (2009) and Lazarus (1991) argue that goals can lead to greater satisfaction and positive word-of-mouth recommendations when goals align with an individual's values and needs. Understanding cyclists' goals and values is essential for mountain biking destinations to create satisfying experiences. For instance, pro-environment, value-oriented cyclists would find trails in landscapes dominated by naturally occurring characteristics more interesting. Thus, mountain biking destinations that match bikers' goals and values are more likely to elicit positive emotions and long-term loyalty (Elster, 2009; Ma et al., 2017). When recreation goals match recreation biking experiences, trail users are more satisfied and more likely to suggest the biking destination to others. Therefore, mountain biking destinations could understand their client's needs and skill levels and adjust their products and services to satisfy them. For instance, a mountain bike trail center might offer a challenging and daring experience for bikers who want to push their limits and a more relaxed one for novices. Mountain biking destinations could promote environmentally responsible and sustainable recreation in line with bikers' environmental stewardship beliefs, which may increase satisfaction and word-of-mouth referrals. Mountain biking locations may seek to ensure that their biking experiences match consumers' goals, needs, and interests to boost satisfaction and post-trip recommendations.

### 6.2. Recreation goal relevance and novelty are weak predictors of post-trip emotions

Our results indicate that emotions were not strongly linked to how relevant or novel a mountain biking recreation experience was. This result aligns with studies that suggest that goal relevance does not predict satisfaction emotions (e.g., Ma et al., 2017). However, it contradicts other studies that indicate a strong relationship between goal relevance and affective emotions or goal novelty and emotions (Ma et al., 2013). According to previous research, goal novelty does not necessarily produce good emotions (Brougham et al., 2009). Consequently, the relevance and novelty of mountain biking destination qualities may not provide the positive emotional experiences needed to induce post-visit word-of-mouth endorsement of biking trails. Concentrating on perceived relevant, meaningful, and novel mountain biking experiences may not be enough to generate favorable emotional outcomes and post-trip word-of-mouth recommendations. Instead, emphasizing recreation goal congruence and interest in biking trail development is more likely to help biking destinations create positive emotional experiences that lead to post-trip word-of-mouth promotion of trails.

Some research has linked emotions to the perceived importance of recreation goals (Ma et al., 2013; 2017; Nyer, 1997). According to research, the novelty of a recreation experience can also boost recreation emotions (Bagozzi & Dholakia, 2006; Ma et al., 2013). The importance and novelty of a mountain biking recreation experience may have played a marginal role in this study due to personality, motivation, or the mountain biking context at the research site. Additionally, a weak role of recreation goal importance or relevance and novelty in shaping emotional reactivity could mean that both moderate the primary appraisal process shaping emotion. For instance, research literature suggests that goal relevance and novelty, unlike goal congruence, are associated with the intensity of an emotional experience rather than the nature of the experience (Lazarus, 2001). Ma et al. (2017) argued that the intensity of an emotional experience is linked to how new the goal is. Lazarus (2001) linked the novelty of goals to the intensity of an emotional experience. Thus, our weak relationship findings suggest that

recreational goal relevance, novelty, and affective emotions in determining post-trip behavioral intention deserve additional study. Conceivably, mountain bikers are already experienced, self-determined, and motivated individuals whose affective reactions are less likely to be elicited by trail experiences. Although our finding is inconsistent with some earlier studies (e.g., Ma et al., 2013; 2017), future studies exploring the moderating role of recreation goal relevance and novelty in the appraisal process are needed to fully understand their role in creating pleasant recreational experiences likely to elicit word-of-mouth recommendations among recreation users, including recreational cyclists.

### 6.3. Satisfaction emotions predict the recommendation intent behavior

Finally, unlike affective emotions, we found satisfaction emotions to firmly predict the intention to recommend trails to other cyclists following the trip. Previous research indicates that satisfaction with a product or service influences consumer behavior, including referrals (Ma et al., 2017). Others suggest that customer happiness leads to positive word-of-mouth, boosting customer loyalty and attracting new consumers (Jiang, 2020; Wen et al., 2018). Homburg et al. (2009) also found that satisfaction strongly predicts customer retention and loyalty. Satisfied customers are more likely to promote a product or service, according to Kumar and Reinartz (2016). Our results seem to confirm these effects.

Our study also provides evidence that the influence of emotions on post-trip behavior may vary depending on the type of emotion being experienced. This confirms earlier findings that different emotions affect behavior differently (e.g., Bagozzi et al., 1999; Ma et al., 2017). Satisfaction emotions indicate how well a customer's expectations were satisfied, and a positive experience can make them more likely to suggest the destination to others. Nevertheless, emotional reactions may be transient and unrelated to long-term behaviors like recommendations or return visits (Lazarus, 1991). These findings are significant for the provision of mountain biking trails. For example, mountain biking destinations seeking to expand ridership might focus on improving visitor satisfaction to induce more excellent positive word-of-mouth recommendations among mountain bikers.

### 6.4. Areas for future research

Our study has identified goal congruence and goal interest as primary appraisal factors and satisfaction emotions as critical secondary appraisal factors that predict the post-trip intent to recommend a mountain biking destination. Implications for future research can be drawn from these results on the factors influencing the post-trip recommendation behavior of mountain bikers. Future research could explore the effect of various marketing communications and strategies on the primary and secondary appraisal factors, as some studies show (Schiffman & Kanuk, 2010). Specifically, for example, future research might examine the effects of different types of messaging, such as highlighting unique features of a mountain biking destination (e.g., variety of trail difficulties, miles of trails available, surrounding environment, activities to do while not biking), on the goal congruence and goal interest of mountain bikers. Furthermore, as some studies argue (e. g., Hagen & Boyes, 2016; Symmonds et al., 2000), future research could investigate the impact of trail difficulty and safety features on goal congruence, goal interest, and satisfaction emotions.

Future research also could examine whether a change in a trail's complexity would significantly influence how mountain bikers feel about their goals and how satisfied they are based on earlier studies (e. g., Hagen & Boyes, 2016). Future research also could build on our study's findings by examining the connection between goal congruence and emotions and how these elements affect other significant post-trip behaviors, such as revisiting and word-of-mouth recommendations. Future research might also examine how cultural and personal values

and lived experiences affect how mountain bikers appraise recreation benefits, which could help mountain biking destinations modify their marketing and product strategies (Hagen & Boyes, 2016; Symmonds et al., 2000). Our study also emphasized the significance of developing recreational activities consistent with user interests to foster happy emotions and the success of destinations. It is necessary to conduct further research to comprehend how different marketing tactics and trail features affect mountain bikers' post-trip behavior and how their cultural and personal beliefs affect how they evaluate their experiences.

Finally, the study employs CAT to determine the feelings mountain bikers are likely to experience when they hear positive things about a location. This finding could influence future research because it shows that knowing the cognitive appraisal process that connects emotions to stimulus evaluation (i.e., mountain biking) and behavioral outcomes (i. e., post-trip recommendation) may help us better understand how emotions influence post-trip behavior. Second, our research findings are consistent with studies (e.g., Ma et al., 2017; Hossany, 2012) that claim CAT is a beneficial conceptual framework for comprehending recreationists' post-visit behavior (e.g., revisiting or word-of-mouth recommendation). Future studies should evaluate the applicability of CAT in explaining post-visit behavior in various recreation and tourism contexts.

### 6.5. Study implications for management

The study underscores the crucial need to tailor mountain biking trails to align with bikers' recreational aspirations and abilities, emphasizing the importance of offering diverse experiences suited to different skill levels. Instead of the typical strategy to grow biking destinations by expanding trail networks, managers should prioritize aligning trail experiences with bikers' expectations and desires to boost competitiveness. Strategic investments in trail infrastructure and services, coupled with feedback systems to gauge changing needs and satisfaction levels, are critical. Collaborating with local biking groups can enhance understanding and adaptability to evolving preferences. Continuous efforts to personalize trail experiences based on bikers' preferences are essential for garnering positive feedback, ensuring enduring enjoyment, and sustaining the appeal and growth of mountain biking destinations.

### 6.6. Study limitations

There are a few caveats to consider when interpreting our findings. The generalizability of our findings may be limited by selecting a convenient and non-probability sample (e.g., Babbie, 2016). Using online forums and social media to recruit participants may have led to a skewed sample of highly educated, affluent individuals with certain expectations and preferences for recreational activities (Xiang et al., 2017). This could have affected how the individuals felt when mountain biking. Second, our sample consisted primarily of white men, which may have limited the applicability of the findings to other demographic groups, such as people of color, women, and low-income workers. Due to cultural, sociological, and economic factors, these underrepresented groups may have different mountain biking objectives, experiences, and emotions than those described in our findings. Third, we only evaluated our proposed CAT model in the context of mountain biking at a single location. Therefore, the model's applicability to other activities and locations needs to be clarified and validated. Future research could test the CAT model in various geographic contexts and recreation and tourism settings to make it more helpful and generalizable. Last but not least, our study did not explore how recreation site conditions and other environmental factors may influence individuals' emotions and recreation experiences. Future studies could focus on these constraints to increase the generalizability and applicability of the findings.

## 7. Conclusions

In the global outdoor recreation landscape, mountain biking stands out as a dynamic activity propelling economic opportunities for communities by creating numerous trails. As the popularity of mountain biking destinations continues to grow, our study takes a significant stride forward in scholarly understanding by delving into the intricate determinants of post-trip behavioral intent among recreational cyclists. Unraveling key factors influencing mountain bikers' trail referrals, our work underscores the importance of primary appraisal components, particularly the alignment of recreation goals and interests, in shaping post-trip intentions. The recognition of satisfaction feelings as significant secondary appraisal elements adds depth to our comprehension of the multifaceted nature of the post-trip experience. Integrating Cognitive Appraisal Theory (CAT) elevates the scholarly contribution, advocating for its application in conceptualizing the antecedents of post-trip recommendation intentions among mountain bikers and other outdoor recreation users. Our progressive step forward contributes practical insights for mountain biking destinations and enriches the theoretical underpinning of post-recreation behavior in outdoor settings.

Our study's forward-looking contribution translates into practical implications that emphasize the paramount importance of tailoring mountain biking trails to meet bikers' diverse needs and preferences, ensuring the sustained growth of mountain biking recreation. The nuanced approach we advocate involves offering a variety of trails aligned with different skill levels and crafting a biker-centric environment that addresses specific needs and preferences. High-quality amenities, trail safety, and overall enjoyment for bikers at all skill levels become integral focal points for destination managers. Our proactive approach encourages collaboration with local trail organizations and groups promoting inclusivity, marking a significant stride towards broadening the potential visitor base and fostering a more inclusive outdoor recreation landscape. In this way, our study contributes to academic knowledge and provides actionable insights for destination managers to enhance the visitor experience and ensure the continued success of mountain biking destinations worldwide.

**CRediT authorship contribution statement**

**Ian E. Munanura:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Jeffrey D. Kline:** Writing – review & editing, Conceptualization. **Javier A. Parada Torres:** Supervision, Project administration, Methodology, Investigation, Data curation. **Randall Rosenberger:** Writing – review & editing, Visualization, Funding acquisition, Conceptualization. **Miles Phillips:** Writing – review & editing, Project administration, Investigation, Funding acquisition, Data curation, Conceptualization. **Julie Miller:** Validation, Resources, Funding acquisition, Data curation, Conceptualization.

**Declaration of competing interest**

None.

**Data availability**

Data will be made available on request.

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